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Intelligent Agents: Authors, Makers, and Owners of Computer-Generated Works in Canadian Copyright Law

Rex M. Shoyama[†]

Introduction

Canadian copyright law continues to undergo extensive reform and reinterpretation due to rapid technological change. Computer-generated works present challenges to copyright law, and there is a need to consider these challenges in light of the ongoing maturing of artificial intelligence technologies. This paper discusses some of the implications of the application of copyright to works created by “intelligent agents”. A specific example that will be revisited throughout this paper is the use of intelligent agents to gather, summarize, and present news that is available on the Internet. The intelligent news agent example is a particularly useful one to consider for the reason that it has vast commercial applicability and has the potential to be the subject of intellectual property litigation.¹

The central objective of this article is to propose a clarification of copyright law as applied to works created by intelligent agents. In Part I, the concepts of artificial intelligence and intelligent agents are introduced. Part II identifies the challenges that are presented to the tests of originality and authorship in the application of copyright to works generated by intelligent agents. It is argued that works created by intelligent agents may meet the tests of originality and authorship. It is also argued that the concepts of “author”, “owner”, and “maker” are distinct from one another in Canadian copyright law. Part III addresses copyright policy arguments. It is shown that intelligent agents may be authors of works but not owners of copyright, and that there is no clear candidate who should be designated the maker of works created by intelligent agents. The role of the public domain is also considered, and it is concluded that the best solution is for no copyright ownership to be vested in anyone. Database protection legislation is examined in Part IV. The paper concludes with some suggestions that should be considered as part of the ongoing process of Canadian copyright law reform.

I. Intelligent Agents

The term “intelligent agent” refers to an entity with characteristics of intelligent human behaviour.² Intelligent software agents (often deployed on the Internet for e-commerce related activities) have a number of important properties, but the two most significant are their (1) autonomous behaviour; and (2) capacity for decentralized action.³ An autonomous system is often defined as one that has the ability to control its own actions and act without the intervention of humans or other agents.⁴ Intelligent agents act in a decentralized manner if they work together to solve a complex problem, even though there is no central control over the agents and they are distributed in different parts of an environment.⁵ These technical characteristics of intelligent agents help to make them very efficient at searching for and organizing information on a wide-scale in environments such as the Internet.⁶ Intelligent agents thus have the potential to be very useful in many practical applications and will do the work that humans cannot or do not want to do.

There are a number of legal uncertainties that result from the introduction of intelligent agents onto the Internet. Two examples include the determination of contract formation (when agents are introduced as intermediaries between contracting parties) and liability for the misbehaviour of agents.⁷ These legal uncertainties are not merely academic musings. One only need examine a case such as *eBay, Inc. v. Bidder's Edge, Inc.*⁸ (which involved the use of software “bots” by Bidder's Edge to create a database of items available on other auction Web sites by copying information on those Web sites) to understand that intelligent agents pose very practical legal concerns.

As intelligent agent technologies advance, it becomes more and more possible for computers to be “creative”, in the sense that their output will increasingly resemble traditional computer output. As natural lan-

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guage processing capabilities increase, intelligent agents will create more “human-like” output. For example, as early as 1993, Scott French attempted to create a heuristically based expert system that would write in the style of a human author.⁹

It is logical, then, for owners and users of intelligent agents to want to exploit value from and protect the creations that are output by the agent and the knowledge that the agent has accumulated. As a result, there is potential for dispute and litigation in situations where the owner or user of an agent feels that a third party has misappropriated the work done by the agent. Who has the legal right in the creations and knowledge generated by an intelligent agent? Are copyright laws nuanced enough to deal with the struggle over the ownership of content that will result from the use of intelligent agents? Since the creations in question are generated by an agent through its own *autonomous* actions, a fundamental issue is the copyrightability of computer-generated works. There are a number of interesting examples already in existence that illustrate the difficulty in applying copyright law to computer-generated works.

Professor Harold Cohen has created an artificial intelligence-based software program called “AARON” that creates visual art.¹⁰ By simply running the AARON program on a computer, a user of the program can have AARON create original paintings with no user-input whatsoever. Each painting that a particular copy of the AARON program creates is unique and different from any other painting that is created by it or any other copy of AARON running on another computer. Computer generated musical compositions¹¹ and fractals¹² are other examples of works that challenge current copyright law. It is unclear whether copyright exists in such computer-generated works, and who the rightful owner of such a copyright would be.

