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***INDICIUM EX MACHINA: UNSTRUCTURED SENTENCING AND DISPARATE OUTCOMES IN
CANADA***

by

Damilola Awotula

Submitted in partial fulfilment of the requirements
for the degree of Master of Laws

at

Dalhousie University
Halifax, Nova Scotia
August 2023

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Dedication

To God for taking me this far!

To all persons and organizations that have supported my academic journey!

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Abstract

Recent advancements in artificial intelligence have caused a wave of technological normality. As expected, the criminal justice system, and more increasingly, criminal sentencing is seeing a trend of “technosolutionism” due to real concerns about unjustified disparity. Truly, artificial intelligence has the prospect of making the sentencing process more effective, value-driven, consistent, and predictable. However, relying on the assumption that using such a system may require being confined to the normative sentencing traditions of each country, this thesis argues that there are crucial questions to be addressed about how this technological normality fits within the traditional and normative pillars of extant legal principles, especially in an anomalous sentencing jurisdiction like Canada. It argues further that discussions about the amenability of technological intervention (automated judicial system) to sentencing reform in Canada require a contextual assessment of extant legal frameworks and practices. It argues that while there is sufficient incentive to integrate AI, the lack of a meaningful sentencing structure significantly undermines the prospect of AI mitigating disparity. To effectively harness the potential of an automated system, the current sentencing approach must substantially shift direction towards a well-structured sentencing practice. In essence, the existing Canadian framework is not ready-made for automation.

List of Abbreviations Used

AI – Artificial Intelligence

AiCOS – Artificial Intelligence in Court Sentencing

ANN – Artificial Neural Network

COMPAS – Correctional Offender Management Profile for Alternative Sanctions

DNN – Deep Neural Network

GenAI – Generative Artificial Intelligence

GPT – Generative Pre-trained Transformer

LLMs – Large Language Models

ML - Machine Learning

NLP – Natural Language Processing

SIS – Sentencing Information System

SCC – Supreme Court of Canada

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Chapter 1: Introduction

1.1 Artificial Intelligence in Criminal Justice

Like scholars in other countries, a growing number of Canadian academics and practitioners are beginning to interrogate the use of artificial intelligence (AI) predictive technologies as a panacea to current criminal justice challenges.¹ For instance, through spatio-temporal predictive algorithms which can identify potential hotspots, the police can achieve preventive policing (*ex-ante*) rather than reactive policing (*ex post facto*).² Other use of AI in criminal justice includes photographic and video analysis, such as facial recognition,³ DNA profiling and evidence, like predictive genomics,⁴ predictive crime mapping for predictive crime hot spots,⁵ mobile phone and extraction tools, data mining and social media intelligence.⁶

Many countries are at the forefront of using these technologies. For example, the United States (US) and China are already deploying AI in policing, sentencing and corrections.⁷ Although there is no record of the use of automated systems such as fourth generation risk assessment tools or automated judicial systems in Canada, there are some suggestions that their adoption may be

¹ Michael Purcell and Mathew Zaia, "Prediction, Prevention and Proof: Artificial Intelligence and Peace Bonds in Canada" (2020) 98 *The Canadian Bar Review* 523; Daniel Konifkoff and Akwasi Owusu-Bempah, "Big Data and Criminal Justice-What Canadians Should Know" (2019) *Institiut Broadent Institute* 3; Kaitlynd Hiller, "Predictive Policing and the Charter" (2021) 44:6 *Manitoba Law Journal* 244; Dennis D Draeger, "Justice Trends 2: Automated Justice, Get the Gist of the Future of Technology Justice" (2018) *Department of Justice* 1-22.

² Monika Simmler et al, "Smart Criminal Justice: Exploring the Use of Algorithms in the Swiss Criminal Justice System" (2022) (article in press) *Artificial Intelligence and Law* 2.

³ Sonal Mishra, "How AI Is Revolutionizing Image And Video Analysis" (last visited 7 May 2023) Online: MCnpreneur <<https://moonpreneur.com/blog/ai-revolutionizing-image-and-video-analysis/>>

⁴ Christopher Rigano, "Using Artificial Intelligence to Address Criminal Justice Needs" (2019) 280 *NIJ Journal* 1-10

⁵ Kate Robertson, Cynthia Khoo and Yolanda Song, "To Surveil and Predict: A Human Rights Analysis of Algorithmic Policing in Canada: The Current Landscape" (The Citizenlab 2019) Online: <https://citizenlab.ca/wp-content/uploads/2021/01/AIPolicing_factualfindings_v6.pdf>

⁶ Chris Bousquet, "Mining Social Media Data for Policing, the Ethical Way" (last visited 7 May 2023) Online: Government Technology <<https://www.govtech.com/public-safety/mining-social-media-data-for-policing-the-ethical-way.html>>

⁷ Law Commission of Ontario, *The Rise and Fall of AI and Algorithms in America Criminal Justice: Lessons for Canada* (Toronto: October 2020) 1.

foreseeable.⁸ However, there are indications that AI technologies—predictive policing tools, facial recognition systems, and risk assessment tools—are already being used by some police forces in Canada and the Correctional Canadian Service.⁹

In respect of criminal adjudication, which is the thrust of this thesis, predictive risk assessment tools and particularly, automated judicial decision systems such as COMPAS and AiCOS are being discussed generally as the future trend of judicial decision making.¹⁰ Arguably, the use of predictive technologies in the courts, particularly automated judicial systems, may help mitigate judicial disparity, and promote parity and consistent sentencing.¹¹

Indeed, the idea of “techno-sentencing” is not new. As early as 1972, Judge Frankel, who is considered one of the ideological pioneers of Federal Sentencing Guidelines in the US mentioned, “It is not necessary, or desirable, to imagine that sentencing can be completely computerized. At the same time, the possibility of using computers as an aid toward orderly thought in sentencing need not be discounted in advance.”¹² Also, a four-year project in the early 1980s by Richard De Mulder entitled, “Sentencing by Computer: An Experiment” at Erasmus University, Rotterdam, concluded that it is possible for a computer to help a judge determine an appropriate sentence.¹³

⁸ Patrick Lejtenyi, “It is Still Too Early To Use Artificial Intelligence for Criminal Justice, Say Concordia PhD Student” (last visited 27 December 2022) Online: Concordia < <https://www.concordia.ca/news/stories/2022/11/22/it-is-still-too-early-to-use-artificial-intelligence-for-criminal-justice-says-concordia-phd-student.html> > Perma.cc [<https://perma.cc/G45T-RVHR>].

⁹ Lisa Silver and Gideon Christian, “Harnessing the Power of AI Technology: A Commentary on the Law Commission of Ontario Report on AI and the Criminal Justice System” (last visited 18 December 2022) Online: Ablawg < <https://ablawg.ca/2020/11/18/harnessing-the-power-of-ai-technology-a-commentary-on-the-law-commission-of-ontario-report-on-ai-and-the-criminal-justice-system/> > Perma.cc: [<https://perma.cc/B9PG-PBL4>]; Neha Chugh, “Risk Assessment Tools on Trial: AI Systems Go?” (2022) *Technological Stewardship and Responsible Innovation* 50.

¹⁰ Stephen Castell, “The Future of Decisions of RoboJudge HHJ Arthur Ian Blockchain: Dread, Delights or Derision?” (2018) 34 *Computer Law and Security Review* 739; Joshua P Davis, ‘Of Robolawyers and Robojudges’ (2022) 73:5 *Hastings Law Journal* 1173; Jesper Ryberg, “Sentencing and Algorithmic Decision-making-when would it be Justified to Replace a Human judge with a robojudge?” in José J. Castro Toledo ed *La transformación algorítmica del sistema de justicia penal* (USA: Thomson Reuter 2022) 147.

¹¹ Daniel Konifkoff and Akwasi Owusu-Bempah, “Big Data and Criminal Justice-What Canadians Should Know” (2019) *Institut Broadent Institute* 5.

¹² Frankel, ME *Criminal Sentences: Law Without Order*, (New York: Hill and Wang 1972).

¹³ RV De Mulder, *Sentencing by Computer: An Experiment* (Norway: Universitetforlaget, 1982) cited in Brian Grainger, “Hard Times and Automation: Should Computers Assist Judges in Sentencing Decisions” (1984) 26:2 *Canadian Journal Criminology* 231; Here, the systems was designed to curate sentence after the facts and details of the case has been entered into the

1.2 Research Justification

Disparate sentencing outcomes are problematic in many jurisdictions which have instigated the adoption of various techniques mainly the use of sentencing guidelines, sentencing range, or starting point and computerized sentencing information systems.¹⁴ While academics have underscored the advantage of judicial discretion, they have also highlighted the problems that come with leaving judges to wholly decide the fate of a person. Interestingly, empirical studies have shown the vulnerabilities of an unstructured sentencing system due to its propensity to permit all sorts of extra-legal factors. An example is the popular “hungry judge” study which revealed considerable variation in sentences depending on whether the judge is hungry and what time of the day.¹⁵ Another striking study is the “Louisiana judge” reports which showed that an offender may receive severe punishment should they have the misfortune to appear before a judge after that judge’s favourite team loses their game.¹⁶

As will be seen in Chapter three of this thesis, Canada is no exception when it comes to the issue of disparate sentencing, mainly as a consequence to its over-reliance on a highly individualized sentencing approach, and the lack of a meaningful guardrail on judicial discretion.¹⁷ The current

systems. After including the facts, the program prompts the judge with questions on a video display terminal and the computer takes the answers to the questions and gives a reasoned account to the judge as to which sanction or punishment could be imposed.

¹⁴ Other techniques include legislative use of mandatory punishment or mandatory maximum or minimums.

¹⁵ Carmelo M Vicario et al, “The Effect of Hunger and Satiety in the Judgment of Ethical Violations” (2018) 125 *Brain and Cognition* 32–36; Danziger, S., Levav, J., & Avnaim-Pesso, L. “Extraneous Factors in Judicial Decisions” *Proceedings of the National Academy of Sciences*, 108, 6889–6892.

¹⁶ Ozkan Eren and Naci Mocan, “Emotional Judges and Unlucky Juveniles” (2018) 10:3 *American Economic Journal: Applied Economics* 173; Emily DeRuy, “Judge’s Football Team Loses, Juvenile Sentences Go Up: No, Seriously” (Last visited 5 June 2023) Online: *The Atlantic* < <https://www.theatlantic.com/education/archive/2016/09/judges-issue-longer-sentences-when-their-college-football-team-loses/498980/>>

¹⁷ According to the Canadian apex court in *R v Bissonnette*, 2022 SCC 23, “There is no *mathematical formula* for determining what constitutes a just and appropriate sentence. That is why this Court has described sentencing as a “delicate art” which attempts to balance carefully the societal goals of sentencing against the moral blameworthiness of the offender and the circumstances of the offence, while at all times taking into account the needs and current conditions of and in the community”; See *R v M (C.A.)*, [1996] 1 SCR 500 at para. 9, Lamer CJC; Canadian sentencing process may best be described as a ‘black art’ devoid of any computational clarity and unduly discretionary. See also Vincent Chiao, “Predicting Proportionality: The case for Algorithmic Sentencing” (2018) 37:3 *Criminal Justice Ethics* 238.

landscape of unstructured sentencing laws and practices makes it desirable for considering how artificial intelligence may address this issue.

1.3 Research Question

The central question of this thesis is whether Artificial intelligence (automated judicial systems) can be used to address sentencing disparity in Canada. Stemming from this central inquiry, four sub-questions will guide the research: first, what is AI in the criminal judicial decision process? Second, to what extent is AI already used in the Canadian criminal judicial process? (3) What criminal justice values dominate Canadian criminal justice? and (4) How may the use of AI fit within these values if it can at all?

In response to the central question, the thesis concludes that while automation has the prospect of addressing unwarranted disparity, Canada's undue and anomalous commitment to an unstructured notion of proportionality and hyper individualization will make it difficult to operationalize an automated sentencing system.

1.4 Research Contribution and Significance

Due to the rise of advanced technologies, the turn to techno-solutionism has become dominant in many sectors, including criminal sentencing predominantly as a panacea for disparate sentencing.¹⁸ This is due in part to the inadequacies of other evidenced-based sentencing techniques like statutory sentencing guidelines in countries such as the US and the United Kingdom (UK).¹⁹

¹⁸ See chapter 2 for the discussion of AI use in criminal sentencing.

¹⁹ For a comparative analysis of reforms programs introduced by England and Wales compared with Canada, see Julian V Roberts, "Structuring Sentencing in Canada, England, and Wales: A Tale of Two Jurisdictions" (2012) 23 Criminal Law Forum 320.

Hence, some countries now routinely use AI,²⁰ specifically computational and statistical techniques for sentencing.²¹ Some criminal justice scholars see AI in the sentencing process as inevitable—what they describe as “Algorithmic Justice”²² or “Smart Criminal Justice.”²³ But, techno-solutionism and techno-rationality in criminal sentencing have led to many arguments from both critics and supporters. Supporters of consistent sentencing approach had argued that algorithmizing the sentencing process by using sentencing guidelines and sentencing information systems (SIS) can help to achieve some level of parity. Now, AI has been touted as having greater capacity to make sentencing more efficient, objective, effective, predictable, and consistent.²⁴

In the context of criminal judicial decision making, the “objective” character of AI may arguably eliminate indiscriminate discretion and sentencing disparity which many agree remains a fundamental problem in the Canadian justice system.²⁵ For instance, speaking on sentencing for sexual offences, per Fraser, C.J., Paperny and Watson, J.J.A stated in *R v Hajar*, “sentencing for cases in this category (sexual interference)... has been all over the place.”²⁶ Thus, if AI technology is properly adopted, as many argue, it may promote penal egalitarianism and distributive justice.²⁷

²⁰ Artificial intelligence is used in the general sense to mean all forms of algorithmic techniques including machine learning algorithms.

²¹ William S Isaac, “Hope, Hype and Fear: The Promise and Potential Pitfalls of Artificial Intelligence in Criminal Justice” (2018) 15:2 Ohio State Journal of Criminal Law 543.

²² Ales Završnik, “Algorithmic Justice: Algorithmic and Big Data in Criminal Justice Setting” (2018) 18(5) European Journal of Criminology 632.

²³ Monika Simmler et al, “Smart Criminal Justice: Phenomena and Normative Requirements” (2021) 0(0) International Review of Administrative Sciences 1.

²⁴ Jaes A Anderson, Jeffrey K Kling and Kate Stith, “Measuring Interjudge Sentencing Disparity: Before and after Sentencing Guidelines” (1999) 42:1 Journal of Law and Economics 271; Jose Pina-Sanchez et al, “Exploring the Origin of Sentencing Disparities in the Crown Court: Using Text Mining Techniques to Differentiate Between Courts and Judge Disparities” (2019) 84 Social Sciences Research 2.

²⁵ Benjamin L Berger, “Judicial Discretion and the Rise of Individualization: The Canadian Sentencing Approach” in Kai Ambos (ed) *Sentencing: Anglo-America and German Insights* (Germany: Gottingen University Press, 2020) 250; Michael Weinrath, ‘Sentencing Disparity: Aboriginal Canadians, Drunk Driving and Age’ (2007) 8:2 Western Criminology Review 16.

²⁶ 2016 ABCA 222, 72; See also *R v Al Aazawi*, 2022 ABCA 361 para 105, here the court noted that “The absence of this trait (treating like cases the same way) in a sentencing system undermines public confidence in the”; See also; *R v Arcand*, 2010 ABCA 363, 24 where per Fraser, C.J. & Côté & Watson, J.J.A stated that “public confidence in the fairness of sentencing in Canada has been undermined by widespread concerns about arbitrariness and disparity in sentencing’.

²⁷ This is without prejudice to the argument that despite AI's promise of objectivity, speed, and efficiency, concerns about bias, privacy, and transparency trump the list of objections for its use. See Michael Veale, Max Van Kleek and Reuben Binns, “Fairness and Accountability Design Needs for Algorithmic Support in High-Stake Public-Sector Decision Making” (2018) Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems 440.

But most analysis on the adoption of AI offers generalized assumptions about its introduction without putting it in proper context. In other words, most discussions often focus on a broad analysis of AI in criminal justice without a nuanced interrogation of the specificity of sentencing itself and its amenability to specific sentencing traditions. On the other hand, the analysis conducted in this thesis is contextual in nature. It focuses specifically on the Canadian sentencing landscape, which makes the analysis a unique one. As previously stated, disparity in sentencing is generally agreed to be a current challenge in Canada. However, the current legal and judicial commitment to disparate sentencing will prove difficult for an algorithmic intervention. By doing a contextual analysis, this thesis contributes to the scarce but burgeoning body of literature that analyzes evidence-based sentencing reform in Canada using AI technologies. It raises critical issues that law makers, regulators, programmers, among others must carefully consider if AI technologies are adopted in order to address disparate outcomes in Canada.

1.5 Research Methodology

Robert Cryer describes methodology as the strategy adopted by research in order to answer the research questions—"what you actually do to enhance your knowledge and test the thesis."²⁸ It also means the principles and procedures of logical thought process that guide the actualization of the research goals.²⁹ In this regard, the thesis adopts doctrinal and theoretical methods to investigate the question of whether an automated sentencing system is amenable to Canadian sentencing laws and practice.

²⁸ Robert Cryer et, *Research Methodologies in EU and International Law* (Oxford, UK: Hart Publishing Ltd, 2011) 5; W J Kamba, "Comparative Law: A Theoretical Framework" (1974) 23:3 *The International Law and Comparative Law Quarterly* 486.

²⁹ Monty Sutrisna, *Research Methodology in Doctoral Research: Understanding the Meaning of Conducting Qualitative Research* in Ross A, ed, *Proceedings of the Association of Researchers in Construction Management (ARCOM) Doctoral Workshop UK* 51.

1.5.1 Doctrinal Research

Doctrinal research is a systematic exposition of legal rules that relates to a legal issue.³⁰ By adopting the doctrinal method, the researcher can analyze the nexus between legal rules, review and explain the potential areas of difficulty and perhaps argue for potential development in legal rules and practices.³¹ Doctrinal research is also often referred to as the "black-letter" method because it is founded on analyzing authoritative legal texts, which may be either primary or secondary sources.³² The crux of doctrinal research is the location and analysis of the said sources of law to establish the nature and parameters of the law.³³

This thesis substantially adopts the doctrinal method to address its central question of whether an automated sentencing system is amenable to extant Canadian sentencing laws and practices. The method will be used in chapters two, three, four, and five to investigate current advances in automated sentencing systems, sentencing law and practices in Canada. It will also be used to consider how automated sentencing systems are currently imagined, and the amenability of these systems to the Canadian context respectively.

Particularly in Chapter 3, the thesis uses the doctrinal method to examine the issue of disparate sentencing in Canada. The analysis includes a survey of past proposed and implemented sentencing reforms such as recommendations for sentencing guidelines and computer sentencing information systems in order to mitigate disparate sentencing. Further analysis includes the unique sentencing tradition of individualization in Canada. This involves an analysis of jurisprudence on sentencing laws in Canada, including an examination of the jurisprudence of section 718 of the *Canadian Criminal*

³⁰ Terry Hutchinson & Nigel Duncan. "Defining and Describing What We Do: Doctrinal Legal Research" (2012) 17:1 Deakin Law Review 83-119 at 101.

³¹ Ibid

³² MLA 8th Edition (Modern Language Assoc.) McConville, Michael, and Wing Hong Chui. *Research Methods for Law*. Vol. Second edition, EUP, 2017 4.

³³ Terry Hutchinson, *Researching and Writing in Law*, (Australia: Thomson Reuters 4th edn, 2018) 51.

Code. In Chapter 4, I employ the doctrinal method to examine proposals that examine how automated systems may be used for structuring sentencing. In Chapter five, a contextual analysis of fundamental sentencing values such as individualization, proportionality, and transparency are considered in the light of automated sentencing systems.

1.5.2 Theoretical Approach

Legal theory reflects on the underlying values in law and makes certain assumptions about the nature of knowledge, language, law or society.³⁴ In other words, legal theory seeks to explicitly detail the underlying assumptions about law in order to provide a hypothesis that we may use to evaluate past, present, or future events, and if necessary, recast the hypotheses.³⁵ Specifically, this thesis draws insights from due process and crime control perspectives. These normative theories provide the broadest lens through which the functionality of criminal justice is often examined. Perhaps, it may be described as “catch-all.” Hence, the thesis adopts the Herbert Packer Crime control and due process theory.³⁶

i. Crime Control

According to this theory, the criminal justice process operates under certain patterns and underlying theoretical antinomies. By examining these assumptions and patterns, one can discern the kind of criminal justice that would be produced in reality.³⁷ The crime control theory of criminal justice describes belief in the idea that the suppression of crimes, of any sort, must be the fundamental objective of the criminal justice process and therefore promotes sentencing objectives like

³⁴ Supra note 30 at 68; H.W Arthurs (Harry William), *Law and Learning: Report to the Social Sciences and Humanities Research Council of Canada by the Consultative Group in Research and Education in Law* (Ottawa: Social Sciences and Humanities Research Council of Canada, 1983) 68.

³⁵ Ibid 69, 70.

³⁶ Examples of other models are the victim’s rights and restorative justice approach.

³⁷ Herbert L Packer, *The Limits of Criminal Sanction* (USA: Stanford University Press, 1968) 152. Parkers Crime Control and Due Process theory has been largely criticized for failing to accommodate the position of the victims and restorative justice approaches. See James Stribopoulos, “Packer’s blind Spot: Low Visibility Encounters and the Limits of the Due Process and Crime Control” in Francios Tanguay-Renaud and James Stribopoulos (eds) *Rethinking Criminal Law Theory: New Canadian Perspectives in the Philosophy of Domestic, Transnational and International Criminal Law* (Oxford: Hart Publishing, 2010) 194.

retribution.³⁸ According to Packer, this assumption is shaped by the understanding that the criminal process is a guarantor of social freedom and law and order.³⁹ When this objective is not achieved, the system is deemed to have failed. Garland explained that this culture focuses on prevention, risk assessment, and management, harm reduction, etc.⁴⁰

The Crime control model is also reflected in the sentencing practice of countries, and they are rooted in the underlining sentencing rationales. Certain objectives of the sentencing process, especially when there is an overreliance on retribution and deterrence can evidence this sort of leaning. These objectives have a key goal in mind—the suppression and prevention of criminal conduct for preserving law and order. According to Andrew Ashworth, it is the case, although arguably, that sentencing serves an indispensable public utility for ensuring that society is held together.⁴¹ John Hogarth notes, “even if it could be agreed that the main purpose in sentencing was to prevent crime through reformation and deterrence, the ability of the court to achieve the goals through sentencing is limited...”.

ii. Due Process Theory

The due process theory encompasses a wide range of criminal justice principles and practices. It is defendant oriented, and it seeks to protect the defendant from the illimitable power of the State by placing an obstacle course in the way of the criminal justice process. While crime control theory operates on efficiency, the due process theory is driven by the reliability of process.⁴² According to Packer, “The combination of stigma and loss of liberty that is embodied in the result of the criminal process is viewed as being the heaviest deprivation that government can inflict on the individual”.⁴³

³⁸ Ibid

³⁹ Ibid

⁴⁰ David Garland, *Culture of Control: Crime and Social Order in Contemporary Society* (USA: The University of Chicago Press 2001) 174.

⁴¹ Andrew Ashworth, *Sentencing and Criminal Justice* (United Kingdom: Cambridge University Press, 2010) 72.

⁴² Supra note 37 at 165.

⁴³ Ibid

As such, there is a need to ensure that the criminal justice process operates in such a way as to guarantee equity, procedural fairness, transparency, accountability, equality of arms, constitutionality, etc. Without guaranteeing these principles, the defendant is at the peril of the State.

One key ingredient of the due process theory is equality—equal treatment before the law—and fairness. Arguments in favour of sentencing parity, which is the core of the thesis, rests on one of these ideals. The theory, however, does not account for the varying conceptions and applications of equality. Canada has a long-standing commitment to the ideal of substantive equality as against formal equality. In *Fraser*, the Supreme Court of Canada (SCC) noted,

“Substantive equality requires attention to the full context of the claimant group’s situation, to the actual impact of the law on that situation, and to the persistent systemic disadvantages that have operated to limit the opportunities available to that group’s members. *At the heart of substantive equality is the recognition that identical or facially neutral treatment may frequently produce serious inequality.*”⁴⁴

This line of reasoning serves as one of the core grounds for individualized sentencing which perpetuates disparate sentencing. Nevertheless, due process in the context of sentencing disparity is not the elimination of disparity but the unwarranted disparity.

1.6 The Structure of the Thesis

This thesis is divided into five chapters. After the introduction, chapter 2 discusses AI, including how it functions. The chapter also examines the applicable subfields of AI that are related to criminal sentencing. Specifically, these subfields include machine learning, deep learning, generative artificial intelligence, and large language models. It concludes by highlighting current use cases of AI technology drawing examples from the use of fourth generation actuarial risk assessment tools and automated judicial criminal sentencing systems in countries like the US, Malaysia, and China.

⁴⁴ *Fraser v Canada (Attorney General)*, 2020 SCC 28. [Emphasis added]. See also Judy Fudge, “Substantive Equality, the Supreme Court of Canada, and the Limits to Redistribution” (2007) 23:2 South African Journal on Human Rights 235.

Chapter 3 contains an analysis of extant Canadian sentencing praxis and underscores how it is typified by a unique and incomparable pattern of discretionary judicial sentencing tradition. In addition, it highlights qualitative findings that validate the discretionary nature of sentence disparity in Canada. Furthermore, it highlights past reform proposals aimed at addressing disparate outcomes. This was broken down into two eras; pre-1996 and post-1996 reform methodologies. It finds that there was generally no significant reform during these two periods, except for the legislative validation of the discretionary sentencing tradition. The chapter closes with a review of past Sentencing Information Systems in Canada and why they fell out of operation.

Chapter 4 looks at how automated sentencing systems offer better promise for establishing evidenced based sentencing. The analysis begins with the burgeoning contention on how machine learning can either replace or supplement sentencing decisions. The analysis includes a critical review of human functional capability comparative to a fully automated system. This includes questions of legal complexity, emotion, compassion, intuition, and common sense. Additionally, the chapter examines what scholars have proposed in order to deal with machine learning algorithms used to supplement sentencing decisions, and the limitations of these proposals.

Chapter five, which is the last chapter, interrogates the adaptability of automated sentencing to sentencing laws and practices in Canada. It addresses several fundamental issues such as legality, transparency, proportionality, data issues, and individualization. The chapter concludes that the current commitments to disparate sentencing in Canada stands in the way of an algorithmic intervention.

1.7 Research Scope and Limitations

The analysis in this thesis focusses on judicially influenced sentencing disparity and how that impacts due process fundamentals. It recognizes the potential advantage of automated systems in

addressing this issue. However, it does not consider other sources of disparate decisions that affect the overall sentencing. In other words, the thesis didn't consider how prosecutorial discretion impacts disparate sentencing outcomes and whether algorithmic sentencing help to address the many root causes of disparity.

Moreover, the discussions on how automated sentencing systems may be used in criminal sentencing are still mostly speculative. There is no clear direction yet on whether such systems are effective. Further, the thesis did not conduct empirical research on how automated systems may address disparate outcomes, nor was any reference made to how the system has mitigated sentencing disparity in countries that currently use similar systems. Finally, the richness of the analysis carried out is also impacted by the very scant literature that specifically discusses automated sentencing systems generally, and specifically in the Canadian context.

Chapter 2: Judicial Modernization: Artificial Intelligence in Criminal Sentencing

2.1 Introduction

In 1965, Nobel laureate Herbert Simon suggested, "Machines will be capable, within 20 years of doing any work a man can do."⁴⁵ Although the prediction did not become a reality in terms of the projected timing, the current capabilities of AI technologies are pointing to such a future.⁴⁶ AI technologies currently encompass a huge variety of subfields, ranging from the general (learning and perception) to the specific, such as playing chess,⁴⁷ proving mathematical theorems, writing poetry,⁴⁸ driving a car on a crowded street,⁴⁹ disease diagnosis and prediction,⁵⁰ and criminal justice. Indeed, "AI is relevant to any intellectual task; it is truly a universal field."⁵¹

Furthermore, the judicial system is being disrupted by technological modernization like never before, suggesting that judges may be at risk of being professionally endangered. While a fully automated judicial system seems futuristic, and perhaps even impossible or undesirable, using advanced analytics to augment judicial processes is generally welcomed by criminal justice gatekeepers and governments, and it appears to be proliferating.⁵² Online courts⁵³ backed by AI capabilities are

⁴⁵ Moshe Y. Vardi, "Artificial Intelligence: Past and Future" (2012) 55:1 Communications of the ACM 1.

⁴⁶ See Patrick J Kiger, "How Artificial Intelligence is Totally Changing Everything" (Last visited 27 July 2023) Online: Howstuffworks <<https://science.howstuffworks.com/artificial-intelligence.htm>>; Isobel Asher Hamilton, "Elon Musk believes AI could turn humans into an endangered species like the mountain Gorilla" (Last visited 3 May 2023) Online: Insider <<https://www.businessinsider.com/elon-musk-ai-could-turn-humans-into-endangered-species-2018-11>>

⁴⁷ See AlphaZero ChessGame developed by DeepMind with unthinkable level of playing chess. Maxim Khovanskiy, AlphaZero "Chess: How It Works, What Sets It Apart, and What It Can Tell Us" (Last visited 1 May 2023) Online: Towards Data Science <<https://towardsdatascience.com/alphazero-chess-how-it-works-what-sets-it-apart-and-what-it-can-tell-us-4ab3d2d08867>>

⁴⁸ Seth Perlow, "AI is Better at Writing Poems Than you'd Expect. But That's Fine" (Last Visited 1 May 2023) Online: The Washington Post <<https://www.washingtonpost.com/books/2023/02/13/ai-in-poetry/>>

⁴⁹ Ben Lutkevich, "Self-driving Car (autonomous Car or Driverless Car)" (Last visited 1 May 2023) Online: TechTarget <<https://www.techtarget.com/searchenterpriseai/definition/driverless-car>>

⁵⁰ Nafiseh Ghaffar Nia, Erkan Kaplanoglu, and Ahad Nasab, "Evaluation of Artificial Intelligence Techniques in Disease Diagnosis and Prediction" (2023) 3:5 Discover Artificial Intelligence 1.

⁵¹ Stuart J Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* 3rd edn (USA: Pearson 2010) 2.

⁵² News surfaced in 2019 that Estonia, an European country was developing a robojudge for small claims litigation, but no mention of its use in the criminal justice system; Joshua Park, "Your Honor, AI" (Last visited 15 May 2023) Online: Harvard International Review <<https://hir.harvard.edu/your-honor-ai/>>; In Canada, the province of Quebec was recorded to have budgeted 500 million CAD to technologically transform the justice system. See The Quebec Economic Plan, "A Plan to Modernize the Justice System: Budget 2018-2019" (Government du Quebec, March 27, 2018) 1-33.

⁵³ Online courts proliferated during COVID-19 opening opportunity for virtual and technology facilitated justice. See Ben Edwards, "The Transformative Power of Virtual Courts" (Last visited 21 July 2023) Online: Reconteur

already being envisioned, piloted, or used by countries like Estonia, China, UK and Canada. For example, the UK completed a pilot project in 2018, which allowed litigants to file divorce claims online. More than 1000 petitions were reportedly filed with 91% expressing satisfaction with the process.⁵⁴ Similarly, in 2017, the UK Ministry of Justice proposed the introduction of an Automatic Online Conviction and Statutory Standard Penalty Procedure. The system was to provide sanctions to those who pled guilty to railway fare evasion, tram fare evasion or were in possession of an unlicensed rod and line.⁵⁵

Furthermore, AI-powered chatbots such as DoNotPay,⁵⁶ popularly described as the “world’s first robot lawyer”⁵⁷ have demonstrated the “routine” nature of legal knowledge, implying that these technologies can benefit the justice system. For instance, between 2016 and 2017, DoNotPay successfully contested more than 375,000 parking tickets (valued at £7.2 million), across London and New York.⁵⁸ While this type of legal tech is small in scale, it does have potential larger scale implications. A trained AI chatbot that fights parking tickets is arguably low stakes, as opposed to an AI technology that may determine whether a person will go to jail or not.

<<https://www.raconteur.net/legal/virtual-court-hearings>>; Robyn Schleihauf, “While Courts Still Use Fax Machines, Law Firms are Using AI to Tailor Arguments for Judges” (last visited 21 July 2023) Online: CBC <<https://www.cbc.ca/news/opinion/opinion-artificial-intelligence-courts-legal-analytics-1.6762257>>

⁵⁴ Neil Rose, “Government Rolls Out Online Divorce after Successful Pilot” (Last visited 1 May 2023) Online: Legalfutures <<https://www.legalfutures.co.uk/latest-news/government-rolls-out-online-divorce-after-successful-pilot>>.

⁵⁵ United Kingdom Ministry of Justice, “Transforming Our Justice System: Assisted Digital Strategy, Automatic Online Conviction and Statutory Standard Penalty, and Panel Composition in Tribunals” (Government Response Cm 9391, February 2017) Online: <<https://consult.justice.gov.uk/digital-communications/transforming-our-justice-system-assisted-digital/>> ; Detractors vehemently opposed the program and enabling legislation and the development of the online court stalled: See John Hyde, “Prison and Courts Bill Scrapped”, The Law Society Gazette” (Last visited 15 June 2020) Online: <<https://www.lawgazette.co.uk/news/breaking-prisons-and-courts-billscrapped/5060715.article>>. Some of the issues raised was how the AI model will be able to consider mitigating factors.

⁵⁶ See Shannon Liao, “‘World’s First Robot Lawyer’ Now Available in All 50 States” (Last visited 1 May 2023) Online: The Verge <<https://www.theverge.com/2017/7/12/15960080/chatbot-ai-legaldonotpay-us-uk>> ; There is also DoNotSign App that helps users to review license agreements.

⁵⁷ See Jon Porter, “This ‘Robot Lawyer’ can Take the Mystery Out of License Agreements” (Last visited 1 May 2023), Online: The Verge <<https://www.theverge.com/2019/11/20/20973830/robot-lawyer-donotpay-aistartup-license-agreements-sign-arbitration-clauses>>

⁵⁸ Sebastian Anthony, “Chatbot lawyer, which contested £7.2M in Parking Tickets, Now Offers Legal Help for 1,000+ Topics” (Last visited 1 May 2023) Online: ArsTechnica <<https://arstechnica.com/tech-policy/2017/07/donotpay-chatbot-lawyer-homelessness/>>

Although the current unstructured state of sentencing practice in most jurisdictions points to the need for reform, the predictive accuracy of AI systems in judicial decisions further strengthens the potential of these systems to assist or even replace criminal judicial decision-making. Examples of such legal prediction studies using Natural Language Processing (NLP)⁵⁹ have been carried out in several countries including Canada,⁶⁰ Germany,⁶¹ India,⁶² Thailand,⁶³ UK⁶⁴, and the US. For example, a deep machine learning text prediction algorithm developed by computer scientists from the University College London was able to predict 584 decisions from the European Court of Human Rights (ECHR) with 79% accuracy.⁶⁵ The study showed that the facts of a case, as presented by the ECHR, were the strongest indicator of the outcome of the case. The AI system was therefore deemed to be very useful as a decision aid for judges because it could recognize patterns in text documents which can guide what direction the judgement will go.⁶⁶ An earlier study in the US, which relied on a machine learning statistical model, examined US Supreme Court decisions from 1816 to 2015 and correctly predicted 70.2% of the court's 28,000 decisions and 71.9% of the justices' 240,000 votes. Earlier studies had indicated that knowledgeable legal experts are only able to predict judicial decisions with 66% accuracy.⁶⁷

⁵⁹ NLP means the ability of computers to understand written and spoken human language, much like the way human beings can. See IBM, What is Natural Language Processing (last visited 21 July 2023) Online: <<https://www.ibm.com/topics/natural-language-processing>>

⁶⁰ See Olivier Salaun et al, "Analysis and Multilabel Classification of Quebec Court Decisions in the Domain of Housing Law" in Elisabeth Metais et al eds *Natural Language Processing and Information Systems* (Switzerland: Springer 2020) 135-143.

⁶¹ See Bernhard Walzl et al, "Predicting the Outcome of Appeal Decisions in Germany's Tax Law" in Pater Parycek et al eds *Electronic Participation* (Switzerland: Springer 2017) 89-99.

⁶² Rafe Athar Shaikh et al, "Predicting Outcomes of Legal Cases Based on Legal Factors Using Classifiers" (2020) 167 *Procedia Computer Science* 2394-2402.

⁶³ Kankawin Kowsrihawat et al, "Predicting Judicial Decisions of Criminal Cases from Thai Supreme Court Using Bi-directional GRU with Attention Mechanism" 2018 5th Asian Conference on Defense Technology (ACDT), Hanoi, Vietnam, 2018 50-55.

⁶⁴ See Benjamin Strickson and Beatriz La Iglesia, "Legal Judgment Prediction for UK Courts in: Proceedings of the 2020" The 3rd International Conference on Information Science and System, 2020

⁶⁵ Dom Galeon, "A New Kind of Judge? AI Lawyer Correctly Predicts Outcomes of Human Rights Cases: Reading the letter of the law quite accurately" (last visited 1 May 2023) Online: *Futurism* <<https://futurism.com/a-new-kind-of-judge-ai-lawyer-correctly-predicts-outcomes-of-human-rights-cases>>

⁶⁶ A D (Dory) Reiling, "Courts and Artificial Intelligence" (2020) 11:2 *International Journal of Court Administration* 5.

⁶⁷ Matthew Hutson, "Artificial intelligence prevails at Predicting Supreme Court Decisions Algorithm Could Reveal Best Strategies for Plaintiffs" (Last visited 1 May 2023) Online: *Science* <<https://www.science.org/content/article/artificial-intelligence-prevails-predicting-supreme-court-decisions#>> See also Victoria Basham, "AI will Make Judicial Decisions with Avenue to Appeal to Humans, Predicts Top Judge" (Last visited 1 May 2023) Online: *Global Legal Post* <

Overall, what these indicate is the potential usefulness of AI systems in judicial decision making. To set the stage for discussions that follow through other parts of this thesis, this chapter investigates the question of what is artificial intelligence? And how is it currently used? The analysis of this chapter is split into three parts; Part 1 discusses the meaning of AI, how it works, including some theoretical assumptions with the definition. Part 2 examines the applicable subfields of AI that are related to criminal sentencing; that is, predictive algorithms: machine learning, deep learning, generative artificial intelligence and large language models, while Part 3 tracks current use of AI technology drawing examples from specific use cases such as fourth generation actuarial risk assessment tools and automated judicial criminal sentencing systems, from countries like the US, Malaysia, and China.

2.2 Explaining AI: How Does it Work?

AI is a form of technology and technology may be defined as the “application of scientific knowledge to the practical aims of human life.”⁶⁸ There have been various taxonomies of technologies. For instance, Susan Brenner grouped technology into tools technologies, machine technology and smart technologies.⁶⁹ Tool technologies such as drills are “more or less complex implements/processes an individual use[s] to carry out physical tasks such as planting crops... were merely extensions and extrapolations of the earlier...”⁷⁰ Machine technology differs from tool technology based on its degree of independence⁷¹ and also lies in their possibility to replace human effort.⁷² Smart technologies, however, are an “extrapolation of computer technology, one that moves “out of the box” and into the recesses of our environment”.⁷³ AI falls into the category of smart technologies

[https://www.globallegalpost.com/news/ai-will-make-judicial-decisions-with-avenue-to-appeal-to-humans-predicts-top-judge-960398482#:>](https://www.globallegalpost.com/news/ai-will-make-judicial-decisions-with-avenue-to-appeal-to-humans-predicts-top-judge-960398482#:)

⁶⁸ Mark Chen, *The International Governance of Artificial Intelligence* (USA: Edward Elgar Publishing, 2023) 9.

⁶⁹ Susan W Brenner, *Law in an Era of “Smart” Technologies* (USA: Oxford University Press 2007) 1-194

⁷⁰ Ibid 17.

⁷¹ Lewis Mumford, *Technics and Civilization* (New York: Harcourt Brace, 1963) 9 quoted in Susan W Brenner, *Law in an Era of “Smart” Technologies* (USA: Oxford University Press 2007) 15.

⁷² Supra note 68 at 25.

⁷³ Ibid 123,124.

because they are “out of the box” technologies as they possess the potential to improve the overall functioning of human society.

The description above does little in clarifying the complexity that comes with defining AI. Although there is no consensus on its definition, it generally refers to algorithms and techniques that rely on large datasets to perform sophisticated tasks that are often reserved for humans, and which carry out the task with little or no human intervention. As rightly observed by Lashbrooke, it is difficult to answer the question, “what is artificial intelligence?”⁷⁴ Scholars have defined and conceptualized it in different ways that have changed over time as a result of rapid development in the AI space as well as the complexity of its constitutive terms.⁷⁵

Rather than try to define AI, Alan Turing who is often considered as one of the founding fathers of AI would rather ask “whether a machine can think.”? Turing suggested that, “If there is a machine behind a curtain and a human is interacting with it (by whatever means, e.g. audio or via typing etc.) and if the human feels like he/she is interacting with another human, then the machine is artificially intelligent.”⁷⁶ Turing’s proposition has been noted as focusing more on “operational” or “behaviourist” AI – that is, an AI playing an “imitation game,” as opposed to systems that are actually “intelligent.”⁷⁷ Indeed, it is popular today to simply characterize AI systems as those that simulate

⁷⁴ EC Lashbrooke, “Legal reasoning and artificial intelligence” (1988) 43:2 Loyola Law Review 295. According to Avron Barr and Edward Feigenbaum, a starting point to defining AI is “the part of computer science concerned with designing intelligent computer systems, that is, systems that exhibit the characteristics we associate with intelligence in human behavior.” See Avron Barr and Edward A Feigenbaum, eds, *The Handbook of Artificial Intelligence*, Vol 1 (USA: HeurisTech Press, 1981) at 3.

⁷⁵ Pei Wang, “On Defining Artificial Intelligence” (2019) 10:2 Journal of Artificial General Intelligence 1; Stuart J Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* 3rd edn (USA: Pearson 2010) 2.

⁷⁶ Alan M. Turing, *Computing Machinery and Intelligence* (1950) 236 Mind: A Quarterly Review of Psychology and Philosophy 433-460.

⁷⁷ Jack Copland, “Computer Machinery and Intelligence” (1950) in Alan Turing in B Jack Copeland ed *The Essential Turing Seminal Writings in Computing, Logic, Philosophy, Artificial Intelligence, and Artificial Life: Plus the Secrets of Enigma* (USA: Oxford University Press 2004) 433 at 435; IBM, “What is Artificial Intelligence (AI)” (Last Visited 1 May 2023) Online: IBM <<https://www.ibm.com/topics/artificial-intelligence>>

human intelligence and thinking.⁷⁸ This position was articulated John McCarthy, a computer scientist who described AI in the mid-1950s in the following way:

every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves.⁷⁹

Two key words are worthy of note in the attempt to define AI: “artificial” and “intelligence.” The word “artificial” is generally not difficult as it simply means something that is not natural or real, or something that appears natural.⁸⁰ The real problem arises with the concept of “intelligence.” According to Matthew Scherer, “the difficulty in defining artificial intelligence lies not in the concept of artificiality but rather in the conceptual ambiguity of intelligence.”⁸¹ Commenting on this issue, Klaus Mainzer noted that it becomes problematic essentially because human intelligence is the yardstick for determining intelligence, which is itself not defined.⁸²

Owing to the challenge with precisely defining AI, efforts focus on “an operational definition of AI formed by a concise taxonomy and a set of keywords that characterize the core and transversal

⁷⁸ Klaus Mainzer, *Artificial Intelligence - When Do Machines Take Over?* (Germany: Springer 2019) 2; Joost N Kok et al, “Artificial Intelligence: Definition, Trends, Techniques and Cases in *Knowledge for sustainable development: an insight into the Encyclopedia of life support systems*” (UK: EOLSS 2002); Leanne Soares, “Artificial Intelligence in Canadian Law Libraries” (2020) 45:4 Canadian Law Library Review 16; According to Talley, a common image of artificial intelligence is a robot that thinks like a human and interacts seamlessly with people, understanding their needs and learning from previous interactions. Nancy B Talley, “Imagining the Use of Intelligent Agents and Artificial Intelligence in Academic Law Libraries” (2016) 108:3 Law Library 384. David Marr defined AI as the study of complex information processing problems that often have their roots in some aspect of biological information processing. The goal of the subject is to identify interesting and solvable information processing problems and solve them. See David Marr, “Artificial Intelligence- Personal View” (1977) 9 Artificial Intelligence 37.

⁷⁹ John McCarthy et al, “A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence; August 31, 1955” (2006 27:4) AI Magazine 13; McCarthy later defined AI in 2007 as “the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable See John McCarthy, “What is Artificial Intelligence” (Last Visited 1 May 2023) Online: Stanford < <https://www.diochnos.com/about/McCarthyWhatIsAI.pdf> >.

⁸⁰ The Britannica Dictionary “Artificial” < <https://www.britannica.com/dictionary/artificial> > (last visited 1 May 2023)

⁸¹ Matthew U Scherer, “Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies and Strategies” (2016) 29:2 Harvard Journal of Law & Technology 362.

⁸² Klaus Mainzer, *Artificial Intelligence - When Do Machines Take Over?* (Germany: Springer 2019) 2.

domains of AI.”⁸³ A comprehensive report by the Joint Research Centre of the European Commission in early 2020 proposed that there are at least four common features, within the manifold range of AI definitions. These include the fact that a system is based on perception of the environment including consideration of the real-world complexity and information processing including collecting and elaborating inputs (in form of data). It also involves decision making including reasoning and learning and the capacity to perform tasks, adapt and react to environmental changes; and the achievement of specific goals.⁸⁴ Similarly, leading authors like Russell and Norvig taxonomized AI into four categories after reviewing eight definitions of AI. The descriptions are thinking humanly, acting humanly, thinking rationally, and acting rationally.⁸⁵

What the above observations demonstrate is that there is no specific definition of AI, now or in the future. It is best described as a suite of technologies powered by sophisticated algorithms that perform tasks that otherwise require human aptitude.⁸⁶ For example, the *Digital Charter Implementation Act* (“Bill C 27”), containing the *Artificial Intelligence and Data Act* (AIDA) describes AI as a “technological system that, autonomously or partly autonomously, processes data related to human activities through the use of a genetic algorithm, a neural network, machine learning or another technique in order to generate content or make decisions, recommendations or predictions.”⁸⁷ This definition is very robust as it captures a wide range of AI capabilities.

⁸³ JRC Technical Reports: “AI Watch Defining Artificial Intelligence: Towards an Operational Definition and Taxonomy of Artificial Intelligence” Publication Office of the European Union, (Luxembourg 2020) 9.

⁸⁴ Ibid 8. Serena Quattrococo, *Artificial Intelligence, Computational Modelling and Criminal Proceeding: A Framework for a European Legal Discussion* (Switzerland: Springer, 2020) 8.

⁸⁵ Stuart J Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (USA: Pearson Education Inc, 3rd ed, 2010) 2-16.

⁸⁶ Jesse Beatson, ‘AI Supported Adjudicators: Should Artificial Intelligence Have a Role in Tribunal Adjudication?’ (2018) 31:3 *Canadian Journal of Administrative Law and Practice* 308.

⁸⁷ See Part 3 of Bill C 27, An Act to enact the Consumer Privacy Protection Act, the Personal Information and Data Protection Tribunal Act and the Artificial Intelligence and Data Act and to make consequential and related amendments to other Acts, 1st Sess, 44th Parliament, House of Commons of Canada, 2022. See also the European Union Artificial Intelligence Act, Article 3(1); which currently defines AI as software that is developed with one or more of the techniques and approaches listed in Annex I and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with. Both legislations are still under debated at the time of writing this thesis.

Despite the nebulosity in defining AI, a thesis like this that primarily examines the use of AI in criminal sentencing should have a working definition or at least a description. Thus, when I use the term “AI” it refers to a wide range of algorithmically driven or smart technologies that have the capability to make reliable predictions, recommendations and decisions acting on large datasets and powered by machine learning, deep learning, or other techniques.

2.3 Predictive Algorithms: Machine Learning and Deep Learning

Although it has been noted that there is no one-size-fits-all definition of AI, it has also been shown above that a better approach to understanding AI may be achieved by taxonomizing the systems. While the subfields of AI are vast due to fast-paced developments, this thesis will focus on predictive algorithms, which may be further divided into machine learning and deep learning.

Before delving into specific subfields, however, it may be necessary to consider what the term “algorithm” itself means. While the term is somewhat hazy, it may be simply described as sets of rules or processes to be followed in computations or problem-solving operations which may be as simple as a pen-and-paper grading rubric.⁸⁸ “Algorithm” refers to a task performance that excludes human intuition and replaces it with a pre-set, causal way to solve a problem.⁸⁹ It may range from Google autocomplete to simple models like Bubble sort—a simple algorithm for list ordering.⁹⁰ As a matter of fact, mathematical calculators run on a set of algorithms or as Finck argued that compensation tables or statutory sentencing guidelines are themselves a sort of algorithm,⁹¹ or that

⁸⁸ Arthur Rizer and Caleb Watney, “Artificial Intelligence Can Make Our Jail System More Efficient, Equitable, and Just” (2018) 23:1 *Texas Review of Law and Politics* 185; “An algorithm can be defined as a series of steps undertaken in order to solve a particular problem or accomplish a defined outcome” See Nicholas Diakopoulos, “Algorithmic Accountability: Journalistic Investigation of Computational Power Structures” (2015) 3:3 *Digital Journal* 400.

⁸⁹ Serena Quattrocolo, *Artificial Intelligence, Computational Modelling and Criminal Proceeding: A Framework for a European Legal Discussion* (Switzerland: Springer, 2020) 8.

⁹⁰ Nick Seaver, Algorithms as culture: Some tactics for the ethnography of algorithmic systems (2017) *Big Data and Society* 1.

⁹¹ Michele Finck, “Automated Decision-Making and Administrative Law” in Peter Cane et al eds, *Oxford Handbook of Comparative Administrative Law* (United Kingdom: Oxford University Press 2021) 848.

law itself is perhaps an algorithmic process.⁹² What is simply meant by an algorithm is a set of defined rules, designed to guide the operation of a task, often with a limited level of opportunity to introduce personal intuition.

2.3.1 Machine Learning Algorithms

Machine Learning (ML) is one method for helping an algorithm achieve the level of artificial intelligence.⁹³ The term was coined by Arthur Samuel in 1959 and is one of the fastest-growing technologies in computer science. These are systems that can make computers act without being rigidly programmed.⁹⁴ In other words, the programmer does not need to write all the instructions that the system should carry out for it to perform a task, instead, the system is fed with training data in the form of examples and leaves the generalized algorithm to analyze real data, discern patterns and produce an output.⁹⁵ Karen Aggarwal et al noted that ML systems may be used to create knowledge, train algorithms, and detect unknown patterns in large data sets. This information is then utilized to make predictions and optimize processes for novel and unknown data sets.⁹⁶

Training ML involves numerous processes. According to David Lehart and Paul Ohm, the process may be broken down into a distinct workflow (playing with the data and the running model), that may be further divided into eight processes: problem definition, data collection, data cleaning, summary statistics review, data partitioning, model selection, model training, and model deployment.⁹⁷

⁹² Philip Sales, "Algorithms, Artificial Intelligence, and the Law" (2021) Bolch Judicial Institute, Duke University School of Law 25.

⁹³ Paula C. Arias, "Artificial Intelligence & Machine Learning: A Model for a New Judicial System?" (2020) 3 *Revista Internacional Jurídica y Empresarial* 84.

⁹⁴ Ammet Joshi, *Machine Learning and Artificial Intelligence* (Switzerland: Springer Nature 2nd edn 2020) 121.

⁹⁵ Karan Aggarwal, "Has the Future Started? The Current Growth of Artificial Intelligence, Machine Learning, and Deep Learning" (2022) 3:1 *Iraqi Journal for Computer Science and Mathematics* 117.

⁹⁶ *Ibid* 117.

⁹⁷ David Lehr and Paul Ohm, "Playing with the Data: What Legal Scholars Should Learn about Machine Learning" (2017) 51:2 *UC Davis Law Review* 655.

Without going into complex details, the model is exposed to historic or “training data” after which it can be fed with “test data” to determine its performance before the model can be deployed.⁹⁸

ML systems have three major sub-branches as follows: supervised learning, unsupervised learning, and reinforcement learning. These branches are grouped on the basis of whether the training data was labelled or not.⁹⁹ Supervised learning occurs when the model is trained on labelled data, which means the data contained a set of expected outcomes. The labelled data with defined objectives then allows the model to predict the label when it receives similar inputs.¹⁰⁰ When properly designed, supervised learning ML can achieve a level of accuracy that surpasses or equals that of a human expert.¹⁰¹ Examples include spam email detection, image classification¹⁰² and criminal risk prediction.¹⁰³ Unlike supervised learning algorithms that predict outcome variables labelled with ground truth, unsupervised learning occurs when the model is fed with unlabelled data. The model is left to design its process of discovering and presenting the interesting structure in the data.¹⁰⁴ Lastly, the reinforcement learning framework is based on interactions between two primary entities: system and environment.¹⁰⁵ It is an online learning technique that enables the systems to learn by interacting with the environment through trial and error. Although the technique is not entirely supervised learning, it is however trained using reward and punishment techniques when the model identifies positive and negative behaviours.¹⁰⁶

⁹⁸ Batta Mahesh, “Machine Learning Algorithms - A Review” (2018) 9:1 International Journal of Science and Research 381.

⁹⁹ Supra note 94 at 121.

¹⁰⁰ Qifang Bi, “What is Machine Learning? A Primer for the Epidemiologist” (2019) 188:12 American Journal of Epidemiology 2223.

¹⁰¹ Fabio Massimo Zennaro, “A Left Realist Critique of the Political Value of Adopting Machine Learning Systems in Criminal Justice” in Irena Koprinska et al, *Workshops of the European Conference on Machine Learning and Knowledge Discovery in Databases* (Switzerland: Springer Nature 2020) 91 at 91.

¹⁰² Supra note 94 at 121.

¹⁰³ Supra note 100.

¹⁰⁴ Batta Mahesh, “Machine Learning Algorithms - A Review” (2018) 9:1 International Journal of Science and Research 381.

¹⁰⁵ Supra note at 94 at 121.

¹⁰⁶ Shweta Bhatt, “Reinforcement Learning 101: Learn the essentials of Reinforcement Learning!” (Last visited 1 May 2023) Online: Towards Data Science < <https://towardsdatascience.com/reinforcement-learning-101-e24b50e1d292>>

2.3.2 Deep Learning Algorithms

Deep learning is an advanced ML technique inspired by the neural construction of the human brain and which, roughly speaking, finds complex ways of changing how input variables are represented and then nonlinearly put together to yield predictions or estimates.¹⁰⁷ This technique is also called Artificial Neural Network (ANN) designed to simulate human cognitive processes which can make the network 'learn' to solve numerous problems.¹⁰⁸ It requires lots of careful training to ensure that the model does not draw incorrect conclusions, and its proliferation was incentivized by the emergence of big data. Massive datasets produced from online social platforms provide the large data that is required to train neural network models which have been applied in a range of domains¹⁰⁹ including criminal justice. Examples are voice recognition,¹¹⁰ facial recognition,¹¹¹ fraud detection,¹¹² etc.

2.3.3 Generative Artificial Intelligence (GenAI) and Large Language Models (LLMs)

Generative AI or GenAI is a term that can be used for any AI system that has been trained to produce content.¹¹³ GenAI is different from other types of AI capabilities, which are designed to perform functions such as classifying data or grouping data. GenAI is powered by Large Language Models (LLMs), which are machine-learning neural network trained through data input/output sets.

¹⁰⁷ Ian Goodfellow et al, *Deep Learning* (2016) 166 <<https://www.deeplearningbook.org/>>. A strong example of deep learning is Google's AlphaGo. Google created a computer program with its own neural network that learned to play the abstract board game Go, which is known for requiring sharp intellect and intuition. By playing against professional Go players, AlphaGo's deep learning model learned how to play at a level never seen before in AI and did so without being told when it should make a specific move (as a standard machine learning model would require).

¹⁰⁸ Anders Krogh, "What are Artificial Neural Networks?" (2008) 26:2 *Nature Biotechnology* 195.

¹⁰⁹ John D Kelleher, *Deep Learning* (USA: The MIT Press 2019) 21.

¹¹⁰ Sam Zegas, "Why Deep Learning is the Best Approach for Speech Recognition" (Last visited 3 May 2023) Online: Deepgram <<https://blog.deepgram.com/deep-learning-speech-recognition/>>

¹¹¹ Vanshika Kaushik, "8 Applications of Neural Networks" (Last visited 3 May 2023) Online: AnalyticsSteps <<https://www.analyticssteps.com/blogs/8-applications-neural-networks>>

¹¹² Florian Tanant, "Fraud Detection with Machine Learning & AI" (Last visited 3 May 2023) Online: SEON <<https://seon.io/resources/fraud-detection-with-machine-learning/>>

¹¹³ Certainly, ChatGPT, "Generative AI, & Large Language Models: a Primer" (Last visited 14 May 2023) Online: Certainly <<https://certainly.io/blog/chatgpt-generative-ai-large-language-models/>>

Frequently, the text is unlabeled or uncategorized, and the model uses self-supervised or semi-supervised learning methodology.

On the one hand, a very conservative view of LLMs is that they are just predictive. This means that based on a large dataset, or through web scraping like ChatGPT, the algorithms predict the next words or content.¹¹⁴ Popular examples of LLMs are OpenAI's GPT-4, Google's PaLM, and Meta's LLaMA which are powered by underlying LLMs.¹¹⁵ In this sense, the ingenuity behind LLMs is somewhat simple. The model basically predicts which word is very likely to succeed other words based on the words in a sequence—"simply probability distributions over word sequences [in that] they tell us that the word sequence "I am going to the store" is more probable than the word sequence "store the going am to I", and more probable than the word sequence "jumped scissors bridge to skate elephant".¹¹⁶ As one writer puts it, "One way — but not the only way — to improve a language model is by giving it more "reading" — or training it on more data — *kind of like how we learn from the materials we study*."¹¹⁷ On the other hand, newer versions like GPT-4, AlphaCode, etc., are becoming foundational models trained on a vast amount of data, which makes them possess greater generative power, enough to respond to complex instructions and produce more accurate solutions.¹¹⁸

Within the very short advancement in the capabilities of LLMs, they are already being integrated into specialized fields like legal writing and coding.¹¹⁹ A recent report revealed LLMs like ChatGPT-4

¹¹⁴ Lucas Mearian, "What are LLMs, and how are they used in generative AI?" (Last visited 14 May 2023) Online: Computerworld <<https://www.computerworld.com/article/3697649/what-are-large-language-models-and-how-are-they-used-in-generative-ai.html>>

¹¹⁵ Helen Toner, "What Are Generative AI, Large Language Models, and Foundation Models?" (Last visited 14 May 2023) Online: CSET <<https://cset.georgetown.edu/article/what-are-generative-ai-large-language-models-and-foundation-models/#:>>

¹¹⁶ Ryan O'Connor, "Introduction to Large Language Models for Generative AI" (Last visited 14 May 2023) Online: AssemblyAI <<https://www.assemblyai.com/blog/introduction-large-language-models-generative-ai/>>

¹¹⁷ Eben Carle, "Ask the Techspert: What is Generative AI?" (Last visited 14 May 2023) Online: Google <<https://blog.google/inside-google/googlers/ask-a-techspert/what-is-generative-ai/>> (Emphasis added).