On the Internet, there is an increasing demand for “news bots” that will deliver news feeds and headlines from various news sources and Web sites around the world directly to the reader.¹³ In an effort to increase the efficiency of news searching and to better personalize access to news on the Internet, researchers have undertaken to create intelligent agents that will have, in addition to numerous other features, the ability to summarize the news items that they gather.¹⁴ In a clever eight-minute flash media movie entitled EPIC 2014,¹⁵ a hypothetical future merger of Google and Amazon is presented wherein “Googlezon” is born. Googlezon constructs news stories dynamically, stripping facts from numerous content sources and recombining them to create a customized news story for a particular user. For example, in putting together a domestic news story, Googlezon could emphasize the international aspects and implications of the story for a reader who is interested in international news.¹⁶ Whether or not copyright subsists in such computer-generated news summaries is questionable.

In addition to the valuable information output by intelligent agents, the agent may also accumulate knowledge within its own internal “knowledge base”. Simply put, a knowledge base is a set of representations of facts about the world.¹⁷ For example, as a shopping agent travels the world (the Internet), it may gather valuable marketing and customer preference information.¹⁸ A news-gathering agent might gather knowledge about the currency and/or breadth of subject matter found at particular news Web sites.¹⁹ As this type of information is incorporated into its knowledge base, the agent will “learn” and adjust its behaviour. This constant mutation by agents (in a manner comparable to viruses) is sometimes referred to as “polymorphism”.²⁰ Thus, agents will act in unpredictable ways and produce unpredictable results, further complicating the legal analysis of copyright in the works generated by the agents.

The question of ownership over the creations and knowledge generated by intelligent agents may be made more difficult where there are competing ownership claims of a number of different parties who are somehow associated with the intelligent agent.²¹ For example, one party may patent certain technologies used in the agent, while another party may copyright the software code composing the agent. If the agent contains the personal/private data of other third parties, these third parties may have some claims to that data. There is also an end-user that has paid money for the right to use the agent. Finally, there is also likely an investor who has been instrumental in the creation of the intelligent agent in the first place. Do any of these parties have a proper copyright ownership claim to the works generated by intelligent agents?

II. Canadian Copyright Law

In Canada, the Subcommittee on the Revisions of the Copyright tabled a report²² in 1985 that considered computer-assisted creations of works and concluded that copyright in any protected work should be vested in the individual or entity principally responsible for the making of the work.²³ In the United States, Congress created the National Commission on New Technological Uses of Copyrighted Works (CONTU) in 1976 to address the problem.²⁴ CONTU came to the conclusion that the user of the program is the author of the work and expressed certainty that for works created with computer assistance, a computer could not contribute to authorship of the works created.²⁵ However, in 1986, the Congressional Office of Technology Assessment (OTA) noted that CONTU’s conclusion that computers are inert tools of creation may be misleading, and raised the possibility for authorship in computers.²⁶ The technological context and surrounding circumstances have changed dramatically in recent years. Two major changes are apparent.

First, nearly two decades have passed, and artificial intelligence technologies have advanced rapidly in recent years, to the point that intelligent agents are not so much assisting the creation of works, but generating them autonomously. OTA's concern that the analysis by CONTU begs the question of whether the computer is a creator or not²⁷ is even more apparent now than it was in 1986. The same may be said about the analysis of the Subcommittee on the Revisions of the Copyright in Canada.

Second, the data at the disposal of intelligent agents on the Internet is far more dynamic and decentralized than could have been imagined twenty years ago. The manner in which data and instructions are presented to agents is much different from what is normally associated with a "computer-assisted" production. There is a distinct difference between a computer program that requires a person to control and supply information to it, and intelligent agents that can autonomously gather information from numerous sources in a highly dynamic and decentralized environment such as the Internet. The significance of the decentralized and highly distributed nature of many intelligent agent programs is that the unpredictability of the resulting works is exacerbated by the fact that agents may collaborate with and delegate tasks to other software agents and do so across multiple Web sites.²⁸

Can and should copyright be applied to works generated by intelligent agents? If the answer is yes, then who should be assigned ownership of the copyright? The answer to these questions depends on whether the works meet the test of originality, and whether intelligent agents may be considered "authors" under the *Canadian Copyright Act*.²⁹ There is no explicit reference to intelligent agents or computer-generated works in the *Copyright Act*, so there is little direct legislative guidance.³⁰ Canada is in the process of extensive copyright reform, but there does not appear to be anything on the agenda dealing with this particular problem.³¹ Additionally, the *Copyright Act* does not define the term "original", nor does it define the term "author", so it is up to the courts to determine what exactly these terms mean.