¹¹⁸ OpenAI "GPT-4 is OpenAI's Most Advanced System, Producing Safer and More useful Response" (last visited 21 July 2023) Online: <<https://openai.com/gpt-4>>

¹¹⁹ Tyna Eloundou et al, "GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models" (Working Paper, 23 March 2023) Online: <<https://arxiv.org/pdf/2303.10130.pdf>>

passing Bar exams¹²⁰ and assisting counsels in drafting court processes.¹²¹ Very recently, a report also revealed at least an admission by a Colombian Judge using ChatGPT to curate decisions,¹²² implying that its use in the justice system is gradually deepening. In addition, Macey-Dare suggested that LLMs like ChatGPT can help the court conduct sentiment analysis on legal documents such as rulings, legal briefs, or social media posts, which can help both judges and lawyers understand the views and attitudes of legal professionals.¹²³

Despite the strength of LLMs, legal scholars have argued that LLMs lack the capability to provide personalized advice to clients, as giving legal advice requires a deep comprehension of the law, ethics, moral specificity, and the ability to apply it to the specific context of the case. They conclude that “text generation models do not have this knowledge. So, without additional frameworks capable of storing and understanding such knowledge, using models such as ChatGPT is a random walk in the court”.¹²⁴ Nevertheless, the increasing strength of LLMs especially when they are trained on legal language would mean that they may become useful tools in sentencing crafting having taken into consideration the specific circumstances of the offender and the applicable legal principles. Whether they can replace judges is another fundamental question.

¹²⁰ Ryan O'Connor, "Introduction to Large Language Models for Generative AI" (Last visited 14 May 2023) Online: AssemblyAI < <https://www.assemblyai.com/blog/introduction-large-language-models-generative-ai/>>; ChatGPT-4 reported performance reaching the 90th percentile of human test takers on the Uniform BAR Exam, which is an exam in the United States that is required to become a certified lawyer; Debra Cassens Weiss, "Latest Version of ChatGPT Aces Bar Exam with Score Nearing 90th Percentile" (Last visited 14 May 2023) Online: Abajournal < <https://www.abajournal.com/web/article/latest-version-of-chatgpt-aces-the-bar-exam-with-score-in-90th-percentile>>

¹²¹ Kathryn Armstrong, "ChatGPT: US Lawyer Admits Using AI for Case Research" (Last visited 14 May 2023) Online: BBC < <https://www.bbc.com/news/world-us-canada-65735769>>

¹²² Purvish M. Parikh, Dinesh M. Shah and Kairav P. Parikh, "Judge Juan Manuel Padilla Garcia, ChatGPT, and a Controversial Medicolegal Milestone" (2023) 75:1 Indian Journal of Medical Services 3.

¹²³ Rupert Macey-Dare, "How ChatGPT and Generative AI Systems will Revolutionize Legal Services and the Legal Profession" Online: SSRN < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4366749> 28.

¹²⁴ Johannes Scholtes, "The Future of Generative Large Language Models and Potential Applications in LegalTech" (Last visited 14 May 2023) Online: JDSUPRA < <https://www.jdsupra.com/legalnews/the-future-of-generative-large-language-1563388/>>

2.4 AI in Criminal Sentencing: Risk Assessment Tools and Automated Judicial Sentencing Systems

2.4.1 Actuarial Risk Assessment Tools

Risk assessment is the process of using designed tools to estimate the likelihood or otherwise that a person will commit a future offence. Broadly, risk assessment tools use statistical methodologies to inform decisions. It involves using statistical algorithms to triage individuals into specific homogeneous groups based on common features and levels of risk.¹²⁵ It follows a mathematical technique developed in 1928 by Ernest Burgess, a Canadian Sociologist and professor at the University of Chicago who successfully developed a tool to measure the likelihood of criminal behaviour which relied on statistical methods rather than intuitions.¹²⁶ Data from three thousand inmates was used and 21 factors were considered to determine whether or not inmates were going to comply with the terms of their parole. Inmates who got a score between 16 and 21 are adjudged as unlikely to re-offend while those who get a low score between four or less are considered to likely reoffend.¹²⁷ Essentially, the technique involves scoring individuals on a range of risks using risk-related or criminogenic factors, such as previous or current drug abuse, criminal history, employment status, and childhood exposure to physical or sexual abuse, among others.

Academic scholarship about the importance of risk-based prediction proliferated in the 1980s and 1990s, leading to the development of various actuarial and algorithmic risk methodologies, deployed at various points of the criminal justice, including criminal sentencing.¹²⁸ Today, it is not out of place

¹²⁵ Eric Silver and Lisa L Miller, "A Cautionary Note on the Use of Risk Assessment Tools for Social Control" 48:1 (2002) *Crime and Delinquency* 139.

¹²⁶ Hannah Fry, *Hello World: Being Human in the Age of Algorithms* (New York: WW Norton & Company 2018)

¹²⁷ Ernest W. Burgess, "Factors determining success or failure on parole", in *The Workings of the Intermediate-sentence Law and Parole System in Illinois* (Springfield, IL: State Board of Parole, 1928 (Cited in Hannah Fry, *Hello World: Being Human in the Age of Algorithms* (New York: WW Norton & Company 2018) 52.

¹²⁸ Robert Werth, "Risk and Punishment: The Recent History and Uncertain Future of Actuarial, Algorithmic and 'Evidenced-Based; Penal Techniques" 13 (2019) *Sociology Compass* 1-19; See Jonathan Sorensen and Rocky Pilgrim, "An Actuarial Risk Assessment Posed by Capital Murder Defendant" 90:4 (1999) *Journal of Criminal Law and Criminology* 1251; Martin Grann, Henrik Belfrage and Anders Tengstorm, "Actuarial Assessment of Risk for Violence: Predictive Validity of the VRAG and the Historical Part of the HCR-20" 27:1 (2000) *Criminal Justice and Behaviour* 97.

to say that risk assessment tools have 'spread like wild fire'.¹²⁹ The tool is founded on the "need principles," which mean that by using the tools, an offender is able to receive a sentence, supervision and services that match their identified level of risk to re-offend.¹³⁰

These tools have been developed over the years and scholars mostly categorize them into four evolutionary generations. According to Desmarais and Singh, risk assessment tools have shifted overtime from first to fourth generation.¹³¹ First-generation risk assessment methods involve merely relying on professional training and information gathered from an offender to determine their risk of recidivism.¹³² These are often described as "unstructured professional judgement,"¹³³ and Desmarais and Singh noted that their accuracy in predicting risk "are less accurate than chance."¹³⁴ Second-generation risk assessment tools were empirically based risk instruments but they were not typically designed to accommodate dominant criminological theories and consisted mainly of historical and static risk factors such as age, sex, and criminal history.¹³⁵ Since they rely mainly on static factors, they are considered limited in providing objective risk reports and determining context specific rehabilitative needs.¹³⁶ Third-generation tools were also empirically based but included dynamic risk factors such as attitude, substance use, and were mostly theoretically informed such as

¹²⁹ Daniel Kehl, Priscilla Guo and Samuel Kessler, "Algorithms in the Criminal Justice System: Assessing the use of risk assessments in Sentencing" Responsive Communities Initiative, Berkman Klein Center for Internet & Society, Harvard Law School 1 at 2.

¹³⁰ Maggie C Clarke, Michele Peterson-Badali and Tracey A Skilling, "The Relationship Between Changes in Dynamic Risk Factors and the Predictive Validity of Risk Assessments Among Youth Offenders" 44:10 (2017) *Criminal Justice and Behaviour* 1341.

¹³¹ Sarah L Desmarais and Jay P Singh, "Risk Assessment Instruments Validated and Implemented in Correctional Settings in the United States" (Council of State Government Justice Center Report March 27, 2013) 4; Bonta, J. "Risk-needs assessment, and treatment" In: A.T. Harland (ed.) *Choosing Correctional Options that Work: Defining the Demand and Evaluating the Supply* (London: Sage Publications, 1996) 19.

¹³² Sarah L Desmarais and Jay P Singh, "Risk Assessment Instruments Validated and Implemented in Correctional Settings in the United States" (Council of State Government Justice Center Report March 27, 2013) 4.

¹³³ D A. Andrews, James Bonta and J Stephen Wormith, "The Recent Past and Near Future of Risk and/or Need Assessment" 52:1 (2006) *Crime & Delinquency* 7.

¹³⁴ *Supra* note 132 at 4.

¹³⁵ Danna-Mechelle Lewis, "The Risk Factors- (Re-) Visiting Adult Offender Risk Assessments Within Criminal Justice Practice" 16:2 2014 *Risk Management* 126.

¹³⁶ Champion, D.J. "Measuring Offender Risk: A Criminal Justice Sourcebook. London: Greenwood Press; Simon, F. (1971) *Prediction Methods in Criminology*" (London: Her Majesty's Stationery Office, 1994); Windlesham, L. *Responses to Crime. Vol. III* Oxford: Oxford University Press 1996)

the Level of Service Inventory-Revised or LSI-RI.¹³⁷ Lastly, fourth-generation risk assessment tools are considered the most sophisticated tools being that they are more robust in terms of risk variables and in proposing personalized rehabilitative recommendations and are powered by artificial intelligence, machine learning, and algorithmic decision-making.

Full-scale deployment of AI has not arrived in Canadian courtrooms to date and it is still gradually gaining space in most jurisdictions around the world.¹³⁸ However, there has been a proliferation of algorithm-assistive judicial AI systems that judges use in criminal sentencing in the US, China, and Malaysia in the past few years. These countries are the leaders in the use of AI-powered judicial systems. The US is the top leader in the use of AI-powered risk assessment tools, while other countries adopt broader AI techniques that go beyond risk assessment but include automated systems and other machine learning techniques that automate the judicial systems from start to finish. These tools/systems will be discussed below.

2.4.3 Correctional Offender Management Profile for Alternative Sanctions (COMPAS)

COMPAS is a 4th generation risk assessment tool, and the most popular and widely used by courts in the United States.¹³⁹ According to Schwerzmann, COMPAS was designed in view of the novel concept of judicial practice of evidence-based judicial sentencing, which seeks to efficiently cut down prison population by statistically assessing who should or should not be granted parole or probation, while at the same time effectively maximizing the use of criminal justice financial expenditures.¹⁴⁰

¹³⁷ Supra note 132 at 5. Other examples of third generation tools were the Self-Appraisal Questionnaire (SAQ), and the Historical-Clinical-Risk Management-20 (HCR-20).

¹³⁸ Risk assessment tools are used by the Correctional Services of Canada, but they are third generations tools. Examples include Hare Psychopathy Checklist (PCL-R), the Violence Risk Appraisal Guide (VRAG), the Static-99, and the Sex Offender Risk Appraisal Guide (SORAG). For a statistical analysis of these tools, see Martin Grann, Henrik Belfrage and Anders Tengstorm, "Actuarial Assessment of Risk for Violence: Predictive Validity of the VRAG and the Historical Part of the HCR-20" 27:1 (2000) *Criminal Justice and Behaviour* 97 – 114. See also the case of *Ewert v Canada*, 2018 SCC 30 on the Supreme Court of Canada decision on the use of risk assessment tools.

¹³⁹ Brennan, T., Dieterich, W., & Ehret, B. "Evaluating the Predictive Validity of the COMPAS Risk and Needs Assessment System" (2009) 36:1 *Criminal Justice and Behavior* 21–40; Hamilton, M "Risk-Needs Assessment: Constitutional and Ethical Challenges" (2014) 52 *American Criminal Law Review* 231–291.

¹⁴⁰ Katia Schwerzmann, "Abolish! Against the Use of Risk Assessment Algorithms at Sentencing in the US Criminal Justice System" (2021) 34:1 *Philosophy and Technology* 1889.

Summarily, COMPAS works on the data gathered from the individual's criminal file and an interview, after which the individual must answer 137 broad questions in a questionnaire. The data collected is then compared with the dataset of over 30,000 COMPAS Core assessments "the norm group" which was collected at criminal justice sites across the United States such as prisons, jails, and probation.¹⁴¹

COMPAS has gained support from advocates and has also come under intense criticism. Advocates of predictive systems like risk assessment put forward the argument that the systems have the potential to make the sentencing process more transparent, pragmatic, and data-driven.¹⁴² In addition, they posit that using these tools can help eliminate bias, augment public safety, make the sentencing process more efficient and help reduce incarceration¹⁴³ largely due to their ability to be more objective and consistent in decision making when compared to human judges. According to Sarah Brayne and Angèle Christin:

Risk-assessment instruments are explicitly designed to 'structure' decision-making and curtail judicial discretion by providing a clear set of guidelines, scores, and recommendations to legal professionals throughout the adjudication and incarceration process. Pre-trial risk assessment instruments evaluate the probability that a defendant is a threat to public safety or will fail to appear in court. During adjudication, they can be used for sentencing decisions. Post-adjudication, they are used to predict recidivism for probation and parole decisions. Risk scores also serve as correctional instruments to determine the security classification of incarcerated individuals.¹⁴⁴

In other words, risk assessment tools can be used by the court to determine the flight risk and recidivism level of an offender. It can help to ensure that bail assessments are evidence informed. Also, sentencing courts impose punishment that fights the offender's need, and correctional departments may use it to inform offender classification.

¹⁴¹ For detailed information about COMPAS, see Northpointe Inc. Practitioner's Guide to COMPAS core (Northpointe Inc 2015).

¹⁴² Andrea Roth, "Machine Testimony" (2017) 126 Yale LJ 1972

¹⁴³ Carole Piovesan & Vivian Ntiri, "Adjudication by Algorithm: The Risks and Benefits of Artificial Intelligence in Judicial Decision-Making" (2018) 36:4 Adv J 42

¹⁴⁴ Sarah Brayne & Angèle Christin, "Technologies of Crime Prediction: The Reception of Algorithms in Policing and Criminal Courts" (2020) Social Problems 1 at 4.

Indeed, a recent empirical study by Zhlyuan et al on the predictive accuracy of humans versus COMPAS, revealed that it outperformed humans.¹⁴⁵ Previous studies had concluded that its predictive accuracy, "is no more accurate or fair than predictions made by people with little or no criminal justice expertise."¹⁴⁶ Nonetheless, advocates add that "the millions of valuable data from past criminal defendants can be used to understand how criminal defendants actually behave"¹⁴⁷ noting further that using these technologies can help in "producing new knowledge about crime and providing new thresholds and justifications to act upon this knowledge."¹⁴⁸

On the contrary, COMPAS has been criticized because it relies on averages, patterns, calculations and aggregate data to make predictions about an offender's future behaviour. In effect, this shifts the focus of criminal assessment from "subjective, individual, and systemic factors to statistical averages and algorithmic decision-making".¹⁴⁹ In addition, Smyth argued that COMPAS can easily be prone to misinterpretation, manipulation, and false positives since it assesses dynamic criteria like criminal personality, social isolation, substance abuse and residence/stability that are very vague.¹⁵⁰ On top of this, evidence has emerged which revealed the ability of the system to perpetuate racial bias on historically prejudiced individuals since it relies on historical data even though the algorithm does not consider race as a criterion. A vivid example is the ProPublica analysis titled "Machine Bias," which demonstrated that COMPAS perpetuates bias against black people.¹⁵¹ In explaining the root cause of algorithmic bias, Hannah Fry states,

¹⁴⁵ Zhlyuan "Jerry" Lin et al, "The limits of Human Predictions of Recidivism" (2020) 6:7 Science Advances 1-8.

¹⁴⁶ Julia Dressel and Hany Farid, "The accuracy, Fairness, and Limits of Predicting Recidivism" (2018) 4:1 Science Advances 1-8

¹⁴⁷ Anthony J Casey & Anthony Niblett, "Artificial Intelligence, Big Data and the Future of Law: Self-Driving Laws" (2016) 66:4 UTLJ 429.

¹⁴⁸ Aleš Završnik, "Algorithmic Justice: Algorithms and Big Data in Criminal Justice Settings" (2021) 18:5 European Journal of Criminology 623 at 628.

¹⁴⁹ Neha Chugh, "Risk Assessment Tools on the Trial: AI Systems Go" (2022) IEEE Technology and Society Magazine 53.

¹⁵⁰ Sara M Smyth, "Can We Trust Artificial intelligence in Criminal Law Enforcement?" (2019) 17:1 Canadian Journal of Law and Technology 105.

¹⁵¹ Julia Angwin et al, "Machine Bias" (last visited 15 May 2023) Online: Propublica <<https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>>

This has nothing to do with the crime itself, or with the algorithm: it's just a mathematical certainty. The outcome is biased because reality is biased. More men commit homicides, so more men will be falsely accused of having the potential to murder. Unless the fraction of people who commit crimes is the same in every group of defendants, it is mathematically impossible to create a test which is equally accurate at prediction across the board and makes false positive and false negative mistakes at the same rate for every group of defendants.¹⁵²

In other words, algorithms are at very best a "garbage in garbage out" and they help to explicitly reveal historical and extant bias in human based practices, one of which could be a reason to advance the utility of an AI-powered judicial process.

2.5 Automated Criminal Judicial Sentencing System

Aside from the use of risk assessment tools that merely play a guiding role in sentencing computation, there are new trends and imaginative ideas about fully automated judicial systems such as the idea of smart criminal justice,¹⁵³ judicial robots,¹⁵⁴ judicial decision support systems,¹⁵⁵ robojudge,¹⁵⁶ etc. Automated judicial systems differ from risk assessment tools because while the latter predicts the offender, the former predicts the human judge, and are better fit to address disparate sentencing. Some ideas have been proposed. For example, a system could be developed to partially automate penalty orders for petty crimes. In doing this, the system would automatically generate the personal data of the offender and description of the facts, based on the police files. The system would then draft the order itself and, if necessary, propose the concrete penalty.¹⁵⁷

¹⁵² Supra note 126 at 64.

¹⁵³ Monika Simmler et al, "Smart Criminal Justice: Exploring the Use of Algorithms in the Swiss Criminal Justice System" (2022) (article in press) *Artificial Intelligence and Law* 1.

¹⁵⁴ Pedro Rubim Borges Fortes, "Paths to Digital Justice: Judicial Robots, Algorithmic Decision-Making, and Due Process" (2020) 7 *Asian Journal of Law and Society* 453-469.

¹⁵⁵ Laura Cristina Ubiali, "Big Data as a Supporting Tool for Judicial Decision Making: A Preliminary Study with Brazilian Judicial System" [2018] (Msc Thesis: Stockholm University, Sweden) 10.

¹⁵⁶ Stephen Castell, "The Future of Decisions of RoboJudge HHJ Arthur Ian Blockchain: Dread, Delights or Derision?" (2018) 34 *Computer Law and Security Review* 739; Joshua P Davis, "Of Robolawyers and Robojudges" (2022) 73;5 *Hastings Law Journal* 1173; Jesper Ryberg, "Sentencing and Algorithmic Decision-Making-when Would it be Justified to Replace a Human judge with a robojudge?" in Francisco J Castro Toledo ed *The Algorithmic Transformation of the Criminal Justice (USA: Thomson Reuter 2022)* 147.

¹⁵⁷ Supra note 153 at 1.

The automation of the criminal justice process is already gaining traction. This ranges from systems that merely track and process cases to complete automation of the justice process such as tracking the case of a defendant from the point of arrest to pre-trial detention, the allocation of counsel, trial monitoring, up to conviction and even incarceration.¹⁵⁸ While most discussions about the automation of judicial decision making are yet imaginations and proposals, some countries are already testing these systems for criminal sentencing. Some life examples already exist in China and Malaysia.¹⁵⁹

2.5.1 Chinese Shanghai intelligent assistive - 206 System 3.0

The Chinese Shanghai intelligent assistive case handling system for criminal cases (the 206 System 3.0) is a powerful one-stop AI machine learning judicial system that functions in case filing, criminal investigation, reviews, prosecution, court trial, conviction, commutation, and parole. The technology is supported by AI, big data, and blockchain techniques.¹⁶⁰ The system is integrated with Optical Character Recognition (OCR)¹⁶¹, Natural Language Processing (NLP),¹⁶² Automatic Speech Recognition (ASR),¹⁶³ and Named Entity Recognition (NER), all embedded with Deep Neural Network

¹⁵⁸ East-West Management Institute, "Designing and Implementing Court Automation Projects: Practical Guidance for USAID DRG Officers" (USAID, August 2019) 1-23.

¹⁵⁹ News surfaced in 2019 that Estonia, an European country was developing a robojudge for small claims litigation, but no mention of its use in the criminal justice system; Joshua Park, "Your Honor, AI" (Last visited 15 May 2023) Online: Harvard International Review <<https://hir.harvard.edu/your-honor-ai/>>

¹⁶⁰ Changqing Shi, Tania Sourdin and Bin Li, "The Smart Court - A New Pathway to Justice in China?" (2021) 12:1 International Journal for Court Administration 1; There are many other AI sentencing systems across China which are developed by national and local courts and private companies. Examples includes "Rui Judge" which is used by criminal courts in Beijing, "Similar Case" system used by the Chinese Supreme Court and "Little Judge Bao" developed by a Chinese private company. See Jiahui Shi, Artificial Intelligence, Algorithms and Sentencing in Chinese Criminal Justice: Problems and Solutions (2022) 33 Criminal Law Forum 121 – 148.

¹⁶¹ OCR is an image to text extraction tool. See Tech Target, "OCR (optical character recognition)" (last visited 21 July 2023) Online: Tech Targe <<https://www.techtarget.com/searchcontentmanagement/definition/OCR-optical-character-recognition>>

¹⁶² NLP means the ability of computers to understand written and spoken human language, much like the way humans beings can. See IBM, What is Natural Language Processing (last visited 21 July 2023) Online: <<https://www.ibm.com/topics/natural-language-processing>>

¹⁶³ ASR or text-to-speech refers to a technology that can converts human spoken language into text by computers. It is the opposite of OCR. See IBM, "What is Speech Recognition?" (Last visited 21 July 2023) Online: <<https://www.ibm.com/topics/speech-recognition>>

(DNN) model.¹⁶⁴ Particularly for assisting the judge in sentencing, the 206 system relies on a large number of historical precedents in a database. Yagong Cui explained that to perform its assistive role in sentencing, the system will first conduct a deep analysis of the sentencing process with the technology of big data. Thereafter, it accurately marks from three dimensions the data of “statutory punishment, benchmark punishment, and declared punishment” with the crime database for the case under consideration. Next, the 206 System “extracts statutory circumstances of sentencing, discretionary circumstances of sentencing, and historical factors affecting sentencing results from the details of cases to form a large size of samples for machine learning, to build the Sentencing Prediction Model.”¹⁶⁵ Furthermore, relying on Prediction Model, the system can provide sentencing recommendations to the judge and prosecutor, which can help standardize sentencing and mitigate inconsistent outcomes.¹⁶⁶ The 206 system is popularly considered to be a breakthrough in Chinese judicial modernization strategy.¹⁶⁷ No such comprehensive and advanced judicial technology has been introduced elsewhere, and it does not look like any such will be introduced anytime soon.

2.5.2 Malaysian Artificial Intelligence in Court Sentencing (AiCOS) System

AiCOS is an AI based sentencing recommendation system used by Malaysian magistrate Courts in Sabah and Sarawak for sentencing defendants. The tool was initially introduced in the year 2020 to recommend sentences for offenders charged with possession of drugs and sexual offences, but it has now been incorporated with twenty offences, including offences under the Malaysian Transport

¹⁶⁴ DNN is a class of machine learning algorithms similar to the artificial neural network and aims to mimic the way human brains process information. See Larry Hardesty, “Explained: Neural Networks” (Last visited 21 July 2023) Online: MIT News <<https://news.mit.edu/2017/explained-neural-networks-deep-learning-0414>>

¹⁶⁵ Yadong Cui, *Artificial Intelligence and Judicial Modernization* (China: Springer and Shanghai People’s Publishing House 2020) 101.

¹⁶⁶ *Ibid* 101.

¹⁶⁷ It is advanced capability has raised justified objection and caution. For instance, Wang et noted that “justice cannot be achieved from only technical adjustment by improving working efficiency through enhancing an AI’s technical performance [but] consideration of the social context of each case, as well as potential moral and ethical risks, all affect the method to achieve fairness of justice for public interest, which will never be just a technical issue”. See Nu Wang, ““Black Box Justice”: Robot Judges and AI-based Judgment Processes in China’s Court System” (2020) IEEE International Symposium on Technology and Society (ISTAS 2020) 63; Zichun Xu, Yang Zhao and Zhongwen Deng, “The Possibilities and Limits of AI in Chinese Judicial Judgment” (2022) 37 *AI & Society* 1601.

Act 1987.¹⁶⁸ AiCOS was introduced to address inefficiency in judicial processes and to address disparate decision making by judges.¹⁶⁹ Accordingly, the Chief Judge of Sabah and Sarawak stated, "Disparate sentences and efficiency are common challenges in the industry... There have been instances when judges give different sentences for similar offences. The challenge has been to find a way to mete out sentences "which are both reasonable and consistent"¹⁷⁰

In using AiCOS, the prosecution and defence can submit addresses and argue a fit sentence before the court relying on precedents and the particular facts of the case. Thereafter, AiCOS will provide recommendations to the judge on fit and appropriate sentence relying on the Court's internal database which was adopted to compile the relevant and critical data and information such as the precedent of cases or past-court decisions.¹⁷¹ These pieces of information are termed "parameters" and it is these parameters that the AI use to generate their recommendations on the sentences that shall be passed. In addition to critical pieces of information, the AI will also take into account five parameters which are so-called "mitigating and aggravating factors"; the status of employment; age; marital status; nationality; gender; and past acquittals. The whole process only takes a few minutes."¹⁷²

¹⁶⁸ Malaysian Bar, "Opening Address by The Right Honourable Tun Tengku Maimun binti Tuan Mat, Chief Justice, Federal Court of Malaysia, at IMLC 2023" (10 July 2023, Shangri-La Hotel Kuala Lumpur) (last visited 27 May 2023) Online: Malaysian Bar Badan Peguam Malaysia < <https://www.malaysianbar.org.my/article/news/speeches/speeches/opening-address-by-the-right-honourable-tun-tengku-maimun-binti-tuan-mat-chief-justice-federal-court-of-malaysia-at-imlc-2023-10-july-2023-shangri-la-hotel-kuala-lumpur->>; Ming En Liew, "How courts in Sabah and Sarawak are sentencing with the help of AI" (Last visited 15 May 2023) Online: GovInsider <<https://govinsider.asia/intl-en/article/how-courts-in-sabah-and-sarawak-are-sentencing-with-the-help-of-ai-abang-iskandar-malaysia>>.

¹⁶⁹ Dennis W K Khong and Chiung Ching Ho, "Artificial Intelligence in Malaysian Courts: PP v Denis P Modili" (2022) 2:2 Asian Journal of Law and Policy 127-128; Rina Chandran, "As Malaysia tests AI court sentencing, some lawyers fear for justice" (Last visited 15 May 2023) Online: BusinessWorld < <https://www.bworldonline.com/world/2022/04/12/441948/as-malaysia-tests-ai-court-sentencing-some-lawyers-fear-for-justice/>>

¹⁷⁰ Ming En Liew, "How courts in Sabah and Sarawak are sentencing with the help of AI" (Last visited 15 May 2023) Online: GovInsider <<https://govinsider.asia/intl-en/article/how-courts-in-sabah-and-sarawak-are-sentencing-with-the-help-of-ai-abang-iskandar-malaysia>>.

¹⁷¹ Hiral Sanghvi et al, "Digitalisation of Judiciary in Malaysia: Application of Artificial Intelligence in the Sentencing Process 22 December 2022" (Proceedings of the International Conference on Law and Digitalization (ICLD 2022) 93.

¹⁷² Ibid 93.

Recommendations by the AiCOS are not binding on the judge in question. In other words, the recommendation is only to assist the judge in computation of an appropriate sentence taking into consideration of the appropriate sentencing principles, judicial precedent, and other relevant factors, while still ensuring that unwarranted disparity is mitigated.¹⁷³ The use of AiCOS has generated legal controversies ranging from its constitutionality, the ability to perpetuate bias, black boxness, moral grounds, and legitimacy. For example, Malaysia lawyers challenged the use of AiCOS because the country's Criminal Procedure Code does not provide for the use of AI when making decisions.¹⁷⁴ In *Denis P. Modili v Public Prosecutor*,¹⁷⁵ which was the first that involved the use of AI for sentencing in Malaysia, the accused counsel appealed the constitutionality of an AI sentence based on relevant provisions of the Malaysian Federal Constitution. On appeal, the sentence of 12 months was reduced to 6 months by the appeal court but no reason was given, and the constitutionality concern was not addressed by the court.¹⁷⁶ Along the same line, Malaysian scholars like Putera have argued that the use of AiCOS presents unacceptable risks of bias and error in such a way that will infract the rule of law.¹⁷⁷ Despite these issues, the use of AiCOS has continued to expand with increased commitment from members of the judiciary. Moreover, no quantitative study has shown how helpful AiCOS has been to sentencing judges in terms of its predictive accuracy. However, the continuing expansion of the system to more offences may suggest that judges are finding it useful.

¹⁷³ *Supra* note 170.

¹⁷⁴ Rina Chandran, "As Malaysia tests AI court sentencing, some lawyers fear for justice" (last visited 27 July 2023) Online: The Stars <<https://www.thestar.com.my/tech/tech-news/2022/04/12/as-malaysia-tests-ai-court-sentencing-some-lawyers-fear-for-justice>>

¹⁷⁵ *Denis P Modili v PP*, Case no. BKI-41H-3/2-2020.

¹⁷⁶ Mahyuddin Daud, "Artificial Intelligence in The Malaysian Legal System: Issues, Challenges And Way Forward" (2022) 39:1 The Journal of the Malaysian Bar 11.

¹⁷⁷ Nurus Putera et al, "Artificial Intelligence-Powered Criminal Sentencing in Malaysia: A Conflict with the Rule of Law" (2022) 7:7 International Virtual Colloquium on Multi-disciplinary Research Impact (2nd Series) 441.

2.7 Summary

This chapter marks a significant starting point for the discussions that follow in other chapters of this thesis. It provides a crucial highlight of the use of advanced analytics in the domain of sentencing practice. Two main AI technologies; risk assessment tools and automated judicial systems have been introduced as catalysts for evidenced based sentencing reform. Risk assessment can promote evidence-based sentencing by ensuring that the decision of the court matches the risk level of the offender. More recently, automated judicial sentencing technologies are now being imagined, discussed and applied. These technologies predict the judge rather than the offender and are arguably more effective in producing consistent sentencing outcomes. What has been unequivocally demonstrated is that the criminal justice system, in particular, sentencing is not left out of the ensuing technological disruptions arising in the criminal justice domain. Indeed, AI-powered sentencing technologies have immense capabilities that can support and address existing processes and challenges.

Chapter 3: Disparate Sentencing in Canada: The Rise and Fall of Evidenced-Based Sentencing

Reforms

3.1 Introduction

Despite differences in legal systems, the need to address disparate sentencing has remained central, and several countries around the world have devised different strategies to address it, some of which include the use of technology. Indeed, many scholars agree that unwarranted variation in sentencing undermines the very principles of fundamental justice.¹⁷⁸ Subjectivity in sentencing, lack of proper guidelines, and the absence of limitations on the exercise of judicial discretion produce unjustified disparity that is objectionable in a democratic system.¹⁷⁹ This is because the imposition of disparate sentences for offenders with similar characteristics is against the basic tenets of equality principles and due process.¹⁸⁰ Thus, distinctions in treatment should be neither arbitrary nor unreasonable but should be rooted in significant factual distinctions.¹⁸¹ Although sentencing theories have fluctuated between two extremes, identical disposition of all persons convicted of the same offence, and individualized disposition based on the character of the offender, a middle course that protects fundamental tenets of equal treatment while considering the peculiar character of the offenders' claim should remain the objective of sentencing and is often sought at the very least by many jurisdictions.¹⁸²

Furthermore, crafting a fit and proper sentence shapes public perception of social equality or otherwise.¹⁸³ In fact, Ulmer argued, "sentencing is a window into a society's, and a community's,

¹⁷⁸ James M. Anderson, Jeffrey R. Kling & Kate Stith, "Measuring Interjudge Sentencing Disparity: Before and After the Federal Sentencing Guidelines" (1999) 42:1 Journal of Law & Economics 274.

¹⁷⁹ Ibid 182.

¹⁸⁰ Ibid 182.

¹⁸¹ Ibid 182.

¹⁸² Sarah Krasnostein and Arie Freiberg, "Pursuing Consistency in an Individualistic Sentencing Framework: If You Know Where You're Going How Do You Know When You've Got There" (2013) 76:1 Law and Contemporary Problems 266. See for example s. 718.1 of the Canadian Criminal Code which states that 'A sentence must be proportionate to the gravity of the offence and the degree of responsibility of the offender.'

¹⁸³ Ulmer, J. T, *New Theory and Research on Sentencing* (2019) 36:7 Justice Quarterly 1145.

cultural and social production of who and what is considered deserving of sanction," and thus the presence of extralegal disparities in punishment arguably undermines the fundamental moral goals of punishment itself.¹⁸⁴ This is because unjustified disparity violates fundamental tenets of the rule of law and the right to equality, erodes public confidence in the administration of justice, and has costly resource implications.¹⁸⁵

The issue of disparate sentencing in Canada remains both historic and perennial. Similarly, evidence-based sentencing reform dates back to many decades ago. As far back as 1979, Canadian academic, Aidan Vining, noted, "The Canadian sentencing system is in need of major reform."¹⁸⁶ Sentencing reforms did become a thing of concern in Canada in the early 1980s after which different proposals were put to test, but mostly failed.¹⁸⁷ Some of these reforms include proposals for sentencing guidelines, the establishment of a sentencing commission and the use of technology (i.e., computer based sentencing systems and information sentencing systems), aimed at addressing the prevalent issue of disparate sentencing. The "Substantive" sentencing reform which finally arrived in 1996 consisted of a proposal for statutory codification of the purpose and principles of sentencing. However, the reform package lacked any form of sentencing guidelines.¹⁸⁸

This chapter investigates the issue of disparate sentencing in Canada. It considers historical strategies aimed at attenuating the issue through various sentencing reform methodologies. It underscores the position of Canadian sentencing policy and practices as unusual when compared to other western democracies. The analysis contained in this chapter is structured into three interconnected parts. Part 1 examines extant sentencing praxis, typified by unique and incomparable

¹⁸⁴ Ibid 1145.

¹⁸⁵ Supra note 182 at 266; Arie Freiberg, "Bridging Gaps, Not Leaping Chasms: Trust, Confidence and Sentencing Councils" (2021) 12(3) *International Journal for Court Administration* 1.

¹⁸⁶ Aidan R. Vining, "Reforming Canadian Sentencing Practices: Problems, Prospects and Lessons" (1979) 17:2 *Osgoode Hall Law Journal* 355.

¹⁸⁷ Julian Roberts, "The Evolution of Penal Policy in Canada" (1998) 32:4 *Social Policy & Administration* 422 – 424.

¹⁸⁸ Ibid 422 – 425.

patterns of discretionary judicial sentencing tradition. In addition, it highlights qualitative findings that validate the discretionary nature of sentence disparity in Canada. Part 2 looks at past reform proposals aimed at addressing disparate outcomes. This is broken down into two eras: pre-1996 and post-1996 reform methodologies. Generally, no significant reform ever happened during the two periods, except for the legislative validation of discretionary sentencing tradition. Finally, Part 3 examines earlier technological techniques aimed at addressing disparate outcomes in Canada.

3.2 Discretion without Limit

Sentencing practice in Canada is one of a kind when compared to western contemporaries. In the words of Julian Roberts, "Canada is increasingly becoming an anomalous jurisdiction in the area of sentencing".¹⁸⁹ Indeed, most common law jurisdictions such as the UK, the US, New Zealand, and South Africa have shifted away from highly discretionary sentencing practices to one that places some levels of legislative guardrails on the exercise of judicial discretion.¹⁹⁰ The desirability to place such legislative boundaries is based on the need to ensure that sentencing outcomes are consistent in a way that upholds democratic tenets of checks and balances, equality before the law, and public confidence in the judicial systems.¹⁹¹

Unlike its contemporaries, past reform efforts to structure sentencing have failed for a number of reasons, and perhaps Canada now occupies a distinctive position that is somewhat concerning. This level of distinctiveness is further exemplified by its greater commitment to individualized sentencing

¹⁸⁹ Julian Roberts and Howard Bebbington, "Sentencing Reform in Canada: Promoting a Return to Principles and Evidenced-based Policy" (2013) 17:3 Canadian Criminal Law Review 329.

¹⁹⁰ This form of sentencing practice described as the concept of 'instinctive synthesis' analysis which underscores that just sentence follows from the experience of the judge in order to produce individualized sentencing instead of a systemic approach. See Mirko Bagaric, "Sentencing: From Vagueness to Arbitrariness: The Need to Abolish the Stain that is the Instinctive Synthesis" (2015) 38:1 UNSW Law Journal 76; See also Australian case of *Markarian v The Queen* 2005 HCA 25 (18 May 2005); "There is no objectively correct sentence, only a range of sentences that the majority of experienced judges would agree applied to the case....There is no Aladdin's cave of accurate sentencing methodology...There is only human judgement based on all of the facts of the case, the judge's experience, the data derived from comparable sentences, and the guidelines and principles authoritatively laid down in statutes and authoritative judgements."

¹⁹¹ Jose Pina-Sanchez et al, "Exploring the Origin of Sentencing Disparities in the Crown Court: Using Text Mining Techniques to Differentiate between Court and Judge Disparities" (2019) Social Science Research 2.

at the expense of parity. Generally, discourse around sentencing policy often wavers between a strict deterministic sentencing approach or an individualistic perspective that considers the offender's context. These polarized views can be seen in the work of influential Canadian criminal law authors like Nadin-Davis and Clayton Ruby. The former proposed some guardrails on judicial discretion through some forms of matrix or schedules while the later argues for a sentencing approach that focuses primarily on the individual, irrespective of evidence of wide disparate outcomes.¹⁹² According to Nadin-Davis, "The conflicting judgment on the issue of uniformity contains nothing more than semantics disputes. Uniformity, as far as desirable, means uniformity of approach or approximate equality of treatment. Wide disparity is repugnant to our notion of justice. The basic premise...is that while absolute uniformity of sentence is not possible, nevertheless sentences upon like offenders for like offence should not be widely disparate."¹⁹³ What Nadin-Davis proposed is a middle ground approach which will be to set meaningful borders on judicial discretion while still allowing a contextual assessment of individual context but ensuring that unwarranted disparity is rooted out from the justice domain.

However, the overarching Canadian approach to sentencing was articulated by the Supreme Court of Canada (SCC) in *R v Ipeelee*,¹⁹⁴ when it noted that "Who are courts sentencing if not the offender standing in front of them?" as a justification for an approach that individually assesses fit and appropriate sentence despite the possibility of disparate outcomes. Also, in *R v M(CA)* the SCC further expressed justification for highly differential outcomes by asserting

Sentencing is an inherently individualized process, and the search for a single appropriate sentence for a similar offender and a similar crime will frequently be a fruitless exercise of academic abstraction. As well, sentences for a particular offence should be expected to vary to some degree across various communities and regions in this country, as the "just and appropriate" mix of accepted sentencing goals will

¹⁹² Nadin-Davis, *Sentencing in Canada* (Canada: Carswell 1982); Clayton Ruby, *Sentencing* (Canada: Butterworths 1980)

¹⁹³ *Ibid* 8.

¹⁹⁴ 2012 SCC 13 at para. 86.

depend on the needs and current conditions of and in the particular community where the crime occurred...¹⁹⁵

This commitment to highly individualized assessment due to the absence of any form of meaningful guidance leaves the determination process almost exclusively to the individual judge. Very few stakeholders support this approach, other than the judiciary itself.¹⁹⁶ For instance, Doob argued that inconsistent sentencing in Canada has been justified by a type of judicial fetish: individualized sentencing.¹⁹⁷ Supporters however argue that individualizing sentencing help to put more human face on sentencing¹⁹⁸ and, hence, "in some ambiguous, spiritual manner, judges are simultaneously serving everyone's interests."¹⁹⁹ According to Benjamin Berger, individualized sentencing responds better to;

the humanity of the moment of sentencing and what is morally and politically urgent about it: the extraordinary act — carried out by a judge — of the state effecting political ends by inflicting violence and suffering on an individual. It seems ethically crucial that the judge draw close to the individual in that moment in order to ensure that the character of this suffering is appreciated; only then can we speak intelligibly about the fitness of a punishment" ...[and] that in this, this emergent approach is better equipped to offer up some resistance to the well-worn pattern of criminal punishment reproducing and exacerbating pre-existing disadvantage and marginalization.²⁰⁰

In short, Berger clearly supports the view that sentencing should respond to the individual's understanding of punishment which is both morally and politically necessary. This political necessity responds to the issue of Aboriginal marginalization which sympathetically justifies the need for individualized assessment. For example, Section 718.2(e) of the *Criminal Code* provides "all available sanctions, other than imprisonment, that are reasonable in the circumstances and consistent with

¹⁹⁵ [1996] 1 SCR 500 para 91-92.

¹⁹⁶ D. van Zyl Smit, "Constitutional Jurisprudence and Proportionality in Sentencing" (1995) 3:4 *European Journal of Crime, Criminal Law, and Criminal Justice* 374.

¹⁹⁷ Anthony N. Doob, "The Unfinished Work of the Canadian Sentencing Commission" (2011) 53:3 *Canadian Journal of Criminology & Criminal Justice* 285.

¹⁹⁸ Tata Cyrus, "A Sense of Justice: The Role of Pre-sentence Reports in the Production (and disruption) of Guilty Pleas" (2010) 12:3 *Punishment and Society* 1462.

¹⁹⁹ *Supra* note 197 at 285.

²⁰⁰ Benjamin L Berger, "Judicial Discretion and the Rise of Individualization: The Canadian Sentencing Approach" in Kia Ambos ed *Sentencing: Anglo-America and German Insights* (Belgium: Gottingen University Press, 2020) 250.

the harm done to victims or the community should be considered for all offenders, with particular attention to the circumstances of Aboriginal.²⁰¹ This provision has been followed by judicial pronouncements like the famous *Gladue* Case which recognize the remedial privileges that sentencing courts must take into consideration when dealing with Aboriginal offenders.²⁰² Nevertheless, the issue of unwarranted disparate sentencing still applies within the context of Aboriginal offenders. Even though section 718.2(e) lawfully recognizes the peculiar need of historically marginalized communities, the section does not preclude the possibility of disparate sentencing among the protected groups, as each judge may assess the circumstances of an Aboriginal defendant differently.

The nature of the individual assessment of offenders' circumstances has dwindled into a controversial domain of individualized proportionality or what Berger described as 'hyper individualization...', the emergent principle of individualization at work in Canadian sentencing law.²⁰³ The term "hyper individualization" was used by Berger to describe a deep commitment to a narrowed assessment of individual context in the assessment of sentencing computation without due regard to the principle of parity.²⁰⁴ As noted by Berger, the Supreme Court of Canada has expanded the scope of individualized sentence to include several extraneous factors that are not directly linked to the nature of the sentence itself such as the suffering experienced by the defendant in the hands of

²⁰¹ Criminal Code, RSC 1985, c C-46.

²⁰² *R v Gladue*, [1999] 1 SCR 688. Section 718.2(e) directs judges to undertake the sentencing of such offenders individually, but also differently, because the circumstances of aboriginal people are unique. In sentencing an aboriginal offender, the judge must consider: (a) the unique systemic or background factors which may have played a part in bringing the particular aboriginal offender before the courts; and (b) the types of sentencing procedures and sanctions which may be appropriate in the circumstances for the offender because of his or her particular aboriginal heritage or connection. See also *R v Anderson*, 2021 NSCA 62; *R v Moriss*, 2021 ONCA 680 on the jurisprudence on sentencing black offenders.

²⁰³ *Supra* note 200 at 250. See also, Benjamin L Berger, "Reform of the Purposes and Principles of Sentencing: A Think Piece" (Department of Justice Canada 2016) 5,271.

²⁰⁴ *Ibid* 250.

the police²⁰⁵ and the collateral consequences of the sentencing.²⁰⁶ These emerging commitments create new possibilities for sentencing disparity, but the issue of disparate sentencing is not new.

3.3 Empirical Research on Disparate Sentencing in Canada

Many challenges currently affect the Canadian criminal justice system. Some of these problems include the overrepresentation of Indigenous peoples, vulnerable and marginalized groups,²⁰⁷ victim revictimization and voicelessness, trial delays, etc.²⁰⁸ On the issue of overrepresentation of Indigenous peoples, data from 2020-2021 revealed that Indigenous peoples represented 32 percent of those in federal prisons, while they only accounted for 5 percent of the general population.²⁰⁹ Some empirical findings provide partial support that this disparate representation is connected to race.²¹⁰ Indeed, these issues are crucial and in need of due attention. However, the broader issue of judicial guidance and disparate sentencing outcomes, which was more prominent in the 1980s and 1990s, has taken the back seat since the 2000s. Indeed, the problem of sentencing disparity and judicial guidance has vanished from public, scholarly, and professional discourse in Canada.²¹¹

Wide judicial discretion and interprovincial and/or interjudge disparity are historic and perennial issues in Canada as revealed by several scholarly empirical studies, especially before the 2000s. In fact, vivid evidence of sentencing disparity in Canada existed since the 1950s, as demonstrated by

²⁰⁵ *R v Nasogaluak*, 2010 SCC 6.

²⁰⁶ *R v Pham*, 2013 SCC 15, in this case, the defendant, an immigrant had his sentence reduced by a day in order to avoid the losing his right to appeal a removal order following his conviction. The SCC noted that Such consequences “may be taken into account in sentencing as personal circumstances of the offender.” See para 11. See also *R v Suter*, 2018 SCC 34, where the defendant who has accidentally killed a child had his received sentencing well below the normal range because he had been kidnapped, beaten and had one of his thumbs cut off by hooded men prior to his sentencing.

²⁰⁷ Department of Justice, “The Canadian Criminal Justice System: Overall Trends and Key Pressure Points” (Last visited 14 May 2023) Online: <<https://justice.gc.ca/eng/rp-pr/jr/press/>>.

²⁰⁸ Department of Justice, “Final Report on the review of Canada’s Criminal Justice System” (Last visited 14 May 2023) Online: <<https://www.justice.gc.ca/eng/cj-jp/tcjs-tsjp/fr-rf/docs/fr.pdf>>

²⁰⁹ Department of Justice, “Addressing the overrepresentation of Indigenous peoples in the justice system in Nunatsiavut” (last visited 14 May 2023) Online: <<https://www.canada.ca/en/department-justice/news/2023/01/addressing-the-overrepresentation-of-indigenous-people-in-the-justice-system-in-nunatsiavut0.html>>

²¹⁰ Michael Weinrath, “Sentencing Disparity: Aboriginal Canadians, Drunk Driving and Age” (2007) 8:2 *Western Criminology Review* 16.

²¹¹ Julian Roberts and David Cole, “Sentencing in Canada: Current Issues and Concluding Thoughts” in Julian Roberts and David Cole eds *Sentencing Law in Canada* (Canada: Irwin Law Inc, 2020) 390.

an empirical study conducted by Stuart Jaffary, which recorded serious variations in sentencing outcomes.²¹² Jaffary's study showed that an offender convicted of theft was nearly twice as likely to be sent to prison in Quebec as in Canada as a whole and almost five times as likely as in the provinces of Manitoba, Saskatchewan, or British Columbia.²¹³ Although this study demonstrated that sentencing disparity was prevalent in Canada at that time, it can be argued that the methodology of examining precedents or archival material alone without considering other social and personal factors that might have affected the sentencing outcomes makes the conclusions black-boxed.²¹⁴

A more sophisticated phenomenological study of the sentencing patterns of a sample of Ontario judges was conducted by John Hogarth in 1971. The study included an evaluation of precedents and semi-structured interviews, which sought to understand what sentencing meant to individual judges, and what meaning each judge attached to the facts of cases and surrounding circumstances, among other things. The study revealed quite clearly that it was easier to predict the outcome of the sentencing decision by knowing the identity of the judge than by knowing the facts of the case.²¹⁵

As aptly described by Hogarth and Julian Roberts;

We have already seen that correlation between the fact of the cases as perceived and understood by the judges and their sentencing behaviour... In fact, it appears from the analysis that one can explain more about sentencing by knowing a few things about the judge than knowing a great deal about the facts of the case.²¹⁶...Knowledge about the judge and the judge's attitude was more relevant than knowledge of the facts of the case...the facts of the case accounted for less than 10 percent of the variations in sentencing practices. However, the judges' perception and sentencing philosophies explained about 50 percent of the variance in sentence length.²¹⁷

²¹² Reporting data from 1955, Stuart Jaffary, *Sentencing of Adults in Canada* (Canada: University of Toronto Press 1963) cited in Julian Roberts and David Cole, "Sentencing in Canada: Current Issues and Concluding Thoughts" in Julian Roberts and David Cole eds *Sentencing Law in Canada* (Canada: Irwin Law Inc, 2020) 390.

²¹³ Stuart Jaffary, *Sentencing of Adults in Canada* (Canada: University of Toronto Press 1963).

²¹⁴ John Hogarth, *Sentencing as a Human Process* (Canada: University of Toronto Press, 1971) 10.

²¹⁵ *Ibid* 10.

²¹⁶ *Ibid* 350.

²¹⁷ Julian Roberts, "Sentencing Trends and Sentencing Disparity" in Julian Roberts and David Cole eds *Making Sense of Sentencing* (Canada: University of Toronto Press, 1999) 155.

By implication, judges are guided more by their intuition of what just sanction means due to lack of clear guidance on what sentencing goals should apply in relevant cases. Hence, Hogarth concluded that the idea of equality in the criminal justice system is nothing but a "myth"²¹⁸ Hogarth concluded that the root cause of this disparity can be connected to the lack of sentencing information about the sentences similar judges would have passed for typical offences.²¹⁹

Another interesting and striking demonstration of disparate sentencing was carried out by Palys and Divorski in 1987. A sentencing simulation exercise with a group of more than 206 Provincial Courts Judges (about 20 percent of all provincial courts judges at that time) attending a sentencing education seminar where each judge was required to read and examine summaries of a series of cases, identify the key sentencing objectives, and then propose a fit and appropriate sentence, revealed without a doubt that the wide variability in proposed sentences was unequivocally connected to what can be described as the judge factor.²²⁰ The study found that the wide variability in sentencing was constituted by a differential subscription to legal objectives to apply to a particular case.²²¹

Aside from such empirical studies, revelations, and consensus about unwarranted disparity in sentencing in Canada have not emanated from academics alone but also from members of the judiciary. For example, a survey of the Canadian judiciary conducted for the Canadian Sentencing Commission in 1988 revealed that 12 percent of judges agreed there was too much variation from judge to judge; 62 percent said there was a fair amount of variation; 26 percent said that the variation

²¹⁸ *Supra* note 214 at 6.

²¹⁹ *Ibid* 371.

²²⁰ Julian Roberts "Structuring Sentencing in Canada, England and Wales: A Tale of Two Jurisdictions" (2012) 23 *Criminal Law Forum* 323; T. S. Palys; Stan Divorski, "Explaining Sentence Disparity" (1986) 28:4 *Canadian Journal of Criminology* 347.

²²¹ T. S. Palys; Stan Divorski, "Explaining Sentence Disparity" (1986) 28:4 *Canadian Journal of Criminology* 360.

that does exist is not significant. Of those respondents who thought there was a problem with unwarranted variation, the most popular explanation (69 percent) was 'different personal attitudes and/or approaches of judges to sentencing'. As expected, only 5 percent of this group attributed unwarranted sentencing variation to a lack of legislative guidance and 50 percent thought there was some unwarranted variation from province to province in sentences handed down. In other words, about two-third of judicial respondents agreed with the assertion that there is a fair degree of sentencing of inter-judge variation.²²²

3.4 Historical Backdrop: Evidence-Based Reforms

Typically, sentencing reform policy in Canada may be divided into two eras: pre-1996 and post 1996. Pre-1996 reform was typified as the time when a structured sentencing reform agenda looked very possible, unlike what applies today.²²³ Legislative reform post-1996 has been little to none, other than conservative efforts to legislate more mandatory minimums in order to curtail what was perceived as excessive judicial discretion. According to Doob and Webster, "In contrast with many Western nations, the structure of Canadian sentencing and its overall effects on imprisonment did not change dramatically over the past century. To a large extent, 'Parliament left sentencing to judges...Sentencing principles legislated in 1996 largely reflected the status quo.'²²⁴ Thus, it is not out of place to conclude that there has been very little substantial reform in Canadian sentencing policy even though there have been two eras.

²²² Jean-Paul Brodeur, Renate Mohr and Julian Roberts "Views of Sentencing: A Survey of Judges in Canada (Department of Justice Canada 1988) 3,7. See also J. V. Roberts, Views of Sentencing: A Survey of Judges in Canada' (Department of Justice Canada, 1988) 7.

²²³ Julian Roberts and Howard Bebbington, "Sentencing Reform in Canada: Promoting a Return to Principles and Evidenced-based Policy" (2013) 17:3 Canadian Criminal Law Review 329.

²²⁴ Anthony N Doob and Cheryl Marie Webster, "Weathering the Storm? Testing Long-Standing Canadian Sentencing Policy in the Twenty-First Century" (2016) 45 Crime and Justice 359.

3.4.1 Pre-1996 Reforms

Reform proposals pre-1996 ranged from the need to exercise restraint so as not to follow the lead of the United States of America, to proposing that some guidance was needed at the very least to ensure consistency in criminal sentencing.²²⁵ Despite the prison explosion crisis in the USA that was causative of inflexible sentencing grids, there was a definite consensus among Canadian criminal justice stakeholders that the issue of disparate sentencing was worthy of attention. Four main agendas were central to the reform proposals contemplated, which were: Firstly, the creation and application of sentencing guidelines, secondly, the establishment of a sentencing council, thirdly, periodic sentencing conferences, and lastly, a mandatory duty for judges to provide reasons for their decisions.²²⁶

The first series of steps taken by the Canadian federal government was the appointment of a Royal Commission, otherwise known as the Canadian Sentencing Commission (CSC) which was charged with the responsibility to review extant sentencing praxis. This point was clearly noted among others in the preamble of the Order in Council establishing the Sentencing Commission, stating that "unwarranted disparity in sentences is inconsistent with the principle of equality before the law" and further noted that "sentencing guidelines to assist in the attainment of those goals have been developed for use in other jurisdictions and merit study and consideration for use in Canada."²²⁷ Following broad consultations, the CSC produced a comprehensive Canadian Sentencing

²²⁵ Ibid 359.

²²⁶ Aidan R. Vining, "Reforming Canadian Sentencing Practices: Problems, Prospects and Lessons" (1979) 17:2 Osgoode Hall Law Journal 364,365. See Aidan Vining paper for a detailed narrative of the reform proposals.

²²⁷ "Sentencing Reform: A Canadian approach: Report of the Canadian Sentencing Commission" (Report of the Canadian Sentencing Commission 1987) Online: < <https://publications.gc.ca/site/eng/9.699766/publication.html>> (J.R Omer Archambault) 6,7.

Commission Report, which was further considered by an all-party committee at the Parliament, which then produced the Daubney Report.²²⁸

The resolve of the CSC and the Daubney Report was clear. Sentencing disparity was a fundamental issue in Canada. The 1987 comprehensive report by the CSC titled, "Sentencing Reforms: A Canadian Approach"²²⁹ recommended a unique package of sentencing guidelines model which was different from the US standard rigid grid, and different from the "guidance by words" approach that was mostly used by Scandinavian countries like Sweden.²³⁰ On the contrary, the CSC report proposed among others the creation of "presumptive ranges" together with the abolition of discretionary parole for all crimes except offences with mandatory life sentences.²³¹ This means that instead of each offence or group of offences having an explicit guideline, the guideline will provide a range of sentences which will allow courts to appropriate sentence within that range or take a departure where necessary and with reasons.²³²

Despite the unique nature of the approach, the idea of a presumptive sentencing guideline was strongly opposed by federal judges. An advisory report by the Supreme Court of Ontario in 1987 noted amongst others that judges found it undesirable to curtail judicial discretion, all in the belief that the 'proposed presumptive guidelines would inject into the sentencing process an element of coercion which would unnecessarily confine judicial discretion in an area where individualization is

²²⁸ David Daubney, "Taking Responsibility: Report of the Standing Committee on Justice and Solicitor General on its Review of Sentencing" (House of Commons 1988) Online: <<http://johnhoward.ca/wp-content/uploads/2016/12/1988-KE-9434-A22-S9-1988-Daubney-E.pdf>>

²²⁹ Supra note 227.

²³⁰ Supra note 223 at 330.

²³¹ Supra note 227 xxx.

²³² Ibid xxx.

crucial.²³³ In the end, the proposed sentencing guidelines never received legislative consent and was a missed golden opportunity to structure the Canadian sentencing process.²³⁴

3.4.2 Post-1996 Reforms – Bill C-41

Essentially, post-1996 reforms began with the enactment of Bill C-41, which codified the principles and purposes of sentencing under section 718 of the Canadian Criminal Code, aside from the innovative introduction of a conditional sentence that was meant to reduce reliance on incarceration.²³⁵ Section 718 of the Criminal Code lists a number of sentencing purposes which a sentencing judge must consider, which are denunciation, deterrence, incarceration, rehabilitation, reparations and the promotion of a sense of responsibility. Bill C-41 did not refer to a permanent body such as a sentencing commission or council despite the numerous advocacies for its creation.²³⁶

The introduced conditional sentence by Bill C-41 was largely criticized by scholars as having no significant impact on the reform sought since the 1980s. The main argument is that the law did nothing other than codify the status quo²³⁷ because it merely lists a range of purposes and principles without giving explicit guidance on how it should be exercised.²³⁸

²³³ "Unpublished Supreme Court of Ontario Committee on Sentencing" [chairman J. A. Brooke], 1987 35 cited in Anthony N. Doob, "The Unfinished Work of the Canadian Sentencing Commission" (2011) 53:3 Canadian Journal of Criminology & Criminal Justice 287.

²³⁴ Supra note 223 at 331.

²³⁵ Supra note 220 at 330.

²³⁶ Julian Roberts and David Cole, "Sentencing in Canada: Current Issues and Concluding Thoughts" in Julian Roberts and David Cole eds Sentencing Law in Canada (Canada: Irwin Law Inc, 2020) 403.

²³⁷ Supra note 197 at 287.

²³⁸ Subsequent amendments in 2005, 2009, 2015 respectively provided explicit direction in a number of cases such as offence against children, peace officer, animals as prescribed under section 445.01(1). For example, section 718.01 provides that; When a court imposes a sentence for an offence that involved the abuse of a person under the age of eighteen years, it shall give primary consideration to the objectives of denunciation and deterrence of such conduct; Section 718.02 When a court imposes a sentence for an offence under subsection 270(1), section 270.01 or 270.02 or paragraph 423.1(1)(b), the court shall give primary consideration to the objectives of denunciation and deterrence of the conduct that forms the basis of the offence; Section 718.03 When a court imposes a sentence for an offence under subsection 445.01(1), the court shall give primary consideration to the objectives of denunciation and deterrence of the conduct that forms the basis of the offence.