Originality

Canada's test for originality was recently considered by the Supreme Court in its decision in *CCH Canadian v. Law Society of Upper Canada*.³² This case had been heavily anticipated as being a decision that would be a landmark ruling on what has often been characterized as a battle between the "sweat of brow" understanding of copyright and the "creativity" model of copyright.³³ The Court ultimately concluded that the correct interpretation of the meaning of "original" falls in between these two competing models of copyright, stating that an exercise of skill and judgment is required to attract copyright protection. In particular, the Court stated that "[t]his

exercise of skill and judgment will necessarily involve intellectual effort. The exercise of skill and judgment required to produce the work must not be so trivial that it could be characterized as a purely mechanical exercise."³⁴

What are the specific implications of this ruling for intelligent agents? First of all, it should be noted that there is some debate as to whether the Supreme Court has truly created a standard of originality that lies in between the two competing models of copyright. It has been argued by one commentator that, "[t]he level of originality as defined by the Supreme Court is functionally almost impossible to distinguish from the 'modicum of creativity' approach of Feist".³⁵ Whether or not Canada has adopted a standard of "creativity" similar to the United States may affect the ability to attach copyright to works produced by an agent.

In *CCH Canadian*, in holding that case summaries are original, the Court stated that a

... summary of judicial reasons is not simply a copy of the original reasons. Even if the summary often contains the same language as the judicial reasons, the act of choosing which portions to extract and how to arrange them in the summary requires an exercise of skill and judgment.³⁶

In fact, a close analogy can be made between the activity of an intelligent agent that summarizes news and that of the publishers in the *CCH Canadian* case. Just as with the summary of judicial reasons in the *CCH Canadian* case, an intelligent news agent must choose the portions of information available to it on the Internet and arrange them into a news summary readable to a human. In fact, the activity of an intelligent news agent appears to exhibit a greater level of originality than a summary of judicial reasons pertaining to a single case. The news agent is required to select from numerous sources of information and determine the relevancy of each instead of summarizing one single document. Thus, it seems that computer-generated works will not necessarily be held to be unoriginal in Canada.

An important consequence of the incorporation of artificial intelligence into intelligent agents is that they will increasingly make decisions and judgments that are unpredictable.³⁷ The agents will not act in a deterministic manner, like regular software, and it will be *highly unlikely that any two agents will create the same output*. Each agent will likely develop its own "writing style" as it traverses the Internet, gathering information and building on its knowledge base. As its knowledge base expands, the agent will "learn" and increasingly behave in a unique manner. The result of this non-deterministic behaviour is the creation of information that neither another agent nor another human is likely to create. This is significant because it is arguable that the test for creativity (thus showing originality) may be formulated in the following manner: "would another author likely have created the same 'work' in the same context?"³⁸

Authorship

It seems then that there is nothing in Canadian law that precludes computer-generated works from copyright protection on the basis of a lack of originality. However, can an intelligent agent be found an “author” for the purposes of copyright? A first blush, this might seem like a ridiculous proposition. It certainly seems implicit in the *Copyright Act* that authors must be human.³⁹ It is highly doubtful that the legislature contemplated giving copyright to non-humans. However, even though the answer to this question may seem self-evident, it is still a question worth examining because the exercise of determining authorship is fundamental to determining the copyright status of a work. The important notion of authorship is often neglected, even though it grounds copyright.⁴⁰ A close examination of the concept of authorship reveals that this concept is not as unambiguous as one might think, and thus offers some insight into Canadian copyright legislation.

From the *Copyright Act*, it appears that if a human author cannot be identified, there may be no copyright.⁴¹ At the same time, as discussed already, there is a very strong argument that intelligent agents are creating original works that should attract copyright protection. This causes tension because originality is the overarching standard of authorship,⁴² but at the same time, it is difficult to identify a *human* author for computer-generated works.⁴³

It might be argued that while intelligent agents exhibit the requisite characteristics to be the author, they are in fact still just a tool being used by a person who is making the necessary arrangements for the creation of the work. Are the users of intelligent agents the proper authors of the works generated by intelligent agents? One analogy that has been employed by commentators in order to argue in favour of granting authorship to the users of computer programs is that of a person tape-recording a live performance of music. It has been argued that because the person tape-recording the performance is the author of the recording despite having a limited contribution (pressing the record button), then a user that simply clicks a mouse button should similarly be considered the author of computer-generated output.⁴⁴ This particular argument does not have much weight in Canada, due to the existence of what are known as “neighbouring rights” in the *Copyright Act*. The performer of live music is given the right to fix the performance and reproduce that fixation.⁴⁵

Another analogy made by commentators arguing for authorship to be attributed to users of computer programs is that of a photographer who takes a photo using a highly sophisticated camera.⁴⁶ Modern computerized cameras have advanced image-processing functions and automated features like autofocus that have the ability to make the job of photography little more than the pressing of a shutter.