Other than articulating a strong statement in support of the principle of proportionality as the fundamental principle, the implication of the provision on sentencing structure is that by merely listing possible traditional objectives, on the usual list of traditional objectives such as denunciation, individual and general deterrence, rehabilitation, incapacitation and so on, it retained the Canadian tradition of leaving sentencing largely to the judges.²³⁹ It is highly unlikely that judges felt that their discretion was being limited in any important way by these new provisions.

Particularly, commentators have noted that section 718 is nothing more than a “confusing” mix of utilitarian and retributivist traditions.²⁴⁰ Section 718 only provides for a list of sentencing goals such as denunciation, deterrence, separation, rehabilitation, reparation and accountability without stating which should be applied in particular situations. Roberts and von Hirsch noted that section 718 states proportionality as the fundamental principle of sentencing, but argued that the weakness of the section is that it embeds and confines proportionality to ‘10 objectives and 5 principles’²⁴¹ without providing any direction on how exactly proportionality interacts with these objectives and principles.²⁴² To them, they would rather reformulate the section to include a purpose for sentence, a fundamental principle and several subordinate principles.²⁴³ This implies that they will eliminate all 6 utilitarian sentencing goals, which will allow the court to majorly interpret proportionality within the retributive ideals. However, Gerry Ferguson argued against deleting the objectives by stating that a contextual reading of the section suggests that utilitarian objectives are to be applied within the confines of what amounts to proportionate and “just sanction.”²⁴⁴ On the contrary, Professor

²³⁹ *Supra* note 197 at 287.

²⁴⁰ Julian V. Roberts & Andrew von Hirsch, “Statutory Sentencing Reform: The Purpose and Principles of Sentencing” (1995) 37:2 *Criminal Law Quarterly* 233.

²⁴¹ The current Canadian Criminal Code has 6 sentencing objectives. Roberts and von Hirsch’s analysis was made during the drafting stage of the Bill.

²⁴² *Ibid* 277.

²⁴³ *Ibid* 234.

²⁴⁴ Gerry Ferguson, “A Review of the Principles and Purposes of Sentencing in Section 718-718.21 of the Criminal Code” (Department of Justice Canada 2016) 16.

Ferguson recommended that the idea of emphasizing the principles of deterrence and denunciation for offences under section 718.01-04 should be extended to other offences and made to be grounded in the nature of the offence, the degree of harm, the moral culpability and blameworthiness of the offender.²⁴⁵

Indeed, courts have often had to battle with balancing competing sentencing objectives since there is generally no statutory guidance. For instance, in *R v Huynh* the court recognized that the goal of promoting the offender's responsibility, acknowledging of harm and rehabilitation can be conflicting.²⁴⁶ It is also not uncommon to see appeals based on the ground that the sentencing court provided disproportionate sentencing for failing to reconcile competing sentencing principles.²⁴⁷

In conclusion, Doob argued that since Bill C-41 avoided the difficult question of the specific purpose and principles of sentencing, the Bill opened the door for unprincipled sentencing reforms such as subsequent proliferation of mandatory minimums by conservative regimes. In other words, the problem with inexplicit sentencing directives is that it makes it difficult if not impossible to identify when a sentencing law violates important principles.²⁴⁸ Overall, the 1996 reforms did nothing significant to the Canadian sentencing landscape, or said differently, "nothing changed."²⁴⁹

3.4.3 Bill C-41 – Disparity and Section 718 of the Canadian Criminal Code

Testaments to the fact that the 1996 reform to sentencing in Canada did nothing new to address unwarranted disparity other than codifying existing sentencing jurisprudence has been validated by a number of findings. Some recent surveys and case laws revealed that the problem lingers. A 2016 and 2017 national survey by the Department of Justice revealed that seven in ten (71%) Canadians

²⁴⁵ Ibid 16.

²⁴⁶ *R v Huynh*, 2006 BCPC 582.

²⁴⁷ *R v Dragani*, 2018 BCCA 225.

²⁴⁸ Supra note 197 287.

²⁴⁹ Ibid 287.

indicated that the best approach to sentencing is to provide guidelines while still allowing for a judge's discretion and 73% of Canadians preferred giving judges/courts guidelines to follow when deciding sentences while 65% approved of researching effective sentencing practices.²⁵⁰

According to Ferguson, no one really knows how disparate sentencing has become because of section 718 since there is no sentencing commission or body to investigate it. However, there are no reasons to assume that the situation has declined following the enactment of Bill C-41.²⁵¹

Although there is no great deal of evidence on the depth of disparity in sentencing in Canada, many scholars argue that it remains substantial.²⁵² This can be seen by looking at two instructive cases that found their way up to the Supreme Court, *R v McDonnell*,²⁵³ and *R v L.M.*,²⁵⁴ In *R v McDonnell*, the accused was convicted of two sexual assaults under section 217 of the Criminal Code, each offence was committed seven years apart. The first offence was committed in 1986 while the second was in 1993. At the trial court, the judge imposed a sentence of 12 months imprisonment for the first assault, and 6 months concurrent for the second assault, for a total of one year imprisonment. At the court of appeal, two judges varied that sentence to five years (4 years for the first assault and one year consecutive for the second assault), while the third judge thought that the one year imposed by the trial judge represents a fit sentence and should not be disturbed. On further appeal to the Supreme Court of Canada, four judges held that one year was unfit and that 5 years was the fit sentence, while five judges held that the one-year sentence was fit and should not be varied. Overall, six judges thought that 5 years was a fit sentence and seven judges thought that 1 year was a fit sentence even though they were all applying the same sentencing principles to the same case.

²⁵⁰ Department of Justice, "Research at a Glance: Sentencing Commissions and Guidelines" (last visited 15 May 2023) Online: <<https://www.justice.gc.ca/eng/rp-pr/jr/rg-rgco/2018/mar05.pdf>>

²⁵¹ Supra note 244 at 13.

²⁵² Robert Diab, "Sentencing for Terrorism Offences: A comparative Review of Emerging Jurisprudence" (2011) 15:3 Canadian Criminal Law Review 267; See also Kristen MacLennan, "Constructing the "Other": Discursive Mechanisms at Play in the Sentencing of Post 9/11 Canadian Terrorism Cases" (MA Dissertation, University of Ottawa 2020) 14.

²⁵³ [1997] 1 SCR 948.

²⁵⁴ 2008 SCC 31.

Although this case had begun prior to the reform introduced by Bill C-41 in 1996 under which sentencing principles were codified, Bloos and Renke argued, “[the] Supreme Court did not address its responsibilities in light of disparities in sentences and sentencing principles across Canada - disparities sure to be exacerbated by the introduction of the new sentencing rules under Bill C-41.²⁵⁵ What McDonnell’s case reveals is that the principles opened enough opportunities for wide disparity as each judge can choose which principle they wish to emphasize.

A similar case is *R v L.M.*, with respect to two serious sexual offences on the offender’s young daughter, the trial judge imposed a sentence of 10 years on the first offence and a consecutive sentence of 5 years for the second offence, for a total of 15 years. On appeal, two judges held that 15 years was unfit and varied the sentence to 9 years, (6 years for the first offence and 3 years consecutive for the second offence). At the Supreme Court of Canada, eight judges held 15 years was fit, but one judge held that it was not and would have imposed 9 years. The wide divergent conclusion obviously reveals that the current statement of purposes and principles are not detailed enough to prevent that dramatic disparity depending on what judge is applying those principles.²⁵⁶

3.5 Using Mandatory Minimum Sentencing

Mandatory minimum penalties take different forms. They can be attached to specific offences such as an automatic life imprisonment, or applicable to recidivists, or attached to an offence when certain aggravating factors exist.²⁵⁷ Although minimum penalties are not new in Canada, they proliferated in the early 2000s.²⁵⁸ The intent for mandatory sentences is generally grounded upon several claims

²⁵⁵ Marvin R. Bloos and Wayne N. Renke, "Stopping Starting Points: R. v. McDonnell" (1996) 35:3 Alberta Law Review 802.

²⁵⁶ Supra note 244 at 13.

²⁵⁷ Yvon Dandurand, "Exemptions from Mandatory Minimum Penalties: Recent Developments in Selected Countries" (Report by the Department of Justice, March 2016) Online: <https://www.justice.gc.ca/eng/rp-pr/jr/rr16_ex/rr16_ex.pdf>

²⁵⁸ Mary Allen, "Mandatory Minimum Penalties: An Analysis of Criminal Justice Outcomes for Selected offenses" (Canadian Centre for Justice Statistics, Catalogue no. 85-002-X, August 29 2017) Online: <<https://www150.statcan.gc.ca/n1/en/pub/85-002-x/2017001/article/54844-eng.pdf?st=NOh4WiNU>> 3. The rise of mandatory penalties began with the Harper administration in 2006, through an increase in the number of offences that have mandatory minimum sentence. Such legislations includes An Act to amend the Criminal Code (protection of children and other vulnerable persons) and the Canada Evidence Act, 2005; Tackling Violent Crime Act, 2008; Safe Streets and Communities Act, 2012; Protection of Communities and

that conform with penal populism ideologies; they are preventative in nature, reduce wide judicial discretion, and they help to promote predictability and consistency in sentencing thereby reducing sentence disparity.²⁵⁹ The conservative government under the Harper regime introduced numerous mandatory minimums for the reasons stated above. A commonly cited paragraph from the Alberta Court of Appeal decision in *R v Arcand* articulated the motive for increased mandatory sentences as follows:

We must face up to five sentencing truths. First, it is notorious amongst judges, of whom there are now approximately 2,100 in this country at three court levels, that one of the most controversial subjects, both in theory and practical application is sentencing. The second truth is that, the proposition that if judges knew the facts of a given case, they would all agree, or substantially agree on the result, is simply not so. The third truth reveals that Judges are not the only ones who know truth one and two, and thus judge shopping is alive and well in Canada — and fighting hard to stay that way. All lead inescapably to the fourth truth. Without reasonable uniformity of approach to sentencing amongst trial and appellate judges in Canada, many of the sentencing objectives and principles prescribed in the Code are not attainable. This makes the search for just sanctions at best a lottery and at worst a myth. Pretending otherwise obscures the need for Canadian courts to do what Parliament has asked: minimize unjustified disparity in sentencing while maintaining flexibility. The final truth. *If the courts do not act to vindicate the promises of the law, and public confidence diminishes, then Parliament will.*²⁶⁰

The above paragraph reveals that Canadian judges recognize the continuing problem of sentence disparity despite the codification of sentencing principles and purposes. In addition, the paragraph also acknowledges the fact that the increase in legislative mandatory minimum sentences was the incentivized by current unstructured sentencing praxis. Nevertheless, Ferguson and Berger points out that the proliferation of mandatory minimums in Canada was based more on political gains than the need for an evidenced based reform.²⁶¹ For example, David Paciocco observed, “minimum

Exploited Persons Act, 2014; Tougher Penalties for Child Predators Act, 2015; Controlled Drugs and Substances Act (CDSA) as amended in 2012.

²⁵⁹ Supra note 258 at 3.

²⁶⁰ *R v Arcand*, 2010 ABCA 363 para 8.

²⁶¹ Gerry Ferguson and Benjamin L. Berger, “Recent Developments in Canadian Criminal Law” (2013) 37 Criminal Law Journal 315.

sentences are enacted by governments not because of a commitment to sound justice policy, but rather to create a political advantage by taking 'tough on crime' measures."²⁶²

This is aside from the criticism that mandatory minimums often infract *Charter* rights, are an expensive and ineffective way to control crime, place undue limitations on judicial discretion, and they can disproportionately affect racial minorities like Aboriginal persons.²⁶³ Interestingly, the Supreme Court of Canada's jurisprudence on section 12 of the *Canadian Charter of Rights and Freedom* has been used to declare many mandatory minimum penalties as being against protection against cruel and unusual punishment or treatment.²⁶⁴

Furthermore, research in Canada and the US has found no evidence that mandatory minimums can advance the goal of denunciation and deterrence, but that it in fact results in the infliction of cruel punishment and sentence disparities.²⁶⁵ Arguably true is that what mandatory minimum sentences do is to shift the pole of sentence discretion from the court to the prosecutor which does not address other conduits of disparity that affects the overall punishment that an offender receives.²⁶⁶ As Wallace noted, 'mandatory minimums "succeeded only in shifting it from one place to another - from the judge, in public proceedings conducted on the record in the courtroom, to the prosecutor's office, off the record and behind closed doors."²⁶⁷

²⁶² David M Paciocco, "The law of minimum sentences: Judicial responses and responsibility" (2015) 19:2 Canadian Criminal Law Review 173; See also Anthony N. Doob & Carla Cesaroni, "The Political Attractiveness of Mandatory Minimum Sentences" (2001) 39:2 & 3 Osgoode Hall Law Journal 287; See also *R v Nasogaluak* 2010 SCC 6 where the Supreme Court of Canada asserted that "minimum sentence is a forceful expression of government policy in the area of criminal law".

²⁶³ Renee M Pomerance, "The New Approach to Sentencing in Canada: Reflections of a Trial Judge" (2013) 17:3 Canadian Criminal Law Review 317.

²⁶⁴ See *R v Ferguson*, 2008 SCC 6; *R v Nur*, 2011 ONSC 4871; *R v Hills*, 2023 SCC 2; *R v Hilbach*, 2023 SCC 3.

²⁶⁵ Smith, Paula, Paul Gendreau, and Claire Goggin, "The Effects of Prison Sentences and Intermediate Sanctions on Recidivism: General Effects and Individual Differences 2002-01" (Solicitor General Canada, 2002) Online: < <https://www.publicsafety.gc.ca/cnt/rsracs/pblctns/ffcts-prsn-sntncls/ffcts-prsn-sntncls-eng.pdf>>; Thomas Gabor and Nicole Crutchter, "Mandatory Minimum Penalties: Their Effects on Crime, Sentencing Disparities and Justice System Expenditures" (Department of Justice January 2002) Online: < https://www.justice.gc.ca/eng/rp-pr/csj-sjc/ccs-ajc/rr02_1/rr02_1.pdf>

²⁶⁶ Tonry, M. H. "The Mostly Unintended Effects of Mandatory Penalties: Two Centuries of Consistent Findings" (2009) 38:1 Crime & Justice 65.

²⁶⁷ Henry Scott Wallace, "Mandatory Minimums and the Betrayal of Sentencing Reform: A Legislative Dr. Jekyll and Mr. Hyde" (1993) 57:3 Fed Probation 9.

Indeed, mandatory sentencing is focused on sheer uniformity and not unjustified disparity. In other words, mandatory minimums place an overly unnecessary monolithic focus on consistency by treating judicial discretion as its "enemy."²⁶⁸ Thus, the unmitigated emphasis placed by mandatory sentences on the sentence outcomes represents the notion of formal equality as opposed to substantive equality which suggests in fact that "equality does not mean sameness; the term more commonly refers to the consistent application of a comprehensible principle or mix of principles to different cases."²⁶⁹ However, "equal justice depends, inter alia, on sufficient judicial discretion to ensure that sentences are proportionate to individual case facts and that relevantly similar – and relevantly different – offenders are treated as such."²⁷⁰ Hence, providing the precise sentence that a judge must pronounce, especially without exceptions, cannot meet the requirement of substantive equality and cannot be a good technique to address sentence disparity.

3.6 "Technological Turn": Computer-Based Sentencing Information Systems in Canada

Aside from having sentencing guidelines, some scholars have also recommended the use of sentencing information systems to address unwarranted disparity. In fact, Canadian scholar Brian Grainger advocated for computer-assisted decision-making tools powered by AI to assist in sentencing decisions in the mid-1980s.²⁷¹ Notably, researchers in Canada happen to be the first to develop computer-based sentencing information systems and have them applied by judges in British

²⁶⁸ Declan Roche, Mandatory Sentencing, "Trends and Issues in Crime and Criminal Justice No 138" (Australian Institute of Criminology, 1999) 4; Sarah Krasnostein, "Pursing Consistency: The Effect of different reforms on unjustified disparity in individualized sentencing frameworks" (PhD Thesis Monash University, Australia 2015) 255.

²⁶⁹ Albert W Alschuler, 'The Failure of Sentencing Guidelines: A Plea for Less Aggregation' (1991) 4 Federal Sentencing Reporter 161, 161-3; Marc Miller, 'Sentencing Equality Pathology' (2005) 54 Emory Law Journal 271.

²⁷⁰ Kate Warner "Mandatory Sentencing and the Role of the Academic" (2007) 18 Criminal Law Forum 321, 344.

²⁷¹ Brian Grainger, "Hard Times and Automation: Should Computers Assist Judges in Sentencing Decisions?" (1984) 26:2 Canadian Journal Criminology 231. Grainger argued that Justice, no less than any other 'life support system', should exploit technological breakthroughs. Beyond simple labor saving, computer assisted decision making in courts respects the judge's independence, recognizes case law, and reinforces the selection of an equitable solution, and that since the Industrial Revolution, new technologies have provided each generation with the means of better coping with contemporary demands for service.

Columbia, Manitoba, Saskatchewan and Newfoundland, although it was later described as a failed project.²⁷²

Sentencing information deficiency was considered in the 1980s to be the real problem in Canada as part of the reasons for disparate sentencing. The Sentencing Commission report in 1987 noted, "One of the most basic failings of the current sentencing system in Canada is that there is no method for anyone ... to know in a systematic, up-to-date, and accessible manner, on a continuing basis, what kind of sentences are being handed down."²⁷³ Aside from that, the process for collection of sentencing and the sentencing process was considered more complex and difficult in Canada, when compared to other jurisdictions which had some structure around sentencing computation.²⁷⁴

Nevertheless, the adoption of sentencing information systems was not considered impossible and was put to test. Again, the Canadian Sentencing Commission, for example, wrote in 1987 that "it is literally unthinkable that such an inherent relationship would not exist between sentencing guidelines, as developed by a sentencing commission, and the establishment of a reliable sentencing information system."²⁷⁵ It needs to be pointed out that in practice, guidelines are still primarily a print-based technology.²⁷⁶ Interestingly, Canadian judges embraced the move at an earlier stage. A survey of judges conducted by the Sentencing Commission in 1988 on the use of information systems and computer systems revealed that judges welcomed the idea. The outcome of the survey showed 79 percent favoured having a better information system about current sentencing practice, 70 percent favoured having a computer system to provide basic sentencing information about

²⁷² Marc L Miller, "A Map of Sentencing and a Compass for Judges: Sentencing Information Systems, Transparency and Next Generation of Reform" (2005) 105:4 *Columbia Law Review* 1372; Uri J Schild, "Criminal Sentencing and Intelligent Decision Support" (1998) 6 *Artificial Intelligence and Law* 165; Cyrus Tata, *Sentencing: A Social Process Re-thinking Research and Policy* (UK: Palgrave Macmillan, 2020) 157.

²⁷³ *Supra* note 227.

²⁷⁴ Robert Hann, "Information Systems for Sentencing Guidelines: Recent Experience: Research Reports of the Canadian Sentencing Commission" (Department of Justice 1998) 1.

²⁷⁵ *Supra* note 227.

²⁷⁶ *Ibid*

individual cases and 65 percent preferred a computer system to provide statistical summary information about current sentencing trends.²⁷⁷

Two pilot projects demonstrated the use of computer-based databases of sentencing decisions to assist a court at sentencing.²⁷⁸ Generally, they proposed that the judge would input the essential factors of the case, and then the computer will generate a template sentence based on the profile of prior sentence trends. Both projects were funded wholly or in part by the federal department of justice and they evidenced the potential of technology to promote greater consistency in sentencing.²⁷⁹ The two projects will be discussed below.

3.6.1 Hogarth's LIST Information Sentencing Project

Hogarth's project was succeeded by his remarkable empirical discovery of the factors that are causative of disparate sentencing in Canada. According to Hogarth, one of the factors that caused sentencing disparity was the lack of real time sentencing information. The system developed by Hogarth operated in British Columbia from 1987 to 1992, and its database consisted of sentencing decisions of the Provincial Court, Supreme Court and Court of Appeal of British Columbia.²⁸⁰ They included a penalty statistics section containing 120,000 trial decisions from the Provincial, County and Supreme Courts of British Columbia which allowed judges to examine distributions of penalty by entering limited offence and offender characteristics, a British Columbia Court of Appeal database containing 1,110 reported decisions, a file containing a list of Aggravating and Mitigating factors recognized by the British Columbia Court of Appeal, and the full text of those cases in which references are made to the factors, a Sentencing Law Database using case law and statutory

²⁷⁷ Jean-Paul Brodeur, Renate Mohr and Julian Roberts "Views of Sentencing: A Survey of Judges in Canada" (Department of Justice Canada 1988) 3,7

²⁷⁸ John Hogarth's and Anthony N Doob and Norman W Park's

²⁷⁹ Supra note 220 at 324.

²⁸⁰ John Hogarth, "Computer and the Law: Sentencing Database System, User's Guide" (Canada: LIST Corporation, 1988) cited in Uri J Schild and John Zeleznikow, "Comparing Sentencing Decision Support systems for Judges and Lawyers" (2008) 17:4 Journal of Decision Systems 534.

authority, and a resources component which provides information about programmes and institutions available in British Columbia.²⁸¹ The system only provided sentencing direction to judges without necessarily prescribing appropriate sentences. Schild outlined the user interface of the system and how it operated in the following way:

1. The user selects (from a menu) the appropriate legal domain (Criminal Code of Canada, Narcotics Control Act, etc.).
- (2) He next selects the particular offence from a list of offences.
- (3) He now defines a small number of offender characteristics. For robbery these would be: age-range, use of weapon (yes/no) and past record of violence (yes/no). After thus having specified the facts of the case at hand the user may proceed in one of several ways.
 - (i) He may request a histogram providing types of sentence ranges on the vertical axis for all cases in the database which match the facts of the case at hand. He may also request a table of the individual dispositions.
 - (ii) The user may view all or some of the relevant decisions of the British Columbia Court of Appeal. These cases are retrieved according to the type of the sentence.
 - (iii) The system permits the user to retrieve cases according to aggravating and mitigating factors relating to the offence, the record or the offender.
 - (iv) The system allows the retrieval of a summary of British Columbia Court of Appeal sentencing decisions which lay down general principles or specific factors which guide the exercise of discretion.²⁸²

The description above showed how detailed the system was, and how it was able to provide meaningful guidance to the judge. Schild noted that the statistical output of the system proved very important for judges in determining "average" sentence provided across British Columbia. However, the system did not enjoy popular usage from judges for a number of reasons. First, it was noted that there was little judicial consultation at the development stage of the project, which made judges felt that the information provided was not helpful to them. Second, the high cost of the system's development and maintenance was also a factor.²⁸³ A notable criticism of the systems by Schild was, ". . . the statistical knowledge embodied in the LIST. . . is based on a very small number of characteristics... [and]...does not suffice to express the actual complexity of the sentencing

²⁸¹ Neil Hutton, Cyrus Tata and John N. Wilson, "Sentencing and Information Technology: Incidental Reform" (1994) 2 *International Journal of Law and Information Technology* 259.

²⁸² Uri J Schild, "Criminal Sentencing and Intelligent Decision Support" (1998) 6 *Artificial Intelligence and Law* 165; Cyrus Tata, *Sentencing: A Social Process Re-thinking Research and Policy* (UK: Palgrave Macmillan, 2020) 159.

²⁸³ *Supra* note 281 at 260.

process”.²⁸⁴ In other words, it was not comprehensive enough to accommodate very complex facts, implying that judges may find the system less useful for some tricky cases.

3.6.2 Doob and Park’s Computer Sentencing Information Project

Doob and Park’s computer-based intervention was primarily incentivized by the outcomes of the 1987 survey of judicial officers quoted above. Aside from that, they underscored the importance of information systems for a number of reasons. One, judges may not be able to recall similar cases because the particular configuration of the facts of the case may be unusual or they might even forget entirely.²⁸⁵ Two, the lack of clear guidance on the specific sentencing objectives from the legally wide range of allowable aims and sanctions will not allow the judge to know for sure what sentences that have been handed down for cases like the one before them. Finally, given that communication of such detailed information is not perfect, it is possible that different judges (in different locations, for example) will have developed differing standards of what kind of sentence is appropriate for particular cases. They noted that information systems are needful given the context of Canada’s sentencing practice at that time,²⁸⁶ that would likely be relevant even with future reforms, although they concluded that giving information to sentencing judges alone may not solve the problem of disparate outcomes.²⁸⁷

The judge will first select an offence (from among 34 offences) and then added information about six other “dimensions,” including criminal record, involvement of the offender in the offence, the seriousness of the offence, impact on the victim, and prevalence of the offence in the community,

²⁸⁴ Uri J Schild, *Intelligent Computers for Criminal Sentencing* (1995) *The Fifth International Conference on Artificial Intelligence and Law: Proceedings of the Conference*, Maryland 230; See also, Lovegrove, A. *Judicial decision-making sentencing policy and numerical guidance* (Germany: Springer Verlag 1989) 42.

²⁸⁵ *Ibid* 57.

²⁸⁶ *Ibid* 57.

²⁸⁷ *Ibid* 57.

after which like decisions will be displayed. The actual working of the system was described by the researchers as follows:

The judge places a disk (or disks) into an IBM-compatible computer and turns the computer on. The judge then sees, on the screen, a list of offences. Using the "arrow" keys on the keyboard, the offence of interest is pointed to and the "+" key is pressed. A second "screen" of choices appears and the judge can either press a key and go on to see all of the cases in the system for that offence or describe the case being sentenced (on such factors as the seriousness of the particular instance of the offence or the criminal record of the accused). To do this, the judge simply points to a "factor" (e.g., previous criminal record of the accused), presses the "+" key, and then "describes" the record by pointing to the most appropriate of three choices of descriptors (e.g., "None, inconsequential, unrelated"; "Some but not serious"; or "Substantial"), which then appear on the screen. The choice is made by pressing the "+" key again and the program proceeds. In this way, cases of interest can be selected by using up to the maximum six "factors" which are contained on the original sheet filled out by the judge.²⁸⁸

Although the systems later died out due in 1990 because judges claimed they did not find the system helpful, two reasons probably made the systems attractive to judges at the early stage. First, the researchers were clear that the system was not designed to perform the role of sentencer which would mean that judicial power is being shared with the system, in other words, it was not a form of guideline or prescriptive system.²⁸⁹ Secondly, the systems would be built in such a way that judges would not have to learn about computers before they can maximize their functionalities. Doob will later write that the project failed because Canadian judges had little interest in information about current court practice, that they were accustomed to numerical forms of information neither did their legal tradition reposed guidance on sentencing on the Court of Appeal.²⁹⁰

²⁸⁸ Ibid 64-65. See page 64 – 66 for a detailed description of how the systems will function.

²⁸⁹ Ibid 60.

²⁹⁰ Anthony N Doob, "Sentencing Aids: Final Report to the Donner Canadian Foundation" (Canada: Centre of Criminology University of Toronto 1990) cited in Cyrus Tata, "The Application of Judicial Intelligence and 'Rules' to Systems Supporting Discretionary Judicial Decision-Making" (1998) 6 *Artificial Intelligence and Law* 208; See also Katja Franko Aas, *Sentencing in the Age of Information: From Faust to Macintosh* (UK: Glasshouse Press 2005) 32.

3.7 Summary

This chapter discusses the historical and current state of sentencing practise in Canada. It examines past and present conduits of sentence disparity and the reform proposals that had been sought. Some of these include the establishment of flexible sentencing guidelines and the use of technology to promote meaningful consistency in sentencing outcomes, all of which have failed. Indeed, evidence abounds that the current state of sentencing in Canada manufactures disparate sentences because the codification of sentencing principles without any clear legislative guidelines leaves the determination process entirely to the judge. Overall, the chapter underscores the peculiar nature of sentence issues in Canada that continue to linger due to judicial apathy and unsound and policy-driven legislative reforms.

Chapter 4: Structuring Sentencing Through Technology: Replacing or Supplementing Sentencing Decisions?

4.1 Introduction

As discussed in the earlier chapter, existing sentencing laws and practices in Canada routinely fail at its central mission of delivering justice, at least for the view taken in this thesis. Empirical studies and even admission amongst judges reveal a system that is inconsistent in its outcomes, and disparate in its impacts, requiring that the current sentencing regime is in dire need of reform. The necessity for parity is underscored by reflecting on the significant impact a sentencing determination can have on the life of the offender. On this point, Ryberg and Roberts noted,

A legal punishment entails acts that, in other contexts, would constitute the quintessential example of wrongful treatment: namely, the imposition of death, penal confinement, or various deprivations of property and liberty. These consequences require a persuasive justification.²⁹¹

In other words, State's imposition of penalty must be founded on just grounds, otherwise, it amounts to illegal punishment. To have a criminal justice system that operates on a highly unstructured sentencing terrain should therefore be a cause for worry. Indeed, advocates for sentencing parity contend that failure to uphold consistency violates due process underpinnings such as equality before the law. They also contend that disparate sentences are rooted in an unjustified discretionary approach to the purpose of sentence and gives way for the introduction of extra-legal factors in formulating appropriate and fit sentences.²⁹² Indeed, "Not only is this result undesirable, it is a

²⁹¹ Jesper Ryberg and Julian V. Roberts, "Sentencing and Artificial Intelligence: Setting the Stage" in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 2.

²⁹² Jose Pina-Sanchez and Robin Linacre, "Refining the Measurement of Consistency in Sentencing: A Methodological Review" (2016) 44 *International Journal of Law, Crime and Justice* 68; Renner, K. E., and Warner, A. H. *The Standard of Social Justice Applied to an Evaluation of Criminal Cases Appearing Before the Halifax Courts* (Windsor Yearbk. Access Just. 1981) 62-80; T. S. Palys and Divorski, S. Judicial decision-making: Results from a national study, and reflections on the boundary of empirical "turf," In Muller, D. J., Blackman, D. G., and Chapman, A. J. (eds.), *Perspectives in Psychology and Law*, (USA: Wiley 1983).

contravention of equality principles that account for Parliament’s declaration that a sentence should be similar to sentences imposed on similar offenders for offences in similar circumstances”.²⁹³

Recent advances in technology like ML algorithms offer a promising advantage. In Chapter 2, examples of such ML sentencing algorithms that can rationalize and predict sentencing decisions have been highlighted and discussed. The common motive is to use these systems to address disparate sentencing outcomes.²⁹⁴ Particularly, automated sentencing systems hold greater promise of providing structured sentencing predictions, unlike risk assessment tools. This is because the former will likely be or should be trained on holistic sentencing data instead of mostly past risk profiles. This is not to say that risk assessment tools do not factor into consideration past sentencing decisions. However, its recommendations are largely influenced by risk indices and do not factor in other crucial sentencing properties like the sentencing aims and principles and aggravating and mitigating factors. Risk assessment tools are designed to predict the behaviour of the offender, while automated sentencing judicial systems are developed to predict the behaviour of the judge – in other words, it is an algorithm designed “to predict what a modal judge in a given jurisdiction would regard as proportionate.”²⁹⁵

How such a system should be adopted is receiving scholarly attention. This chapter looks into the ensuing arguments around how AI can be used to address disparate sentencing. It concludes that despite the advancements in technology, the sentencing process requires components beyond mathematical approximation. It explains that the notion of AI replacing a human judge fails to appreciate the complexity of the judging process and the variability of sentencing legal traditions. It concludes that an assistive automated sentencing system is a better option still.

²⁹³ *R v Ryan*, 2015 ABCA 286 at para 65; Court also referred to the decision of the Supreme Court of New South Wales in *The Queen v. Jurisic*, [1998] NSWSC 423 where it stated that “[i]nconsistency in [sentencing decisions] offends the principles of equality before the law [and is itself] a manifestation of injustice”.

²⁹⁴ Examples have been highlighted in chapter 2 of this thesis.

²⁹⁵ Vincent Chiao, “Predicting Proportionality: The Case for Algorithmic Sentencing” (2018) 37:3 Criminal Justice Ethics 240.

4.2 Proposals on the Use of Automated in Criminal Sentencing

The digitization of the sentencing process is already a reality in some jurisdictions either by using AI-powered risk assessment tools or automated judicial systems that can supplement judicial decision-making.²⁹⁶ For the former, they merely serve as decisional aid because the outcome the system produce constitutes one of the factors the sentencing judge will take into account in making a final decision. As earlier stated, risk assessment tools focus on risk prediction with which it proposes a sentence for the offender. In short, they won't pass as the best tool to structure sentencing patterns. Further, risk assessment tools also raise several legal and ethical considerations and can be somewhat problematic, many of which apply to automated sentencing systems.

Automated judicial systems appear to be a viable alternative, but there are growing scholarly tensions on how they should be used. Recommendations for the use of automated systems range from moderate (supplement) to extreme (replace). The proposals are often divided between AI systems that completely *replace* the judge and determine sentence by taking into account the relevant facts, principles, guidelines, and purposes of sentencing after all necessary factual information has been deposited into the system; and systems that *support* judicial decision-making similar to the past Sentencing Information System. Each of these positions has its basic assumptions but is predominately based on the necessity to have a structured and principled sentencing system that mitigates disparate outcomes. These two views will be discussed below.

4.3 Supplanting the Sentencing Judge

The current state of machine learning AI points to some indication that these systems can fully perform the role of a judge without any human intervention. This position is hotly contested but several legal scholars seem to defend such a claim. These scholars argued that AI can not only

²⁹⁶ See chapter two for examples.

conduct legal argumentation and interpret calculation results, but also fully perform the role of a judge.²⁹⁷ Along this line, Bagaric and Wolf argued that sentencing may be particularly amenable to computerized decision making because most sentencing laws have well-established objectives and considerations, presumptive or fixed and mathematically ascertainable.²⁹⁸

They argued that computerized sentencing through the use of sophisticated algorithms can eliminate more subtle problems with sentencing law, some of which include the judge's subconscious biases on sentencing decisions, which can often lead to the imposition of harsh sentences on racial and marginalized groups.²⁹⁹ In addition, they proposed that computerized sentencing could foreseeably incite a fundamental reshaping of substantive sentencing law objectives and principles, which would result in profound community benefits, including far lower incarceration levels and, consequently, a safer community.³⁰⁰

If we are going to box artificial intelligence into extant sentencing designs, there is no way we can accept the proposition that sentencing can be fully automated. Perhaps the starting point to interrogate these claims is to place the ability and training that is required of a judge side-by-side with that of current machine learning systems capabilities. Essentially, counterarguments focus on the 'capability' required in the judging process as opposed to merely looking at the 'outputs' produced by AI systems. Indeed, AI systems suffer from a number of non-codable human abilities like intuition, flexibility, empathy, and individualization, some of which will be discussed below.

²⁹⁷ Yadong Cui, *Artificial Intelligence and Judicial Modernization* (China: Springer and Shanghai People's Publishing House 2020) 1601; Tania Sourdin and Richard Cornes, "Do Judges Need to be Human? The Implication of Technology for Responsive Judging" in Tania Sourdin and Archie Zariski eds *The Responsive Judge: International Perspectives* (Singapore: Springer 2018) 85; David Harvey, "From Susskind to Briggs: Online Court Approaches" (2016) 5 *Journal of Civil Litigation and Practice* 84, 93.

²⁹⁸ Mirko Bagaric & Gabrielle Wolf, "Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice" (2018) 25:3 *George Mason Law Review* 653,654.

²⁹⁹ *Ibid* 708,709.

³⁰⁰ *Ibid* 708,709.

4.3.1 Legal and Factual Complexity

Judging, and in particular, sentencing is a very delicate and complex process: delicate because its outcomes can have a significant impact on the life of the defendant, and complex because it requires the judge to consider a variety of complex facts and unsettled variables such as the nature of the crime, the harm inflicted, society's interest, family obligations, and many more. This huge task requires analogical reasoning that requires the interpretation of normative principles and not just extracting patterns from data.³⁰¹ What would be required of an AI judge was illustratively described by Ian Kerr and Carissima Mathen as follows:

...it would have to be able to recognize the different parties and stakeholders and understand their basic claims. It would have to be able to hear evidence. It would have to be able to make factual findings. It would have to be able to know the primary and secondary legal rules, as well as other legal standards such as principles and policies. It would have to know how to determine which are the relevant rules and principles, correctly interpret them according to their context, assign them appropriate weight and apply them accurately to the facts. It would have to reason by analogy. It would have to understand and take into account the political and policy implications of the decisions it is making. In sum, an AI would have to be capable of engaging in legal reasoning.³⁰²

These are tasks that require human cognitive ability. In sentencing particularly, the sentencer is required to consider an infinite number of factors. The possibility that an AI judge will be able to carry out all of these complex functions is very doubtful and arguably impossible. For example, the ability to make factual findings will mean that the AI judge can detect truth from lies or sieve relevant facts from redundancy. In terms of interpreting rules, the systems must be designed to correctly apply very complex and nuanced legal rules and principles to the facts identified—that is, the system would be endowed with the ability to cognize and perceive the spirit of the law.³⁰³ Indeed, trials that

³⁰¹ Cass R. Sunstein, "Of Artificial Intelligence and Legal Reasoning" (2001) 8 U. Chicago L. Sch. Roundtable 29 at 33–34

³⁰² Ian Kerr & Carissima Mathen, "Chief Justice John Roberts is a Robot" (2014) University of Ottawa Working Paper, online: SSRN <https://ssrn.com/abstract=3395885> 20,21; Another illustrative point was made by Judge Richard Posner that, "The judicial mentality would be of little interest if judges did nothing more than apply clear rules of law created by legislators, administrative agencies, the framers of constitutions, and other extrajudicial sources (including commercial custom) to facts that judges and juries determined without bias or preconceptions. Judges would be well on the road to being superseded by digitized artificial intelligence programs." Richard A. Posner, *How Judges Think* (USA: Harvard University Press, 2008) 5.

³⁰³ Adelina A Sargsyan, "Prospects for digitalization of sentencing and execution of punishment" (2022) 16:2 Penitentiary Science 147.

require political or social context consideration will mean that the systems must be up to date at all times to be able to perform these functions. This is very unlikely.

Furthermore, the inability of AI systems to fully understand the language of the law is a fundamental flaw. This is because legal rules even though they appear rigid, nevertheless require the judge to fully comprehend and apply them contextually. Also, legal rules are often expressed in natural language which may be difficult for a computer to parse. As noted by Simon Chesterman, "humans often interpret language consistently, but not logically, and language is inherently ambiguous for computers to fully understand its context and circumstances."³⁰⁴ McEwan's illustration explains it in the following way: "Imagine an instruction to go shopping, for example, with the following request: 'Please buy me a newspaper; and if the store has bananas, buy six.'³⁰⁵ Generally, the algorithm may interpret the instruction literally which means that it could return with six copies of the newspaper.³⁰⁶ However, one must acknowledge that recent developments in NLP seemed to have overcome these sort of issues. Nonetheless, some statutes, case laws and principles of law are arguably more challenging because they are not reducible to logical representation and are based substantially on human experience.³⁰⁷

4.3.2 Intuition and Common Sense

According to Selbst, intuition which can also be called common sense is one of the main differences between humans and machines.³⁰⁸ Intuition can be described as "a sense of feeling of pattern or

³⁰⁴ Simon Chesterman, "All Rise for the Honourable Robot Judge? Using Artificial Intelligence to Regulate AI" (NUS Law Working Paper No 2022/019) 8 Online: SSRN < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4252778 >

³⁰⁵ Ian McEwan, *Machines Like Me: A Novel* (Knopf Doubleday Publishing Group, 2019) 178.

³⁰⁶ *Supra* note 304 at 8.

³⁰⁷ *Ibid* 9-10; See also Livio Robaldo et al, "Introduction for Artificial Intelligence and Law: Special Issue "Natural Language Processing for Legal Texts" (2019) 27 *Artificial Intelligence and Law* 113. According to Robaldo, legal analytics pushes NLP to its limits. See also European Union, *Mining and Reasoning with Legal Text: Massively parallel Reasoning Algorithms for Normative Reasoning* (D3.5 690974, 31/12/2019) 16 <<https://www.mirelproject.eu/publications/D3.5.pdf>> See also, David Fuenmayor and Christoph Benz Müller, *Computational Hermeneutics: An Integrated Approach for the Logical Analysis of Natural-Language Arguments* in Beishui Liao et al eds *Dynamics, Uncertainty and Reasoning: The Second Chinese Conference on Logic and Argumentation* (Singapore: Springer 2019) 187-207; Melissa Perry, "iDecide: Administrative Decision-Making in the Digital World" (2017) 91 *Australian Law Journal* 29, 32

³⁰⁸ Andrew D Selbst, "A Mind Defense of Our New Machine Overlords" (2017) 70:87 *Vanderbilt Law Review En Banc* 101.

relationship.”³⁰⁹ It usually comes to play when a decision must be made when addressing a complicated situation and all the facts required is not present or the outcome is not precise.³¹⁰ In sentencing, intuition is trained by experience and not only information which allows some room for the exercise of justifiable discretion. Judges generally can do this due to their experience over the years in applying the law using their intuition and sense of justice.³¹¹

Arguments in support of an AI judge fail to consider other important factors such as induction and intuition, as well as the capacity to assess the social impact of decisions.³¹² In other words, legal decisions are not based solely on formal rules. Hence, the exercise of justifiable and contextual discretion in sentencing must be retained and considered vital for any judicial system. Unfortunately, machine learning cannot exercise such capacity because discretion crucially depends on context.³¹³ Put rightly by Selbst, “machines are myopic. They can only understand facts about the world that they are exposed to, and as a result, it is possible they will miss something that a human will see with the human’s broader knowledge base.”³¹⁴

Also, it is difficult and perhaps unachievable to develop an AI system that can factor social developmental goals into its decision. In addressing this issue, Arias argued that the human component in the judiciary which is fundamentally attributed to the cognitive ability and process of the human judge is essential to the evolution of the human society.³¹⁵ Accordingly, “without the ability to forget or unlearn ... we could not have recognized the rights of the child or the women,

³⁰⁹ Vicki L Sauter, “Intuitive decision-making” (1999) 42:6 Communications of the ACM 109.

³¹⁰ Andrew Vincent, Tania Sourdin and John Zeleznikow, *Criminal Sentencing, Intuition and Decision Support in Khaled Elleithy and Advances and Innovations in Systems, Computing Sciences and Software Engineering* (USA: Springer 2007) 42.

³¹¹ Harry Rodger, “Andrew Lensen and Marcin Betkier, Explainable artificial intelligence for assault sentence prediction in New Zealand” (2023) 53:1 Journal of the Royal Society of New Zealand 134.

³¹² Australian Law Reform Commission, “Technology: What It Means for Federal Dispute Resolution”, Issues Paper No 23 (1998) 101.

³¹³ Frank Pasquale, “A Rule of Persons, Not Machines: the Limits of Legal Automation” (2019) 87:1 George Washington. Law Review 52–55; See also Richard M. Re & Alicia Solow-Niederman, “Developing Artificially Intelligent Justice” (2019) 22 Stanford Technology Law Review 252–253.

³¹⁴ Supra note 308 at 101.

³¹⁵ Paula C Arias, “Artificial Intelligence & Machine Learning: A model for a New Judicial System?” (2020) 3 Revista Internacional Jurídica y Empresarial. Número 81.

and overcome racial and ethnic segregation.”³¹⁶ What this means is that using AI systems will tie society to past inequities.

In addition, Richard and Solow-Niederman argue, “social and cultural norms can change the law rather abruptly in a way that would be difficult for a machine to identify, more difficult to react to, and impossible to advance itself—resulting in judgments that would not advance society and may not even reflect it.”³¹⁷ Invariably, a fully automated system must be constructed to not only understand the law but to factor in rapidly changing social norms. Therefore, If AI were to take over an adjudication process, it would change not only the mechanics of adjudication but also the adjudicatory values that are held by legal actors and that underlie the legal system.³¹⁸

The varied complexity of situations required during the judging process fundamentally calls into question the ability of an AI judge. No wonder very few legal scholars share the belief, and even those who take such positions are better described as “skeptics.” Hence, sentencing is a uniquely human process as it involves varied activities that change on context;³¹⁹ aside from the fact that machines and humans process information and reach conclusions differently.³²⁰ Judges make decisions based on legal and cultural knowledge, experience, their interaction with the expertise of others such as lawyers, court-appointed experts, witnesses etc., context, and sometimes common sense, which machines (at least for now) cannot emulate.³²¹

³¹⁶ Ibid

³¹⁷ Richard M. Re & Alicia Solow-Niederman, “Developing Artificially Intelligent Justice” (2019) 22 Stanford Technology Law Review 244, 246–248, 252, 255.

³¹⁸ Frank Pasquale & Glyn Cashwell, “Prediction, Persuasion, and the Jurisprudence of Behaviourism” (2018) 68: Supp. 1 U.T.L.J. 63.

³¹⁹ John Morison & Adam Harkens, “Re-engineering Justice? Robot Judges, Computerized Courts and (semi) Automated Legal Decision-Making” (2019) 39:4 L. S. 618.

³²⁰ Ian Kerr & Carissima Mathen, “Chief Justice John Roberts is a Robot” (2014) University of Ottawa Working Paper, online: SSRN <<https://ssrn.com/abstract=3395885>>; Rebecca Crootof, “‘Cyborg Justice’ and the Risk of Technological-Legal Lock-In” (2019) 119 Columbia Law Review Forum 233 at 236–242

³²¹ Ignacio N. Cofone, “AI and Judicial Decision-Making” in Florian Martin-Bariteau & Teresa Scassa, eds., *Artificial Intelligence and the Law in Canada* (Toronto: LexisNexis Canada, 2021), ch. 13; Quentin L. Koop, “Replacing Judges with Computers is Risky” (20 February 2018), online: Harvard Law Review Blog <<https://blog.harvardlawreview.org/replacing-judges-with->

4.3.3 Empathy and Compassion

Compassion and emotion are also not out of place in the sentencing process. As rightly noted by Dagan and Baron, “softer” considerations other than retribution such as benevolence, compassion and other types of mercy remain important in modern criminal justice system.³²² Almost all jurisdictions take into account the lived experience of the defendant in determining an appropriate sentence. However, the reality is that machine learning systems have yet to be developed to interact with people with compassion, emotion or agile responsiveness.³²³ Recognizing this algorithmic flaw, Lord Philip Sales of the British Supreme Court in 2019 proposed that an “expert commission” could help ensure that automated decision-making processes have “a capacity for mercy.”³²⁴

Despite this perceived limitation, there are some views that it is possible to encode compassion into machine learning systems in the context of criminal sentencing. On this issue, Dagan and Baron argue that it depends on the conception of mercy or compassion; ‘Justice mercy’ or ‘Pure mercy’ and the type of AI system; inductive algorithm or deductive algorithm.³²⁵ Justice mercy implies mercy that does not deviate from the fundamental principles of proportionality, but rather the infusion of mercy that operates within the context of legally permissible retributive-based proportionality.³²⁶ Pure mercy is the opposite and can simply be described as the ability to emulate biological

[computers-is-risky/](#) ; Frank Pasquale, “A Rule of Persons, Not Machines: the Limits of Legal Automation” (2019) 87:1 *George Washington Law Review* 29–30.

³²² Netanel Dagan and Shmuel Baron, “The Compassionate Computer: Algorithms, Sentencing and Mercy” in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 145; Jessica Jacobson and Mike Hough, *Mitigation: the role of personal factors in sentencing* (UK: Project Report: Prison Reform Trust 2007) 40.

³²³ Tania Sourdin, “Judge v Robot? Artificial intelligence and Judicial decision-making” (2018) 4:4 *UNSW Law Journal* 1125; Bingie Liu et al, “Should Machines Express Sympathy and Empathy? Experiments with a Health Advice Chatbot” (2018) 21:10 *Behaviour and Social Networking* 625; Chris Kourakis, “The intersection of artificial intelligence and other new technologies with the judicial role” (2019) 31:4 *Judicial Officers Bulletin* 33.

³²⁴ Michael Cross, SC Judge Calls for Expert Commission on Algorithms (7 July 2023) Online: *The Law Society Gazette* <<https://www.lawgazette.co.uk/law/sc-judge-calls-for-expert-commission-on-algorithms/5102154.article>>

³²⁵ *Supra* note 322 at 150,151, 152, 155,155-157. Inductive algorithms according to the authors are algorithms that are trained using past judicial decisions. It merely finds correlates between case factors and uses it as a prediction point for new cases. Deductive algorithms however are pre-programmed with preferred sentencing principles, the weight to attached to relevant factors, and are more or less like structured sentencing guidelines.

³²⁶ *Ibid* 155,155-153.

properties like feeling, responding and noticing.³²⁷ Pure mercy will generally constitute a departure from equality principles or the award of undeserving considerations outside the legal parameters of justifiable mitigation. In theory, this is prohibited because judges are not expected to generally express emotional concerns that can affect their judgement in passing legally permissible sentences. But justice mercy means penal impact-based mitigation that is proportionality conscious. An example will include taking into consideration the disability or serious medical consideration of the offender in such a way that imposing the most stringent punishment will overshoot the retributivist proportionality.³²⁸ They noted that 'As long as deductive algorithms can calculate many moral and factual considerations so that the algorithm will produce a sentence ... it should be possible to add mercy considerations (justice mercy) to this equations?'³²⁹ In other words, factors such as disability or medical condition can be given appropriate weight when programming the algorithm such that when the algorithm finds that they are present in the facts, it gives a sentencing discount. By this, there is no need for the algorithm to show pure mercy since there is no need to exhibit personal sensitivity towards the defendant; a type of mercy that is normatively undesirable for a judge to show.

Therefore, until AI can simulate the human cognitive process, a fully automated court or an artificially intelligent judge is a futuristic idea or at best a myth. For now, it is hard to imagine an AI judge until new waves of AI capabilities are developed which possess the functional capacities identified above. Otherwise, to completely automated the sentencing process with current AI capabilities will mean

³²⁷ Amit Ray, *Compassionate Artificial Intelligence: Frameworks and Algorithms* (Compassionate AI Lab, 2018) 13,15; Jason M Kanov et al, "Compassion in Organization Life" (2004) 47:6 *American Behavioural Scientist* 812. Compassion according to Gilbert includes attributes such as sensitivity, sympathy, empathy, motivation/care, distress tolerance, non-judgement. See Paul Gilbert, "Compassion focused therapy: A special section" (2010) 3:2 *International Journal of Cognitive Therapy* 95.

³²⁸ *Supra* note 322 at 156.

³²⁹ *Ibid* 156.

that we have to reimagine and re-evaluate the role of the judge and the judicial system in our societies, which supposes redesigning the system or designing a new one.³³⁰

4.4 Supplementing Judicial Role

The use of assistive AI technologies for judicial decision-making means that they are intended to augment decision-making rather than take on the role of a judge completely. Using assistive judicial systems is very likely to cross the hurdles of legality and human complex moral judgment. This is because the system will not need to match or surpass human's intuitive level or reduce the sentencing process entirely into a mathematical enterprise. Rather, the system will only provide a meaningful snapshot of comparable sentences for similar cases, and the curated outcome will constitute one of the determining factors the judge *must* consider in sentencing. It is necessary to mention that this approach nevertheless faces some technical challenges, but the use of such systems in some jurisdictions already points to the fact that it can work. Whether it may work in all jurisdictions is another critical question, and that will be left to the last chapter of this thesis.

By using ML to augment sentencing decisions, there may be more structure and parity, especially in jurisdictions that do not have any formalized sentencing structure such as sentencing guidelines or mandatory judicial guidance. Aside from that, Schwarze and Roberts noted that ML may be used to identify flaws in previous sentencing outcomes like identifying unjustified disparate patterns in sentencing data.³³¹

³³⁰ Nigel Stobbs et al, "Can Sentencing Be Enhanced by the Use of Artificial Intelligence?", (2017) 41:5 Criminal Law Journal 261.

³³¹ Mathis Scharze and Julian Roberts, "Reconciling Artificial Intelligence and Human Intelligence: Supplementing Not Supplanting the Sentencing Judge" in in Jesper Ryberg and Julian V Roberts eds Sentencing and Artificial Intelligence (USA: Oxford University Press 2022) 206.

4.4.1 What could such a system look like?

Although several scholars have discussed the potential benefit of automated judicial systems, very few have provided a clear direction on how such systems can be developed and how they may be applied in practice. However, two studies by Vincent Chiao and Nigel Stoobs, Dan Hunter and Mirko Bagaric respectively have provided some clear directions and their propositions will be outlined and analyzed.

According to Chiao, there are two ways the system may be developed. The first option is to develop an algorithm using a traditional regression technique that is capable of drawing correlations between input variables. This will require that judges themselves input the relevant sentencing factors for why they gave a particular decision.³³² This will require a definite agreement on the usual sentencing factor since Chiao stated that the algorithm will make predictions based on 'a finite list of case-specific factors'.³³³ Such factors could include judicially recognized aggravating or mitigating factors which can then be inputted into the system. Getting such data will not be difficult in a jurisdiction that has rigid or at the very least some sort of flexible sentencing guidelines. In jurisdictions without a sentencing guideline, such data could be collected from judicial members using surveys.³³⁴

Alternatively, Chiao proposed that a machine learning algorithm holds greater promise due to its incredible ability to draw correlations from vast datasets. Chiao noted that unlike the previous option which can be static, a machine learning algorithm can revise its predictions quickly in the light of new evidence in the dataset. ML algorithms can be self taught based on the data, which according to Chiao allows it to continually reflect the up-to-date and collective wisdom of the court.³³⁵ Chiao

³³² Supra note 295 at 245.

³³³ Ibid 246.

³³⁴ Nur Syairah Mohd Nizam, "Seeing Eye to AI: A Modest Case for an Algorithmic Sentencing System in New Zealand" (LLB Dissertation, University of Otago, New Zealand 2021) 26.

³³⁵ Supra note 40 at 246

made these assumptions on the belief that a rich dataset will be available albeit he acknowledged that the likelihood of obtaining such data may be low.

Furthermore, Chiao proposed that the prediction of the algorithm should not be binding at the initial stage, but departure should be allowed in highly unusual cases. Where there is a need for such departure, the judges should be required to provide detailed reasons so that the algorithm can be trained on the new reason. Moreover, a sentencing reason should always be provided by the judges so that the recommendation of the algorithm will not amount to “an exercise in rubberstamping.”³³⁶ Each jurisdiction could develop its model. For instance, aside from treating the outcome produced by the algorithm as recommendations, the judge may be required to treat the outcome as presumptively binding but they may exercise their discretion within the ranges provided and should only make substantial departure where necessary but with clearly articulated reason. Using such an algorithm, Chiao proposed that; “the algorithm would generate a prediction of the sentence that would be regarded as proportionate for such a crime in the relevant jurisdiction, as well as sentences within a standard deviation from the averages.”³³⁷

To Chiao, this proposition is very likely to satisfy the views of both critics and supporters of discretionary sentencing. First, the system envisioned is not expected to be emboldened with non-quantifiable characteristics like emotion, because such a process will involve “a rich moral tapestry of actions, intentions, emotion, harms and relationships.”³³⁸ Secondly, the predictions are not binding and are only meant to draw the attention of the judge to what their colleague’s view of proportionate sentences means based on factual specificity before them.

³³⁶ Ibid 246.

³³⁷ Ibid 240. [Emphasis added].

³³⁸ Ibid 246.

While Chiao's view appears attractive, it suffers from a number of obstacles. First, his idea of how the system will work is not well laid out and understandable. Secondly, the argument is premised on the assumption that there will be rich data to train such a sophisticated algorithm, which will not always be the case. Thirdly, it assumes that previous sentencing data will be representative of what is intended in statutes on what amounts to a proportionate sentence. It may as well be that current sentencing data do not actually reflect what the legislature intended, which will mean that using such data to train the algorithm will defeat the intention of the legislature. Nevertheless, Chiao's work is a significant contribution to how such a system can work in practice.

Another interesting contribution was made by Stooops, Hunter and Bagaric. According to them, such assistive judicial algorithms can be created from two standpoints; an algorithm that is based on current sentencing laws and practices or an algorithm that is based on current sentencing laws and practices but seeks to enhance the sentencing process. They suggested that both could be achieved using deductive inference or inductive and neural network systems.³³⁹ For the first option, sentencing guidelines can be coded into a deductive inference system. However, they recognized that recent advances in neural network systems provide a greater advantage. To achieve this objective, the algorithm will be trained on a large number of past sentencing decisions which then ascertains the key sentencing factors and the weight that contributed to previously formulated sentences.³⁴⁰ Interestingly, they mentioned that luckily sentencing is one of the few areas with a huge corpus of decisions,³⁴¹ contrary to Chiao's view.

³³⁹ Supra note 330 at 31.

³⁴⁰ Ibid 32

³⁴¹ Ibid 32.

Furthermore, they mentioned that the data which will be required for specific cases would be aggravating and mitigating sentences because all other factors such as penalties and typical sentencing objectives for specific offences would have been integrated into the system. While they did mention that some of these factors can include the maximum penalty, sentencing objectives, aggravating and mitigating factor³⁴² the difficulty with their proposition is that they never provided for what all the relevant variables are despite acknowledging that the important factors (including mitigating or aggravating ones) that may be required in computing sentencing can be more than two hundred.³⁴³

Aside from that, how does the system identify what weight the judge placed on each factor when determining proportionality? In addition, how will the system cope with the complexity of mitigating or aggravating factors? For instance, what may amount to an aggravating factor in one instance, might be a mitigating factor in another instance. How will the system understand these dynamics? These questions may well require some technical considerations and are better left to experts working together with criminal justice stakeholders but neither Chiao nor Stobbs et al provided an insight on the system will respond to such nuance. Also, what sentencing objectives do they mean or which ones should be prioritized? Most jurisdictions have more than one sentencing objective, which often include retribution, rehabilitation, reparations, etc.

The second option proposed by Stooob et al is to develop an algorithm that is meant to improve the sentencing system. So, this will mean that the system will be trained and refined to reflect proper sentencing objectives and principles. To them, this enhancement can be done by incorporating risk assessment tools into the algorithm to effectively recommend the most appropriate sentencing goal.³⁴⁴ According to them, "[T]hese refinements would not involve an alteration to existing

³⁴² Ibid 33.

³⁴³ Ibid 33.

³⁴⁴ Ibid 33,34.

sentencing rules and principles—merely the utilization of enhanced information to enable the existing system to operate more effectively.”³⁴⁵ Invariably, the utility of such a system would be to design a system that is anchored to reflect the sentencing laws as it ought to be, instead of as it is. Unfortunately, it is equally difficult to imagine how this can be achieved by merely adding risk assessment capabilities to the system, and the proponents provided no guidance.

4.4.2 Is the System justified?

Having explained the method through which these systems have been envisioned. It is perhaps relevant to consider whether there are any bases to consider their usage. Arguably, using an automated judicial system to supplement sentencing decisions is consistent with extant or previous practices in many countries which means that introducing AI is not entirely novel. Many jurisdictions use assistive tools like sentencing guidelines which may be flexible or rigid. In any case, sentencing guidelines are meant to guide the sentencing judge toward structured and consistent outcomes. Indeed, many of these guidelines can pass as “algorithms” in their elementary form³⁴⁶ because they provide some mathematical parameters for how the judge will consider what weight to ascribe to aggravating and mitigating factors. Franko Aas rightly noted that “guidelines are still primarily a print-based technology.”³⁴⁷ The only difference is that machine learning algorithms can perform similar tasks with great speed and accuracy.

The same argument can also be extended to judicial sentencing ranges or starting points because they are meant to supply structured guidance on how trial courts should determine appropriate sentences for similar cases. Sentencing ranges or starting point sentences usually aggregate the situation of the defendant within general parameters before the trial judge delves into the specific

³⁴⁵ Ibid 3.