However, there are some problems with the analogy between cameras and intelligent agents. First, a photographer may control lighting, camera angles, and the positioning of objects in order to construct a final image. This is not true for users of intelligent agents. Users of intelligent agents have little or no control over the final work created by agents. Also, unlike photographs, there are competing claims to authorship (such as by the programmer of the agent), and the user has no preconceived conception of the final work that is created.⁴⁷

The same commentator who argues that computer-generated works are analogous to photographs notes that true artificial intelligence is “a mode of expression whose capabilities, contours, and directions are even less predictable than the future of computer programs . . .”.⁴⁸ Even based on this commentator’s own description of artificial intelligence, a user could never possibly “construct” the final output of an intelligent agent due to the unpredictable nature of the computer-generated work. Thus, the analogy between camera and intelligent agent is not a particularly strong one.

Originality is the touchstone for determining authorship, and a computer program user who contributes little or no *creative control* over the final work should not be considered an author. If the individual who introduces originality into a work is the proper author, it seems then that an argument may be advanced in favour of delineating computer programmers as the authors of computer-generated works. However, due to the highly unpredictable nature of intelligent agents, it is questionable whether or not a programmer should be considered to be the one who introduced the original expression into the works. The programmer cannot possibly conceive what output the intelligent agents will create.⁴⁹ In addition to the questionable claim that programmers are the source of originality in the works, there is an even more immediate doctrinal problem facing the authorship claim of programmers. Authors are generally considered to be those who cause the fixation of the work, and programmers do not do so.⁵⁰

The question is still open as to whether a non-human intelligent agent qualifies as an “author” in Canada. The legislature has nowhere explicitly defined an “author” in the *Copyright Act* as having to be human. In leaving the term “author” undefined, to what extent was this concept expected to be stretched in the future?⁵¹ Regardless of the level of artificial intelligence actually exhibited by agents, and though they are easy subjects for anthropomorphism, it is clear that agents are machines and not human.⁵² Laws usually only apply to humans or juridical persons, and not machines.

International law is also somewhat unhelpful with respect to this issue. A very strong argument can be made for the requirement that an author be a natural person, by looking at the text of the Berne Convention. The proposition is supported by the fact that there is a min-

imal requirement for the protection of moral rights,⁵³ and according moral rights to an intelligent agent does not make sense. It has also been argued that human authorship is, “[t]he *leitmotiv* running through all the categories of works presently protected by the Convention”.⁵⁴

Conversely, it might be argued that the Berne Convention is in fact neutral on this topic. First of all, much like the Canadian *Copyright Act*, the Berne Convention does not define the term “author”. The reasoning behind this lack of definition has been pointed to as evidence of Berne’s neutrality on this topic, since “[t]he Berne Convention Guide states that this is because ‘national laws diverge widely, some recognizing only natural persons as authors, while others treat certain legal entities as copyright owners.’”⁵⁵ Legal persons such as corporations are clearly non-human.

At first glance, the copyright legislation of the United Kingdom appears to be quite helpful, since it is one of the few countries in the world that has enacted specific copyright provisions with respect to computer-generated works.⁵⁶ In the U.K., the author of the work is “the person by whom the arrangements necessary for the creation of the work are undertaken”.⁵⁷ This would appear to settle the issue in the U.K. A policy decision was made there, presumably on the basis that it simply does not make sense to make the agent the bearer of rights, and thus a human author is deemed for computer-generated works. There is nothing wrong with making a decision that machines cannot be rights holders. However, a problem does lie in the wording of the statute. It *conflates authorship with the vesting of ownership*, which leads to considerable incoherence.⁵⁸ Just because the U.K. legislature has decided that a particular human may be the best choice for ownership of a copyright computer-generated work, it does not directly follow that this human should be found the “author”. The lack of existence of a human author for a given work does not necessarily lead to the conclusion that an author does not exist. At the risk of being repetitive, owners are not necessarily authors.