³⁴⁶ Algorithms generally means as sets of rules or processes to be followed in computations or problem-solving operations. See chapter 2 ad Lee Rainie & Janna Anderson, “Code-Dependent: Pros and Cons of the Algorithm Age” (7 July 2023) Online” Pwe Interest <<http://www.pewinternet.org/2017/02/08/code-dependent-pros-and-cons-of-the-algorithm-age/>>

³⁴⁷ Katja Franko Aas, *Sentencing in the Age of Information: From Faust to Macintosh* (UK: Glasshouse Press 2005) 68.

context of the defendant for the purpose of supplying an individualized sentence. In other words, risk assessment tools and assistive automated sentencing algorithms are designed to function more like a sentencing guideline or sentencing range. Sentencing ranges and starting points sentence that are developed, interpreted, and applied by appellate court involves merging the individual and the collective³⁴⁸ which is what algorithms are meant to do.

Also, supplementing judicial decisions using automated systems is similar to previous sentencing information systems (SIS) that have been applied in many jurisdictions including Canada.³⁴⁹ Perhaps, the only difference is the vast increase in computing power that today's automated systems have. SISs were developed to address the gap in information available on sentencing across courts. They are better than sentencing guidelines because, unlike the latter which are often developed by committees or specialized institutions, sentencing information systems reflect the practices and will of judges as a collective,³⁵⁰ making it more attractive for judges to accept it.³⁵¹

Also, its application will be consistent with the rules of precedents because the decision of past judges will guide future judges unless there is a new statute that changes the sentencing coordinates.³⁵² Donohue described this as a 'machine learning-powered dialog' because unlike risk assessment tools and sentencing guidelines which act as feedback loops on what should be the appropriate sentence for similar cases, automated systems are in constant and direct conversation with the jurist themselves.³⁵³

³⁴⁸ Lisa Silver, "The Ties that Bind Us Together: Precedent and the Role of Appellate Courts in Setting Sentencing Ranges and Starting Points" (2023) 27:1 Canadian Criminal Law Review 2.

³⁴⁹ See Chapter 3 on the Hogarth and Doob and Park SIS in Canada.

³⁵⁰ Marc L. Miller, "A Map of Sentencing and a Compass for Judges: Sentencing Information Systems, Transparency, and the Next Generation of Reform" (2005) 105 Columbia Law Review 1351.

³⁵¹ Ryan W. Scott, "The Skeptic's Guide to Information Sharing at Sentencing" (2013) 2 Utah Law Review 380; See also Eric S. Fish, "Sentencing and Interbranch Dialogue" (2016) 105 Journal of Criminal Law and Criminology 549, 581-82. This is because SIS as an alternative is a less intrusive form of structured sentencing unlike sentencing guidelines.

³⁵² Brent E. Newton and Dawinder S. Sidhu, "The History of the Original United States Sentencing Commission, 1985-1987" (2017) 45:4 Hofstra Law Review 1269,1270.

³⁵³ Michael E. Donohue, "A Replacement for Justitia's Scales?: Machine Learning's Role in Sentencing" (2019) 32:2 Harvard Journal of Law and Technology 676.

Similarly, using automated judicial technology will mean that the decision that flows from the automated system flowed from the mind of a human judge since the systems will be fed with sentencing data.³⁵⁴ Additionally, it will not be difficult to distinguish cases because the judge is able still to exercise considerable discretion by providing what factors makes the prediction of the algorithm inapplicable to the facts under their consideration. An appellate review will equally be faster since the appeal court is able to easily consider the rationale for judicial divergence vis-à-vis the outcome of the system.

Thus, while most sentencing decisions do not involve computer technology at present, algorithms are already used to some extent to help determine core sentencing variables. The climate is therefore right for an expansion of the role of algorithms in the sentencing domain. This is especially the case given that sentencing is an area of law that on its face is extremely amenable to computerized decision-making subject to the legal tradition of the jurisdiction that seeks to apply. In most sentencing matters, the relevant facts are not contested, and sentencing decisions are generally made after the prosecution and defence have agreed on the relevant facts. To the extent that the facts are in dispute, the judge can make a clear-cut factual determination before proceeding to apply the relevant law. In addition, the relevant legal considerations that inform the ultimate decision are often clearly designated, and even the weight that should be accorded to them can sometimes be prescribed in sentencing guidelines. Moreover, sentencing generally does not involve the resolution of matters of credibility or reliability, which require human judgment. In short, many quantitative components of sentencing can be algorithmized, although it is important to factor in the nuances of respective legal traditions.

³⁵⁴ Supra note 351 at 380; See also Eric S. Fish, "Sentencing and Interbranch Dialogue" (2016) 105 *Journal of Criminal Law and Criminology* 549, 581-82.

4.5 Summary

Automation is gradually entering the sentencing process, and legal scholars are already testing their normative boundaries. The analysis in the chapter looks into the burgeoning issue of how automated systems can be used in sentencing. Generally, some critics argue against any form of automation because algorithmizing the sentencing process impinges judicial discretion, de-humanizes the process, and delimits the ability to individualize fit and appropriate sentences, which is itself considered crucial in criminal sentencing.³⁵⁵ Irrespective, very few contend that highly discretionary sentencing is acceptable or that rigid uniformity in sentencing is desirable.

Scholars have therefore offered how automated systems can be used in sentencing. The argument as presented above is divided between possible and impossible, or perhaps total undesirability. The analysis concludes that sentencing remains largely human-defined, at least in the way that it is practised currently. The analysis posits that proponents of the view that judges can be replaced by AI are arguably missing the point on what the sentencing process entails and how determining proportionate sentences is fundamentally human. The chapter however conceded that there are components of the sentencing process that may be algorithmized, but there is a need to further consider it in the context of each jurisdiction.

³⁵⁵ Mirko Bagaric & Gabrielle Wolf, "Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice" (2018) 25:3 *George Mason Law Review* 653.

Chapter 5: Issues Arising: Analyzing the Adaptability of Automated Judicial Decision Systems in Canada

5.1 Introduction

The issue of disparate outcomes is still prevalent in Canada. As discussed in Chapter 3, the Canadian sentencing system is unique in that it allows for wide discretion in the interpretation of applicable goals and principles. The absence of sentencing guidelines or clear judicial direction on how 'similar' cases should be decided makes it a source of concern. When judges rely on general sentencing principles without guidelines or any clear direction, the sentencing judge can rationalize erratic decisions that lead to disparate outcomes. This is an issue in Canada - "Most Canadians understand this. Some judges do."³⁵⁶

Based on the analysis in the previous chapters, it is fair to state that using AI to aid decisions has the prospect of making the sentencing process more effective, value-driven, consistent, and predictable.³⁵⁷ But there are crucial questions to be addressed about how this technological normality fits within the contextual, traditional, and normative pillars of extant legal principles, especially in a unique and anomalous sentencing jurisdiction like Canada.³⁵⁸ Relying on the assumption that using such a system may require being confined to the normative sentencing traditions of each country, this chapter concludes that it is very unlikely that an automated sentencing system can work within the current anomalous sentencing approach to proportionality

³⁵⁶ *R v Al Aazawi*, 2022 ABCA 361 para 105.

³⁵⁷ Zichun Xu, "Human Judges in the Era of Artificial Intelligence: Challenges and Opportunities" (2022) 36:1 Applied Artificial Intelligence 1045. May be relevant to mention that some Canadian Federal agencies are already using automated systems have already deployed AI in arguably high-stake sectors like immigration and taxation. See Paul Daly and Brandon Orct, "Artificial Intelligence Accountability of Public Administration in Canada: Country Report for the 2022 General Congress of the International Academy of Comparative Law" (2022) (last visited 26 July 2023) Online: SSRN < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4266365 > 4; Jennifer Raso, "AI and Administrative Law" in Florian Martin-Bariteau & Teresa Scassa, eds., *Artificial Intelligence and the Law in Canada* (Toronto: LexisNexis Canada, 2021) 2; Petra Molnar & Lex Gill, "Bots at the Gate: A Human Rights Analysis of Automated Decision Making in Canada's Immigration and Refugee System" (Toronto: Citizen Lab, 2018) 14,15.

³⁵⁸ Nigel Stoops, Dan Hunter and Mirko Bagaric, "Can Sentencing Be Enhanced by the Use of Artificial Intelligence?" (2017) 41:5 Criminal Law Journal 261.

and individualism. This lack of meaningful sentencing structures significantly undermines the prospect of AI to mitigate disparate outcomes. Hence, to effectively harness the potential of automated systems, the current sentencing approach must shift significantly towards a well-structured sentencing practice.

5.2 Assistive Automated Sentencing System for Canada

In Canada, the desirability of implementing automated sentencing technology to aid decision-making is justified by the current unstructured sentencing laws and practices.³⁵⁹ Automated systems arguably hold the potential of augmenting current processes by ensuring that the principle of parity under the Canadian *Criminal Code* is realized.³⁶⁰ The system does not need to produce outcomes that substantially reflect legislative and judicial intentions on appropriate sentences.³⁶¹ Inasmuch as it helps to develop more reliable sentencing options that promote parity, then such a system may be adopted. Furthermore, the most workable proposal for using automated technology is to use it as a sentencing aid, which is not entirely new to sentencing judges. Judges in Canada rely on many actors when computing just sanctions. In fact, most times, sentencing decisions are based on the agreement of both the prosecution and the defence. Even where both parties disagree on what constitutes just sanctions, the purpose of a sentencing hearing is for the court to receive some guidance on what constitutes just sanctions by listening to the legal positions of the parties.³⁶² Likewise, judges receive expert testimonies during sentencing hearings and adopt them while

³⁵⁹ I acknowledge that using assistive technology is merely desirable, not a necessity. This is because there is no empirical finding that they promote consistency and parity.

³⁶⁰ S. 718 Criminal Code, RSC 1985, c C-46.

³⁶¹ Sigrid van Wingerden and Mojca M. Plesničar, "Artificial Intelligence and Sentencing: Humans against Machine in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 212. Here, Sigrid argued that using automated system should be evaluated by comparing computers to the status quo ante, rather than to an unrealistic imagination.

³⁶² Naomi M Lutes, *The Role of Defence Counsel at Sentencing* in David Cole and Julian Roberts eds *Sentencing in Canada: Essay in Law, Policy and Practice* (Canada: Irwin Law Inc 2020) 129-152. Judges also rely on appellate sentencing ranges and starting points which as Lisa Silver argued 'merges the individual and the collective'. See Lisa Silver, "The Ties that Bind Us Together: Precedent and the Role of Appellate Courts in Setting Sentencing Ranges and Starting Points" (2023) 27:1 *Canadian Criminal Law Review* 2.

figuring out a just sentence. Assistive automated systems can simply be added to the list of decisional aids without necessarily infracting constitutional rules.³⁶³

Moreover, technological intervention for structuring sentencing is not novel in Canada. Canada was the first country to develop a working Sentencing Information System (SIS).³⁶⁴ SIS was developed and deployed in Canada as far back as 1987 before it emerged in other countries like Israel, Scotland, Australia, etc.³⁶⁵ Importantly, SISs were used at that time without any known challenge to their constitutionality. They only went out of use due to lack of subsequent judicial “buy-in” by judges who felt unwilling to forgo their subjective assessment of just sanctions,³⁶⁶ despite evidence that the system proved useful for judges in determining the average sentence for similar cases.³⁶⁷ Invariably, there is hardly going to arise any legal challenge to using assistive technologies, only that legislation would be required to mandate judges to consider the outcomes produced by the system. That way, there will be uniformity of adoption so that the objective of using it in the first place will not be defeated.

Recent developments in computing power, therefore, offer renewed hope for the introduction of an automated sentencing system in Canada, which does not provide “information” per se but can also be flexible and multi-layered in handling input factors with great speed and accuracy. But can such a system fit sentencing laws and practices in Canada? This question will be addressed by examining the current state of Canadian sentencing law.

³⁶³ The situation would be different for fully automated systems because the law envisages that Canadian judges must be human beings. See s. 96 – 101 of The Constitution Acts, 1867 to 1982

³⁶⁴ Robert Hann, “Information Systems for Sentencing Guidelines: Recent Experience: Research Reports of the Canadian Sentencing Commission” (Department of Justice 1998) 1.

³⁶⁵ Neil Hutton, “From Intuition to Database: Translating Justice” (2023) 17:1 Theoretical Criminology 109.

³⁶⁶ Cyrus Tata, “The Application of Judicial Intelligence and ‘Rules’ to Systems Supporting Discretionary Judicial Decision-making” (1998) 6:2-4 Artificial Intelligence and Law 203; Cyrus Tata, “The Struggle for Sentencing reform: Will the English Sentencing Guidelines Model Spread?” In Andrew Ashworth and Julian Roberts eds *Sentencing Guidelines: Exploring the English Model* (UK: Oxford University Press 2013) 236.

³⁶⁷ *Supra* note 284 at 230.

5.2.1 Algorithmizing Sentencing Objectives and Principles

Sentencing is a complex judicial exercise that requires the human judge to determine a just and appropriate sentence after factoring in many variables. A judge would have to consider numerous variables such as the nature of the offence committed, the intensity of harm, society's interest, prospects of rehabilitation, and potentially the racial background of the offender, etc. In addition, a human judge would sometimes have to consider competing sentencing purposes. Accordingly, Chiao noted that 'sentencing is a "bit of a black art."³⁶⁸ With this difficulty, Engle recommended that an assistive automated system may help mitigate this challenge since "[c]ourts generally 'duck' the question of exactly how they weigh the [varying] interests,"... modelling law by computer "can eliminate judicial discretion and discrimination, and articulate precisely how various interests are balanced in the decision-making process."³⁶⁹

However, it is not that simple in practice. At times, the judge's work may be made easy when there is a mandatory sentence, or where the defendant and prosecution agree on the appropriate sentence, but this is not always the case. Where there is no such consensus, the sentencing judge is required to articulate a sentencing objective which can be a difficult task. A judge would usually have multiple and conflicting sentencing goals before them. For example, section 718 of the Canadian Criminal Code provides that the "fundamental purpose of sentencing is to protect society and to contribute, along with crime prevention initiatives, to respect for the law and the maintenance of a just, peaceful and safe society by imposing just sanctions that have one or more of the following objectives:'. These goals are denunciation, deterrence, separation where necessary, rehabilitation, reparations, and promotion of a sense of responsibility.³⁷⁰ Each of these sentencing objectives may

³⁶⁸ Vincent Chiao, "Predicting Proportionality: the case for Algorithmic Sentencing" (2018) 37:3 Criminal Justice Ethics 238.

³⁶⁹ Eric Engle, "Legal Interpretation by Computer A Survey of Interpretive Rules", (2011) 5:1 Akron Intellectual Property Journal 71,92-93; Mirko Bagaric & Gabrielle Wolf, "Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice" (2018) 25:3 George Mason Law Review 690.

³⁷⁰ Canadian Criminal Code, RS C 1985, c C-46.

also have different forms. The objective of deterrence for instance can be general or specific. Equally, a criminal statute may be clear at times on which sentencing goal(s) must be stressed for specific offences,³⁷¹ but it can be left as a menu from which a judge can choose, just like its stated in the *Canadian Criminal Code*.

The sentencing objectives under section 718 are not listed in any order of priority which makes it arguably unsusceptible to automated judicial systems. Section 718 has been criticized for failing to provide specific guidance on what specific sentencing goal should underpin the sentencing process.³⁷² Commenting on the issue, Ferguson observed that section 718 is a “confusing” mix of utilitarian and dessert-based (i.e. retributivist) purposes and objectives.³⁷³ Furthermore, Ferguson recommended that,

It is not necessary to eliminate or alter the six competing objectives in s. 718. What is required is some direction on situations or types of cases in which one objective should be emphasized more than another. That direction needs to be grounded in the nature of the offence, the degree of harm caused and the moral culpability or blameworthiness of the offender. Those factors are informed by the nature and degree of aggravating and mitigating circumstances...³⁷⁴

Impliedly, Ferguson recommends the creation of some sort of sentencing guideline that unequivocally states the objectives that should be prioritized for types of offences. If the recommendation by Ferguson is embraced, it would prove useful for training a sentencing algorithm that can work in the Canadian context. This is because a sentencing machine learning algorithm is not generally “intelligent”: “they operate within the preconceived or pre- learned parameters and

³⁷¹ See S. 718.01; Offence against children; S. 781.03, offences against peace officer; S. 718.04 offences against certain animals; S. 718.04 Offences against vulnerable persons; In each cases the court is statutorily required to stress the objective of denunciation and deterrence. See *R v Barton*, 2019 2 SCR 579; *R v Friesen*, 2020 SCC 9, this case the Supreme Court of Canada noted unequivocally that it is an error for a court not to give primary consideration to the objective of deterrence and denunciation for sexual offences against a child.

³⁷² Julian V. Roberts and Andrew von Hirsch, “Statutory Sentencing Reform: The Purpose and Principles of Sentencing” (1995) 37:2 *Criminal Law Quarterly* 255. They argued that the choice provides judges with a dilemma that they are likely to resolve in their own individual way, as they have done in the past.

³⁷³ Gerry Ferguson, “A Review of the Principles and Purposes of Sentencing in Section 718-718.21 of the Criminal Code” (Department of Justice Canada 2016) 16. Online: < https://www.justice.gc.ca/eng/rp-pr/jr/rppss-eodpa/RSD_2016-eng.pdf >

³⁷⁴ *Ibid*

are unable to adapt to new situations and different problems.”³⁷⁵ Therefore, without a clear direction on which sentencing objective(s) are relevant for groups of offences, it may be difficult to train such an algorithm.

Furthermore, it could also result in what Donohue described as the “philosophy anchoring of machine learning-based tools,” which explains the possibility that the automated system could anchor on a specific sentencing objective to the exclusion of others. For example, the inputted data can detect patterns of inherent retributive sentencing objectives in past verdicts and use that to propose future sentencing for its users.³⁷⁶ This would mean that future advisory sentences, if judges do not depart from the recommendation, can substantially anchor on a specific goal contrary to the intention of the legislature or judiciary. Aside from that, Angel Christin *et al* rightly noted that the ‘anchoring’ effect can have a behavioural implication on the judge’s mind which might lead prosecutors and judges to alter their sentencing practices in order to align with the recommendations of the algorithms.³⁷⁷

5.2.2 Proportionality and Algorithms

The principle of proportionality in its crudest form means that punishment must fit the crime. However, the principle is not that simple which makes it difficult for it to practically facilitate uniform sanction.³⁷⁸ What proportionality entails is hotly debated, complex and often confusing.³⁷⁹ For

³⁷⁵ Supra note 361 at 212.

³⁷⁶ I noted however the utility of detecting that extant sentencing decision is anchored on a specific objective can also be useful for redirecting future decision in a way that makes it representative of all sentencing objectives required by statute.

³⁷⁷ Angele Christin, Alex Rosenblat and Danah Boyd “Courts and Predictive Algorithms (2015) Data and Civil Rights: A New Era for Policing and Criminal Justice 7. This is often described as automation bias. It speaks of a human-computer interaction where humans feel inclined to follow predictions from an algorithm even when there is warning against following the prediction; Jesper Ryberg, “Sentencing Disparity and Artificial Intelligence” (2021) 57:3 Journal of Value Inquiry 447, Ryberg argued that building the ML system on past sentencing decisions could face serious problems if there exist a discrepancy between real sentencing practice and what is desirable based on legislation.

³⁷⁸ Mirko Bagaric, Proportionality in Sentencing: Its Justification, Meaning and Role (2000) 12:2 Current Issues in Criminal Justice 145.

³⁷⁹ Julian V Roberts & Howard Bebbington, “Sentencing Reform in Canada: Promoting a Return to Principles and Evidence-Based Policy” (2013) 17 Canadian Criminal Law Review 327.

instance, Grossman stated that; “the law with respect to proportionality in sentencing is confused.”³⁸⁰ Goh observed that several reasons account for these problems which are that there are no clear definitions and definite theories on the concept; it is difficult to reconcile the theory with other sentencing objectives; the inherent differences in the character of crime, and the nature of the principles as merely a product of varied theoretical assumptions.³⁸¹

In terms of its varied theoretical assumptions, proportionality theory is often grouped into retributive proportionality and utilitarian proportionality, each having different forms. Retributive proportionality is retrospective in that it focuses on the past conduct of the offender to decide the proper sentence.³⁸² Retributive proportionality can be further divided into defining retributivism and limiting retributivism.³⁸³ The former supports punishment that is as close as possible to the gravity of the offence leaving no room for other types of sentencing aims, while the latter gives room for other sentencing goals like rehabilitation, in addition to placing a ceiling on the sentence that should be meted out.³⁸⁴ For example, Canadian courts have used the concept of limiting proportionality concept to deem some mandatory minimum sentences as 'grossly disproportionate' because they amount to excessive 'cruel and unusual punishments' as enshrined under section 12 of the Canadian Charter of Rights and Freedoms.³⁸⁵

On the other hand, Utilitarian proportionality is prospective in its approach because it focuses more on rehabilitation and deterrence instead of retribution.³⁸⁶ Utilitarian proportionality has two forms

³⁸⁰ Steven Grossman, 'Proportionality in Non-Capital Sentencing: The Supreme Court's Tortured Approach to Cruel and Unusual Punishment' (1994) 84 Kent Law Review 107, 108.

³⁸¹ Joel Goh, "Proportionality - An Unattainable Ideal in the Criminal Justice System" (2013) 2 Manchester Review of Law, Crime & Ethics 45.

³⁸² Richard S Frase, 'Excessive Prison Sentences, Punishment Goals, and the Eighth Amendment: "Proportionality" Relative to What?' (2004) 89 Minnesota Law Review 571, 592.

³⁸³ For further explanation on limiting retributivism see Norval Morris, *The future of Imprisonment* (USA: University of Chicago Press 1974).

³⁸⁴ Richard G. Fox, "The Meaning of Proportionality in Sentencing" (1994) 19:3 Melbourne University Law Review 495.

³⁸⁵ Section 12 of the Canadian Charter prescribes that '[e]veryone has the right not to be subjected to any cruel and unusual treatment or punishment'. See *R v Hills*, 2023 SCC 2; *R v Hilbach*, 2023 SCC 3.

³⁸⁶ Michael Cavadino and James Dignan, *The Penal System: An Introduction*, (USA: 2nd edn, Sage 2007) 37.

which are 'ends proportionality' focus mainly on whether the gravity of the punishment is greater than the benefits the offender derives from committing the crime. In its other form, 'means proportionality' when applied looks into whether there are alternatives to less severe punishment that can be given to the offender which will still outweigh the benefit derived from committing the crime.³⁸⁷

None of these theories stated above answers the question of what amounts to a serious or grave crime, which makes it difficult to operationalize. The problem has been addressed by some jurisdictions by introducing sentencing grids with appropriate ranges or mandatory punishment for specific offences based on their perceived gravity. For instance, section 718.1 of the Canadian Criminal Code provides that sentences 'must be proportionate' to the severity of the crime and the culpability of the offender, but it does not proceed to elaborate on the meaning of "proportionate" when applying it to the gravity of the offence and degree of responsibility, or how such a "proportionate" sentence may be determined, except to provide for numerous sentencing goals.³⁸⁸ In that sense, all the sentencing goals are constituents of proportionality, and there is no indication that any should be pursued more than others.

Despite the complexity of the concept of proportionality, some scholars argue that sentencing can be algorithmized. Accordingly, Hutton emphasized that integrating "the principle of proportionality" into computer sentencing information systems can help "increase the formal, generalizable, rule-governed aspects of sentencing and thus provide a more rational basis for sentencing" which will therefore produce consistent sentencing outcomes.³⁸⁹ When using the system, Hutton envisages a transparent and predictable sentencing system in which any sentencer presented with the same case

³⁸⁷ Joel Goh, "Proportionality - An Unattainable Ideal in the Criminal Justice System" (2013) 2 *Manchester Review of Law, Crime & Ethics* 47.

³⁸⁸ *Ibid* 44.

³⁸⁹ Neil Hutton, "Sentencing, Rationality, and Computer Technology" (1995) 22:4 *Journal of Law and Society* 565.

would reach the same decision as to the appropriate sentence. Also, using the system will make the indicators of aggravating or mitigating factors more transparent, and decisions can be predicted provided the correct rules and procedures have been followed.³⁹⁰ In other words, a well-defined set of relevant variables would be applied by all judges which will eliminate judicial bias and mitigate disparate outcomes.

Hutton further proposed that to ensure that computerized sentencing leads to proportionate sentencing, it can be incorporated into the algorithm as mathematical calculations of the “extent to which certain offences set back the interests of their victims and the society.”³⁹¹ Obviously, Hutton’s idea of proportionality is predominantly utilitarian which means the system will supposedly be encoded to prioritize the objective of deterrence and rehabilitation instead of retribution. This makes it likely that the algorithm might be trained to prioritize specific sentencing goals, unlike a jurisdiction like Canada which has no priority structure for what sentencing goals define proportionality.

A more recent study by Vincent Chiao made a bolder assertion, particularly in the context of ML algorithms about algorithmizing proportionality. According to Chiao, the fact that applying proportionality in practice can be very complex and thus require human moral judgement does not mean that proportionality is ineffable.³⁹² While acknowledging the complexity of the concept, he argues that the system can curate predictions that represent a publicly-known and predictable baseline that reflects the judiciary’s own sense of what proportionality means in practice.³⁹³ Chiao provided a hint on how such a system can be operationalized by positing:

The idea, in a nutshell, is to develop a sentencing algorithm that draws correlations between input variables of various kinds—reasons judges give for the sentences they impose, for instance—and outcomes, that is, concrete sentences. This could be done by

³⁹⁰ Ibid 565

³⁹¹ Ibid 565. Nigel Stobbs et al also argued that that “both limbs of the principle should be informed by the extent to which empirical data suggests the crime and punishment set back important human interests.” See Nigel Stobbs et al., *Can Sentencing Be Enhanced by the Use of Artificial Intelligence?* (2017) 41:5 *Criminal Law Journal* 276.

³⁹² *Supra* note 368 at 242.

³⁹³ Ibid 240.

means of traditional regression techniques applied to a large enough, and rich enough, data set of cases and case outcomes. Alternatively, and perhaps more promisingly, a machine-learning algorithm might be deployed to discover correlations on its own... A requirement for such an algorithm to “learn” correlations is a sufficiently rich dataset about the cases coming before judges, as well as the sentences that they ultimately impose.³⁹⁴

Accordingly, Chiao believes that a ML algorithm that can be trained on rich data sets to find meaningful correlations on what proportionality means to judges based on past decisions.³⁹⁵ Chiao’s paper seems to be the only study at the time of writing this thesis that has delved deeply into the concept of proportionality in the context of machine learning sentencing, including some references to Canadian sentencing law. However, Chiao’s work was substantially a general analysis of how proportionality can be integrated into an automated system, without applying it to an anomalous sentencing regime like Canada, making his propositions implausible to the Canadian situation.³⁹⁶

Another interesting analysis that directly touches on algorithmizing proportionality was made by Frej Thomsen. According to Thomsen, the arguments against the use of automated systems due to the legal complexity of sentencing principles are unpersuasive and misguided.³⁹⁷ Thomsen argues that while it is true that many sentencing variables influence the computation of proportionality, only very few are relevant for determining what amounts to a just sanction. Thomsen thereby argued that “the proper role in sentencing of any particular property in a case is determined by the *moral reasons that apply* to sentencing...it is the theory of just sanction *we adopt* that allows us to say which properties of the cases affect just sentencing and how.”³⁹⁸ Thomsen’s argument is premised on the assumption that there is a clear and identifiable sentencing philosophy by stating that the appropriate sentencing parameters, perhaps, including the sentencing goal(s) will be directly

³⁹⁴ Ibid 245.

³⁹⁵ See Chapter 4 for a more comprehensive explanation of Chiao’s proposals.

³⁹⁶ Chiao recognized that the system does not need to perfectly fit the sentencing process of the jurisdiction, only that it has to be better than the status quo.

³⁹⁷ Frej Klem Thomsen, “Indicium Ex Machine: The Ethical Challenges of ADM in Sentencing” in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 255.

³⁹⁸ Ibid, 255. [Emphasis added].

inputted into the systems for it to curate individualized outcomes.³⁹⁹ This implies that the algorithm's sense of proportionality is not self-taught or also under the control of the sentencing judge. cases. The disadvantage to such design is that it is unlikely to mitigate disparate sentencing since the individual judge has substantial control over how the system determines proportionality. On the other hand, an ML based system that aggregates proportionality based on past sentencing data, similar to what Chiao proposed may work best since it summates all relevant past decisions that are related to facts of the case and then provide an approximate sentence.

Indeed, ML techniques offer unprecedented advantages due to their significant computing sophistication, compared to previous sentencing information systems. Chiao's propositions may likely work in a jurisdiction with a mechanized conceptualization of proportionality and sufficient sentencing data. Sentencing law and practice in Canada are highly individualized – 'hyper individualized' in such a way that obtaining training data may prove problematic.⁴⁰⁰ While indeed proportionality has a quantitative import, Canada operates an innovative and unique brand of proportionality which "...is fundamentally at odds with the reality that the severity of a sentence lies not in the cool metrics of quantum, alone, but in the experience of suffering — something driven by the real consequences and conditions of punishment and their effects on a given person's life."⁴⁰¹

³⁹⁹ Ibid 255, for instance, Thomsen stated that 'if it is impossible to specify, for instance, an exhaustive list of mitigating circumstances, it will not be impossible to construct an ADM that gives mitigating circumstances a particular role in sentencing and allows the human judge to input whether mitigating circumstances are present or not'.

⁴⁰⁰ Interestingly, this may not be so difficult as contemplated because a private Canadian company, Slice Legal Inc. (<https://www.rangefindr.ca/>) already developed a tool called rangefinder which judges, prosecutors, and defence counsel may consult for ranges. See Charlotte Santry, "B.C. court libraries to offer free access to sentencing tool" (last visited 27 July 2023) Online: Canadian Lawyer <<https://www.canadianlawyermag.com/news/general/bc-court-libraries-to-offer-free-access-to-sentencing-tool/271907>> Rangefinder allows lawyers to use tags such as addiction, financial difficulties, etc to find the type of punishment given for similar cases. The tool may pass as an advanced legal information retrieval system.

⁴⁰¹ Benjamin L Berger, "Proportionality and the Experience of Punishment" in David Cole and Julian Roberts eds *Sentencing in Canada: Essay in Law, Policy and Practice* (Canada: Irwin Law Inc 2020) 27.

5.2.3 Individualized Sentencing and Generalized Data

Individualized sentencing is the distinctive hallmark of sentencing in Canada. By applying individualized sentencing, the judge is required to apply applicable laws and rules to the context of the defendant before it.⁴⁰² This was the position in *R v Lyons*, where the court stated that “the relative importance of each sentencing objective varies with the nature of the crime and *the characteristics of the offender*”.⁴⁰³ Also, in *R v Sturgeon*, Somji J of the Ontario Superior Court of Justice reiterated that “While the court must keep in mind the principle of parity in sentencing, determining a fit sentence *is an individualized process*”.⁴⁰⁴ Most importantly, the Supreme Court of Canada in the recent decision of *R v Bissonnette* reemphasized the following:

There is *no mathematical formula* for determining what constitutes a just and appropriate sentence. That is why this Court has described sentencing as a “delicate art which attempts to balance carefully the societal goals of sentencing against the moral blameworthiness of the offender and the circumstances of the offence, while at all times taking into account the needs and current conditions of and in the community.”⁴⁰⁵

Arguably, this cardinal jurisprudence will affect the usage of an automated sentencing system. This is because sentencing algorithms are trained on generalized data or group-based data that cannot reflect the specificity of the offender before the court.⁴⁰⁶ Along these lines, albeit explained in the context of risk assessment tools, Professor Gideon Christian argued that the use of such systems will infringe the right to an individualized assessment, which could be the basis to challenge the sentence.⁴⁰⁷ A similar challenge occurred in the USA case of *State v Loomis*⁴⁰⁸ where the defendant

⁴⁰² Neil Hutton, Sentencing, Rationality, and Computer Technology, (1995) 22:4 Journal of Law and Society 565; Mirko Bagaric & Gabrielle Wolf, “Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice” (2018) 25:3 Geo Mason Law Review 689.

⁴⁰³ [1987] 2 SCR 309 at 329. [Emphasis added].

⁴⁰⁴ 2022 ONSC 5218 at 44.

⁴⁰⁵ 2022 SCC 23 at 49. [Emphasis added].

⁴⁰⁶ Laurel Eckhouse et al, “Layer of Bias: A Unified Approach for Understanding Problems with Risk Assessment” (2019) 45:2 Criminal Justice & Behaviour 198.

⁴⁰⁷ Gideon Christian, “Legal Framework for the Use of Artificial Intelligence (AI) Technology in the Canadian Criminal Justice System” (Keynote Paper delivered at the Law and Technology Institute Conference, From Inequality to Justice, Schulich School of Law, Dalhousie University, Halifax, 16 June 2023) [unpublished].

⁴⁰⁸ *State v. Loomis*, 881 N.W.2d 749 (2016).

challenged the decision of the trial court for using the COMPAS risk assessment system on the basis that the algorithm's training data are generalized data. While the court acknowledges that the data on which the algorithm formulates its predictions are from a general dataset, it nevertheless distinguished the difference between when an algorithmic tool determines the sentence as opposed to one that complements the sentencing decision. Arguably, the reasoning that flows from this decision applies to assistive automated systems since they only form part of crucial sentencing considerations.

Aside from the individuality requirement, the legality of automated sentencing technology may be questioned when considering the differential remedial considerations for Aboriginal offenders. In Gladue's case,⁴⁰⁹ the court expounded on Section 718.2(e) which directs judges to approach the sentencing of Aboriginal offenders both individually and as uniquely owing to their distinct position and over-representation in the Canadian carceral system. In sentencing an Aboriginal offender, the judge must consider: (a) the unique systemic or background factors which may have played a part in bringing the particular Aboriginal offender before the courts; and (b) the types of sentencing procedures and sanctions which may be appropriate in the circumstances for the offender because of his or her particular Aboriginal heritage or connection.

Invariably, an automated system that will fit the differential assessment of Aboriginal offenders must not only try to produce individualized outcomes but also produce outcomes that reflect the context of an Aboriginal offender relative to the offender before the court. In *Ewert v Canada*,⁴¹⁰ the Supreme Court of Canada considered the validity of using a risk assessment tool in the context of an Aboriginal offender by the Canadian Correctional Service. The defendant, Ewert, a Metis, challenged the use of five psychological and actuarial risk assessment tools which were used to calculate his risk

⁴⁰⁹ [1999] 1 SCR 688.

⁴¹⁰ 2018 SCC 30.

level on the basis that the tools were predominately tested on non-Indigenous populations and were unrepresentative of the cultural differences and special needs of Aboriginal persons. While not agreeing with Ewert's argument that the use of the tools impinges his Charter rights under sections 7 and 15, the Supreme Court underscored the obligation of the Correctional Service to ensure that the tools do not manifest cultural bias; that is 'if the CSC wishes to continue to use the impugned tools, it must conduct research into whether and to what extent they are subject to cross-cultural variance when applied to Indigenous offenders.'⁴¹¹ This case arguably sets a legal duty for the need to develop future automated systems with robust data sets that are sensitive to the cultural variance of Canada.

Operationalizing an automated system that will respond to the individuality requirement and cultural variance of the country will be difficult. Therefore, developing and using an automated system in a jurisdiction that gives considerable recognition to high sentencing discretion is very complex because the variables and weights to be attached to relevant factors are not clearly articulated. It may only work effectively by streamlining relevant sentencing factors, and delineating core sentencing principles unlike what is applicable under Section 718(1). For such a system to be effective, there is a need to inject greater clarity into the considerations that inform the sentencing calculus and then develop an algorithm incorporating those considerations to make sentencing determinations.⁴¹²

5.3 Data Paucity

Machine learning is only able to produce 'intelligent' outputs largely through heuristics, which involve detecting patterns in data and using knowledge, rules, and information that humans have

⁴¹¹ 2018 SCC 30 para 67. See also, Nate Jackson, "The Substantive Application of Gladue in Dangerous Offender Proceedings: Reassessing Risk and Rehabilitation for Aboriginal Offenders" (2015) 20 Canadian Criminal Law Review 77, for an analysis of Gladue and risk assessment tools.

⁴¹² Mirko Bagaric & Gabrielle Wolf, "Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice" (2018) 25:3 George Mason Law Review 682.

structured in a way that it can be processed.⁴¹³ Without enough quality data, the systems cannot run effectively. This is because data is the lifeblood of an algorithm. A machine learning algorithm that will effectively produce meaningful sentencing outcomes like the examples highlighted in the preceding chapter must be trained on large, qualitative, and representative datasets. Importantly, the source of the data required for a sentencing algorithm cannot be from open source or by scraping the internet. The data must have been carefully collected, sorted, and cleaned for it to work effectively. The data must also be country-specific because the algorithm cannot be fed with the sentencing data of another country. Such data will be unrepresentative of the historical and social context of the country. Aside from that, such data will not reflect the sentencing traditions of the country. Hence, importing sentencing data will cause a skewed sentencing prediction that cannot be relied upon, leaving room for justified departure by judicial members.

Unfortunately, sentencing data is limited in Canada which makes the adoption of automated judicial technologies probably impossible or difficult to operationalize. This is because sentencing outcomes are under-reported or not consistently collected,⁴¹⁴ meaning that available data must be treated and used with caution if the data should be used at all. The most comprehensive data sources on sentencing in Canada are the Integrated Criminal Court Survey and the Adult Correctional Service Survey which mainly contain a small number of criminal matters and offender's characteristics.⁴¹⁵ According to Reid, the paucity of sentencing data can be credited to the complexity of the sentencing process and the dynamic nature of sentencing trends which evolve along with public sentiments on

⁴¹³ Harry Surden, "Artificial Intelligence and Law: An Overview" (2019) 35:4 Georgia State University Law Review 1308.

⁴¹⁴ See Statistics Canada, "Integrated Criminal Court Survey (ICCS)" (last visited 27 May 2023) Online: <<https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3312>>; Statistics Canada Adult Correctional Services (ACS) (last visited 27 May 2023) Online: <<https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3306>> The robustness and accuracy of the data is undermined because the database did not contain data from some courts in Quebec, Manitoba, Saskatchewan, PEI, during some period.

⁴¹⁵ Paul Reid, "Historical Statistics of Canada, Section Z: Justice" (last visited 27 May 2023) Online: Statistics Canada <<https://www150.statcan.gc.ca/n1/pub/11-516-x/pdf/5220025-eng.pdf>>

what crime and justice mean.⁴¹⁶ This complexity can be attributed to the very unstructured nature of sentencing in Canada and the lack of mechanized sentencing guidelines. Most available data on Canadian sentencing trends only often provide rough data on the number of sentencing proceedings, most frequent sanctions, incarceration rates, etc.⁴¹⁷

Moreover, the Supreme Court of Canada's decision in *R v M(CA)* suggests that what amounts to a fit and appropriate sentence can fluctuate with the need to promote specific sentencing objectives in a particular locality or region. According to the court, sentencing requires a balance of societal goals, and offenders' blameworthiness, including the fact that 'the just and appropriate' mix of accepted sentencing goals will depend on the *needs and current conditions of and in the particular community where the crime occurred*.⁴¹⁸ By implication, the sentencing objectives under section 718 may be applied uniquely not only to offenders but also to the community in which they reside. In short, the past sentencing data may not be relevant for predicting future sentencing outcomes because the particular community may not need the promotion of such sentencing objectives.

Aside from the need to have a country or community-specific data, Schwarze and Roberts have argued for what they called the 'input problem'.⁴¹⁹ They argued that inputting sentencing data into the algorithm is particularly problematic for sentencing. This is because a sentencing judge factors many subtle and interacting factors that require differing weight. While there are some readily static

⁴¹⁶ Andrew A Reid, "Sentencing Options and Sentencing Trends in David Cole and Julian Roberts" eds *Sentencing in Canada: Essay in Law, Policy and Practice* (Canada: Irwin Law Inc 2020) 27.

⁴¹⁷ Department of Justice "Sentencing in Adult Criminal Courts in Canada in 2020–2021" (last visited 27 August 2023) Online: < https://www.justice.gc.ca/eng/rp-pr/jr/jf-pf/2023/pdf/RSD_JF2023_Sentencing-in-Canada-EN.pdf>; Department of Justice, Sentencing in Canada (last visited 27 August 2023) Online: <https://www.justice.gc.ca/eng/rp-pr/jr/jf/2017/jan01.html#:~:text=The%20median%20length%20of%20custody,the%20longest%20median%20custodial%20sentences.>> See also Department of Justice, "Sentencing in Canada: A Compendium of Sentencing Statistics" (Last visited 27 May 2023) Online: Research and Statistics Division <<https://www.canlii.org/en/commentary/doc/2016CanLII Docs4664#!fragment/zoupio-Toc2Page1-Page10/BQCwhgzIBcwMYgK4DsDWszlQewE4BUBTADwBdoAvbRABwEtsBaAfX2zgCYAFMAc0lCMjHvwEAGAJQAaZNIKEIARUSFcAT2gByTVliEwuBMtUbtu-YZABIPKQBCGgEoBRADLOAgEEAcgGFnKVlwACNoUnYJCSA>>

⁴¹⁸ 1996 SCR 500 para 92. [Emphasis added].

⁴¹⁹ Mathis Scharze and Juian Roberts, "Reconciling Artificial Intelligence and Human Intelligence: Supplementing Not Supplanting the Sentencing Judge" in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 211.

variables such as age and gender that may be relevant for the determination process, there are some variables such as remorse that are difficult to program into the algorithm because they cannot be reduced into specific values.⁴²⁰ The input problem also extends to other variables such as victim impact statements which the court is required to factor when computing sentence.⁴²¹ Victim impact statements are generally emotional statements that cannot be assigned quantitative weight, meaning that their use may be redundant, especially in the context of a fully automated sentencing program. However, the input problem may only be problematic if the system will take over the judge's role completely. Developing the system as a decisional aid will mean that it should perform tasks that are mathematically possible, leaving the judge to factor in emotional considerations where necessary.

5.4 Algorithmic Transparency and Judicial Decision Making

One of the key issues that legal scholars continue to debate about the use of automated judicial systems is transparency. Despite the consensus that transparency is fundamental in algorithmic decision-making, it can be difficult at times to pinpoint what scholars exactly mean when they discuss transparency. For instance, Papdoui stated that words like "traceability, understandability, inspectability, verifiability, explicability, interpretability, auditability or accountability" are directly connected to the concept of transparency.⁴²² However, most discussions often focus on the issue of algorithmic complexity or inscrutability and proprietary non-disclosure.

⁴²⁰ Ibid 212. The authors did observe that while a offender's criminal record can be ascribed a mechanical weight, it can only provide a crude weight of prior crimes.

⁴²¹ Ibid 212.

⁴²² Juris Vasiliki Papdoui, "Transparency in Artificial Intelligence: A Legal Perspective" (2022) 4:1 Journal of Ethics and Legal Technologies 29; See also Aaron Spinger and Steve Whittaker, "Making Transparency Clear" (2019) Joint Proceedings of the ACM IUI Workshop, Los Angeles, USA. See also Andrew D. Selbst & Solon Barocas, "The Intuitive Appeal of Explainable Machines" (2018) 87 Fordham Law Review 1094. Speaking on inscrutability described it to mean "a situation in which the rules that govern decision-making are so complex, numerous, and interdependent that they defy practical inspection and resist comprehension."

Proprietary secrecy speaks to the opacity of the operational methodology of the system. In other words, the technical methods of the system are kept as trade secrets. This is usually the case when the system is developed by private for-profit organizations. Proprietary disclosure does not seem to be a hotly contested issue. Arguably, it is more about striking a fair balance between disclosure and commercial privacy. In short, fixing proprietary concerns is more about having clear rules on disclosure or putting in place development and deployment modalities that will eliminate the issue of commercial proprietary interests.⁴²³

Furthermore, the transparency requirement in automated decision making has been included in regulations as a key ethical standard. In Canada, the Federal Directive on Automated Decision Making (DADM) recognizes *among others*, the need for automated systems to be transparent by providing meaningful explanations to affected individuals.⁴²⁴ However, the DADM applies primarily to administrative decision making and there is nothing that indicates that its provisions apply to federal criminal judicial decision-making.⁴²⁵ Nonetheless, transparency remains a constituent of due process requirements in a criminal proceeding, so the absence of federal or provincial rules still makes it a vital requirement. The meaning of the concept and how it applies to judicial decision making will be analyzed below.

⁴²³ A common recommendation is for government agencies to develop the algorithmic in-house rather than outsource it to private companies. See Joshua A Kroll et al, 'Accountable Algorithms' 165:3 University of Pennsylvania Law Review 658. The use of prohibitive orders has also been suggested. See John Villasenor & Virginia Foggo, "Artificial Intelligence, Due Process and Criminal Sentencing" (2020) 2020:2 Michigan State Law Review 344. Proprietary disclosure appears to have been settled in the context of criminal cases in Canada, and the jurisprudence of the court can justifiably be extended to the use of automated system. See the Canadian case of *May v Ferndale Institution*, 2005 SCC 82, where the court extended the rule in *R. v Stinchcombe*, [1991] 3 SCR 326 to prosecutorial duty to disclose proprietary information regarding the matrix score and methodology used in computing risk factors by Canada Correctional Service. See also *R. v B.H.D.*, 2006 SKPC 32

⁴²⁴ Treasury Board Directive on Automated Decision Making (last visited 27 July 2023) Online: Government of Canada < <https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32592§ion=html> > ; See also the European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their Environment (Adopted at the 31st Plenary Meeting of the CEPEJ (Strasbourg, 2-4 December 2018).

⁴²⁵ Law Commission of Ontario, *The Rise and Fall of AI and Algorithms in America Criminal Justice: Lessons for Canada* (Toronto: October 2020) 39. The LCO noted that the directive does not explicitly exclude or include decision making tools used for federal criminal sentencing, but its explicitly refer to administrative decisions made by federal agencies.

5.4.1 Transparency and Algorithmic Complexity

As stated above, transparency in criminal judicial decision making is intrinsically linked to due process requirements, such as reason giving. This has been recognized as relevant to the offender, the public and the court. For instance, in the case of *R v Sheppard*, the SCC speaking on the duty of trial courts to give reasons, stated,

The delivery of reasoned decisions is inherent in the judge's role. It is part of his or her *accountability for the discharge of the responsibilities of the office*. In its most general sense, the obligation to provide reasons for a decision is owed to *the public at large*. An accused person should not be left in doubt about why a conviction has been entered. *Reasons for judgment may be important to clarify the basis for the conviction ... The lawyers for the parties may require reasons to assist them in considering and advising with respect to a potential appeal....*⁴²⁶

Along the same lines, Cohen contends that the "practice of reason giving limits the scope of available discretion over time by encouraging judges to treat similarly situated cases alike and to treat differently situated cases differently"⁴²⁷ Invariably, any procedure that mandates articulate reason-giving as a crucial requirement will make judges pass sentencing with greater uniformity. In addition, scholars have suggested that the requirement of reason-giving may help mitigate biased sentencing since the judges know their decisions are subject to scrutiny. Again, Cohen noted that "there is some evidence, drawn from cognitive psychology research, that requiring decision makers to explain may diminish some forms of cognitive bias."⁴²⁸

In terms of enhancing public confidence and accountability as stated by the court in Sheppard's case, giving reasons could make the public aware of judicial decisions, which can provoke them to hold the judiciary accountable where necessary.⁴²⁹ This is because "reason-giving...promotes accountability toward the general public...in a variety of ways, ranging from public debate to

⁴²⁶ 2002 SCC 26 para 1-3. [Emphasis added]

⁴²⁷ Mathilde Cohen, "When Judges Have Reasons Not to Give Reasons: A Comparative Law Approach" (2015) 72 *Washington and Lee Law Review* 483.

⁴²⁸ *Ibid*, Cohen 513.

⁴²⁹ Jesper Ryberg and Thomas S. Petersen, "Sentencing and the Conflict between Algorithmic Accuracy and Transparency" in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 58

legislative action. Dissatisfied citizens can elect legislators who can overrule judicial decisions they dislike through statutes or constitutional amendments."⁴³⁰

But how do all of these apply in the context of an automated judicial decision-making system? It starts with the issue of algorithmic complexity. The issue can be viewed from two senses. Firstly, it means that a person without technical background such as the defendant or even the judge in a criminal proceeding would lack sufficient literacy to understand how the sentencing algorithm works.⁴³¹ Secondly, it can also mean that how the algorithm curates its sentencing output is not fully comprehensible even to computer experts.⁴³² This is often discussed as the 'black box' problem.⁴³³

Accordingly, Christopher Markou argues "sentencing algorithms move us towards crude methodologies, which are lacking in rigor and sophistication, and the "black boxing" of the legal system.... Legal systems depend on continuity of information, transparency, and ability to review..."⁴³⁴

Truly, sentencing algorithms like all other machine learning algorithms bare the character of opacity. Critics of algorithmic transparency have suggested particularly that one of the relevant objects of non-transparency would be insights into how input factors are weighed by the algorithm.⁴³⁵ Indeed,

⁴³⁰ Mathilde Cohen, "When Judges Have Reasons Not to Give Reasons: A Comparative Law Approach." (2015) 72 *Washington and Lee Law Review* 507.

⁴³¹ Bruno Lepri et al, "Fair, Transparent, and Accountable Algorithmic Decision-Making Process." (2018) 31 *Philosophy and Technology* 611–627.

⁴³² Tae Wan Kim and Bryan R Routledge "Informational Privacy, A Right to Explanation, and Interpretable AI." (2018) *IEEE Symposium on Privacy-Aware Computing (PAC)* Washington DC, USA 64; Cynthia Rudin, "Stop Explaining Black Box Machine Learning Models for High Stakes Decisions and Use Interpretable Models Instead." (2019) 1 *Nature Machine Intelligence* 206; Aaron Springer and Steve Whittaker, "'I Had a Solid Theory Before but It's Falling Apart': Polarizing Effects of Algorithmic Transparency." *Human-Computer Interaction* (2018) Online: ResearchGate <https://www.researchgate.net/profile/Steve-Whittaker/publication/328781395_I_had_a_solid_theory_before_but_it's_falling_apart_Polarizing_Effects_of_Algorithmic_Transparency/links/60f9f4f11e95fe241a80fbc8/I-had-a-solid-theory-before-but-its-falling-apart-Polarizing-Effects-of-Algorithmic-Transparency.pdf>.

⁴³³ Nu Wang, "Black Box Justice: Robt Judges and AI Based Judgment Processes in China' Court System" (2020) *IEEE International Symposium on Technology and Society (ISTAS 2020)* 58; Warren J von Eschenbach, *Transparency and the Black Box Problem: Why We Do Not Trust AI* (2021) 34 *Philosophy and Technology* 1620.

⁴³⁴ Christopher Markou, *Why Using AI to Sentence Criminals is a Dangerous Idea*, *The Conversation* (May 16, 2017, 6:26 AM), <http://theconversation.com/why-using-ai-to-sentence-criminals-is-a-dangerous-idea77734>.

⁴³⁵ Leah Wissler, "Pandora's Algorithmic Black Bow: The Challenge of Using Algorithmic Risk Assessments in Sentencing" (2019) 56 *American Criminal Law Review* 1811; Rebecca Wexler, "Life, Liberty, and Trade Secrets: Intellectual Property in the Criminal Justice System" (2018) 70 *Stanford Law Review* 1342; Alyssa M Carlson, "The Need for Transparency in the Age of Predictive Sentencing Algorithms" (2017) 103 *Iowa Law Review* 303.

addressing this problem can be difficult, especially with machine learning systems.⁴³⁶ Also, there is validity in the argument that some degree of transparency is necessary for algorithmic decision making.⁴³⁷ However, in response, Ryberg and Chiao have suggested that the best way to address this concern is to compare algorithmic decision-making process to that of a human. For instance, Chiao argued that “insofar as lack of transparency in either of these senses is problematic for algorithmic tools, it is also a problem for human decision-making by judges.”⁴³⁸ This is because the requirement for judges to give reasons does not necessarily mean that the judge understands what led them to come to such a decision – behavioural scientists term this psychological opacity.⁴³⁹ In short, Chiao argued that,

...[M]any aspects of how people process information, from perception to information recall to judgment, *are not open to introspection*. Moreover, there is a significant gap between the reasons people give for their actions and the factors that actually explain their behavior. Opacity is not simply the result of deliberate dissimulation...judges often give only highly abbreviated and conclusory reasons for their decisions... their reasons sometimes appear to exhibit features of *post hoc* rationalization⁴⁴⁰

Along the same lines, behavioural researchers like De Keijser have suggested that the sanctions judges impose are often driven by pragmatism and eclecticism,⁴⁴¹ in such a way that the final sentence imposed often does not align with the required sentencing theories.⁴⁴² Hence, to scholars like Chiao, Zerilli, Ryberg, and many others, the debates about algorithmic transparency are probably mundane because transparency is equally problematic in the context of human decision making.⁴⁴³

⁴³⁶ This problem has led to the field of explainable AI.

⁴³⁷ Jesper Ryberg and Thomas S. Petersen, “Sentencing and the Conflict between Algorithmic Accuracy and Transparency” in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 58.

⁴³⁸ Vincent Chiao, “Transparency at Sentencing: Are Human Judges More Transparent than Algorithms” in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 35.

⁴³⁹ *Ibid* 42

⁴⁴⁰ *Ibid*, 36,42. [Emphasis added].

⁴⁴¹ De Keijser, J. W., R. Van der Leeden, and J. L. Jackson, “From Moral Theory to Penal Attitudes and Back: A Theoretically Integrated Modeling Approach” (2002) 20:4 *Behavioral Sciences & the Law* 317.

⁴⁴² Sigrid van Wingerden and Mojca M. Plesničar, “Artificial Intelligence and Sentencing Humans against Machines” in Jesper Ryberg and Julian V Roberts eds *Sentencing and Artificial Intelligence* (USA: Oxford University Press 2022) 238.

⁴⁴³ Hohn Zerilli et al, “Transparency in Algorithmic and Human Decision Making: Is There a Double Standard?” (2019) 32 *Philosophy and Technology* 661; Cary Coglianese and David Lehr, “Transparency and Algorithmic Governance” (2019) 71:1 *Administrative Law Review* 20.

While this position appears compelling, Chiao and others seemed to imply that judges curate sentencing decisions as though using a “magic wand.” Truly, how sentencing judges formulate their sentences may be opaque, but it is never to the extent of algorithmic opacity. It is much easier to trace the thought process of the sentencing judge on the factors they considered for their conclusion and to glean the weight they attribute to them. As stated in Sheppard’s case, one important purpose of giving reason is to allow lawyers and appellate courts to determine whether a trial judge computed their sentence within known legal boundaries. When any of the parties intend to appeal the decision, the appellate process requires that the appellant produce litigable grounds and that can only be done by reviewing the reason of the judge. So even though the human sentencing process can be opaque, it is doubtful that the same level of opacity applies to an ML powered algorithm. Notwithstanding this issue, machine learning algorithms can still be very useful especially when used as assistive technology.

5.5 Summary

In this chapter, a contextual analysis of the use of automated systems has been carried out. Firstly, the chapter builds upon the analysis of previous chapters to examine the prospects and challenges of an automated sentencing system in Canada. The issues discussed include the legality of potentially using automated systems, the adaptability of automated systems to how sentencing aims and principles in Canada are applied; such as proportionality and individualization. It also considers other crucial issues like data availability and algorithmic transparency.

On the issue of legality, it concludes first that the introduction of an automated system into the Canadian sentencing process is unlikely to face legal objections when used to aid sentencing decisions. This is because past use of technology for structuring sentencing did not face any known legal challenge. The chapter suggests that the main challenge lies more with operationalizing such a system within existing sentencing laws and practices.

Particularly, the chapter recognizes data paucity as a significant drawback being a resultant factor of high deference to unstructured proportionality and individualism. Since ML relies on a vast number of datasets, the current insufficient judicial data resources will be a significant setback to harnessing its power.⁴⁴⁴ In short, it will be difficult to gather structured sentencing data in a jurisdiction that does not have extensive sentencing guidelines. This is because the main considerations such as sentencing aims, and the approximate weight for relevant factors would have been laid out in the guideline. If there were robust sentencing data from the sentencing guideline, that could be readily mapped into the sentencing algorithm.⁴⁴⁵

Overall, the chapter reiterates the unique, anomalous and undesirable position of sentencing laws and practices in Canada, as a sufficient reason to doubt the effectiveness of automated systems to fit sentencing traditions and mitigate disparate sentencing outcomes.

⁴⁴⁴ Xuan Chen, "Deep Learning-Based Intelligent Robot in Sentencing" (2022) 13 *Frontiers in Psychology* 6.

⁴⁴⁵ Mirko Bagaric & Gabrielle Wolf, "Sentencing by Computer: Enhancing Sentencing Transparency and Predictability and (Possibly) Bridging the Gap between Sentencing Knowledge and Practice" (2018) 25:3 *George Mason Law Review* 682.

Chapter 6: Conclusion

The issue of unwarranted disparate sentencing has long been discussed in Canada. This issue has its root in past sentencing traditions of undue deference to a highly individualized notion of proportionate sentence which arguably undermine due process and penal egalitarianism. Several solutions have been proposed to address it, all of which sought to introduce meaningful guardrails aimed at promoting sentencing structure and parity. Unfortunately, many of these proposals have failed. However, the rise in technological advancements raises renewed hope, and once again brings disparate sentencing into the spotlight.

In very recent years, discussions about automating the sentencing process have gained popularity, with some countries already using them, either through ML-powered risk assessment tools in the US or automated sentencing systems in Malaysia and China. Generally, scholars and practitioners tend to agree on the desirability of addressing disparate outcomes and have examined the potential of integrating automated sentencing systems. Although there are significant variations in how scholars imagine the use of automation in sentencing, there is a general consensus that such systems have the prospect of mitigating unwarranted sentencing. This thesis takes on this conclusion and examines it in the context of Canada.

Put simply, this thesis examined sentencing law and practice in Canada and its amenability to automation. In doing this, the thesis began with a survey of current trends in sentencing automation such as the use of AiCOS in Malaysia. It revealed that sentencing automation system is not a myth, but a reality, despite the complexity of the sentencing process.

The thesis also examined current sentencing and practices in Canada. It looked into root causes of disparate sentencing. This includes an examination of past sentencing reforms and proposals including the use of sentencing information systems. Evidently, the study shows that Canada's

sentencing law and practice are anomalous: specifically, Canada can be argued to have embraced disparate sentencing, rather than seeing it as a problem to be solved.

Based on the prospects of AI, the thesis interrogated current debates about how automated systems can be implemented for sentencing. It concludes that the present sentencing landscape as practiced in almost all jurisdictions makes it impossible and undesirable to integrate fully automated sentencing systems, without a radical change to extant sentencing laws and practices. The limitations stem from their incapacity to replicate human intuitive abilities as required for present sentencing methodology, to respond to very nuanced legal situations and to demonstrate appropriate compassion and emotion.

Specifically, the thesis examined the preferred option of an assistive automated sentencing system in the context of Canada. The conclusion is that while there is very a strong incentive to deploy an automated system in Canada, the current unique sentencing culture makes it impossible to operationalize such a system effectively. Aside from concerns with transparency and bias, the challenge is largely tied to the current approach towards proportionality and individualism which are both causative of data paucity. In other words, Canada would have to change direction towards a structured sentencing tradition before it could embrace AI.

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