Authors, Makers, and Owners

While there is no legislation specific to computer-generated works in the *Copyright Act*, there are some provisions specific to cinematographic works and sound recordings. Sections 2 and 2.11 of the *Copyright Act* contain very similar wording to subsection 9(3) of the U.K. *Copyright, Design and Patent Act* within it. However, the Canadian legislature appears to have intended to avoid the conflation of authorship with the vesting of ownership by specifically defining a “maker”:

s. 2 “maker” means

(a) in relation to a cinematographic work, the *person by whom the arrangements necessary for the making of the work* are undertaken, or

(b) in relation to a sound recording, the *person by whom the arrangements necessary for the first fixation of the sounds* are undertaken

s. 2.11 For greater certainty, the arrangements referred to in paragraph (b) of the definition “maker” in section 2, as that term is used in section 19, and in the definition “eligible maker” in section 79, include arrangements for entering into contracts with performers, financial arrangements and technical arrangements required for the first fixation of the sounds for a sound recording. [Emphasis Added]⁵⁹

Cinematographic works and sound recordings are similar to computer-generated works in the sense that vesting ownership in the author poses problems. Individual contributors to a film or a sound recording are certainly “authors”, but the multiplicity of creators makes the management of copyright in the final work unwieldy.⁶⁰ The Canadian solution to this problem is to vest copyright in a “maker”, the person who is responsible for making the arrangements necessary to create the work. That “person” can be a corporation.⁶¹ This is different from the approach in the United States, which explicitly gives corporations that produce cinematographic works or sound recordings “authorship” status under the work-for-hire doctrine. Canadian law makes it clear that a “maker” is distinct and different from an “author”.⁶²

In many cases, the “maker” will have made financial and logistical contributions that make the production of the work possible, but will have not made any creative or technical contribution.⁶³ While the maker retains copyright over the final cinematographic work or sound recording, the individual contributors to the work as a whole remain “authors” and retain copyright to their individual contributions. In this sense, the Canadian law is relatively more coherent in terms of its treatment of authorship than the United States, since it does not conflate it with ownership.

Having said that, the Canadian *Copyright Act* is not without its ambiguities and inconsistencies. For example, subsection 10(2) of the Act deems the author of a photograph to be the person who owns the initial negative or, if there is no negative, the owner of the initial photograph. A corporation who owns a photograph or negative may be the author of a photograph. This is an inconsistency that conflates authorship with ownership that likely has its roots in a misunderstanding of the technology behind photography and the relationship photographers have with their cameras, and is an inconsistency that may soon be remedied.⁶⁴ An interim report on copyright reform released by the Standing Committee on Canadian Heritage in May 2004 states:

The Committee feels that photographers should be given copyright protection in their works equal to that enjoyed by other artists. Historically, photographs have been treated differently from other categories of works because they were perceived to be more mechanical and less creative than other art forms. This idea is outmoded and inappropriately treats photographers differently from other artists.⁶⁵

One can see why this inconsistency in the treatment of “authorship” came to be. Since it was believed (at the time that subsection 10(2) of the *Copyright Act* was enacted) that photographers were not authors (since they did not clearly make original and expressive contributions to photographs), these works would not be protected under copyright unless someone was designated the author. A copyrightable work *requires* an author. That is why the notion of authorship is so important. The only solution at the time was to deem the owner of the photograph the author of the work; otherwise, no copyright would subsist in photographs at all. As noted already, this inconsistency is likely soon to be remedied, as proposed amendments to the *Copyright Act* will ensure that the photographer is the author of his or her photograph.

There are three main points to note here. First, the Canadian legislature has appeared to try to avoid conflating authorship with the vesting of ownership, by defining “makers” for particular specific types of works (such as cinematographic works). Thus, the concepts of “author”, “maker”, and “owner” are distinct from each other. Second, nothing in the *Copyright Act* or in international treaties explicitly requires an “author” to be human. Canadian case law also does not seem to preclude the possibility. Third, intelligent agents appear capable of meeting the “originality” requirement in the works they create. What then, should be done with respect to works that are authored by intelligent agents?

III. Canadian Copyright Policy

Intelligent Agents Can Be Authors, But Not Owners

In order to maintain coherence within copyright law, authorship must be understood to be a distinct concept from ownership. As a matter of copyright doctrine, it seems that information generated by intelligent agents meets the requirements necessary for copyright protection. Apart from the fact that intelligent agents are not natural persons, they appear to be good candidates for being authors. However, it is not clear whether assigning *ownership* of the rights associated with authorship to the agent makes sense. The conflation of authorship with the vesting of ownership and the confusion surrounding the nature of the concept of authorship is exacerbated in the context of intelligent agent technology because the term “agent” has a general legal meaning. One definition of agency is “the relationship which results from the manifestation of consent, by one person to another, that the other shall act on his behalf and subject to his control, and consent by the other so act”.⁶⁶ The phrase “intelligent agent” may be misleading, as it may carry such legal connotations of the term “agent”.⁶⁷

In Canada, there has been some attempt to legislate with respect to emerging e-commerce technology. The

use of “electronic agents” had been contemplated and legislated for in the *Uniform Electronic Commerce Act* (UECA),⁶⁸ but since the context for the drafting of this legislation was Electronic Data Interchange (EDI) transactions, the UECA is not very useful when applied to agents on the Internet. While “electronic agents” were contemplated within the UECA, “intelligent agents” that were more than an extension of human action were not.⁶⁹ However, a number of commentators have considered the issues of “electronic agents as persons” within the context of contract law, and their analysis is helpful for thinking about the meaning of authorship and ownership in copyright law.

Cognitive science begins with the assumption that the human mind is computational in nature, and thus can be modeled as a computer program.⁷⁰ However, the attribution of legal personality to entities embodied in computer software is questionable due to the lack of evidence of sentience or consciousness in such entities.⁷¹ It is arguable whether or not intelligent agents possess the ability to process meanings (an attribute referred to as “intentionality”).⁷² For example, it is questionable whether or not it can be claimed that the exercise of summarizing news items gathered from the Internet *endows* intelligent agents “skill and judgment”. This may just be a case of “skill and judgment” being *displayed* by intelligent agents in producing useful outcomes that have been designed by a computer programmer. This type of philosophical debate has raged on for years in the fields of artificial intelligence and cognitive science.

Fortunately, this debate does not have to be resolved here. It is the owner who is the bearer of rights and not the author. As a result, while questions such as “do intelligent agents possess the ability to process and understand meanings?” may be relevant to the question of ownership, they are not relevant to the question of authorship.⁷³ A lack of consciousness or “intentionality” on the part of intelligent agents does not derogate from their ability to produce works that meet the test of originality under Canadian copyright law. At the same time, “intentionality”, consciousness, emotion, property rights, and humanity are all concepts that may be relevant to an inquiry into the qualities that make a bearer of rights one that is afforded the protection of social institutions.⁷⁴ The relevance of such concepts in determining whether an entity is a bearer of rights becomes clear when one considers the assignment of legal rights to non-humans. For example, these concepts would play a role in determining whether or not higher order mammals should have stronger legal rights.⁷⁵ Thus a lack of “intentionality” and consciousness may be a barrier to the granting of copyright ownership rights to intelligent agents.

Pragmatic considerations relating to the assignment of ownership to intelligent agents also help to illustrate the distinction between authorship and ownership in copyright law. First, who would enforce the copyright owned by an intelligent agent if it were infringed? The

intelligent agent has no standing to sue for damages in court.⁷⁶ Secondly, an intelligent agent is not capable of transferring rights to others. Even if it was conceptually possible for agents to enter into licensing agreements with each other and with humans, and to negotiate for the transfer of rights, the assignment of copyright must be in writing in Canada.⁷⁷

It seems then that an intelligent agent can be an author, but *not* an owner. This is problematic because in general, copyright vests first ownership in the author. Policymakers have two options within copyright law to deal with this problem. Either nobody owns any copyright in works created by intelligent agents, or the Canadian legislature will have to create a specific exception for computer-generated works in the *Copyright Act*. If the latter option is chosen, policymakers will need to avoid conflating authorship and ownership to maintain consistency and coherence in the Act. Thus the owner of the copyright should take the form of a “maker”. If specific laws are not enacted for computer-generated works and intelligent agents, then it is not for the courts to carve out an exception to the general requirement that an author be given first ownership.

There Is No Clear Legitimate Maker

For ownership over works created by intelligent agents to vest in anyone, there must be a clear candidate who would meet the requirements of being a “maker”. Interestingly, the Subcommittee on the Revisions of Copyright stated back in 1985 that where data banks were built up from elements from many sources and it was impossible to identify human authors, ownership should be vested in the individual or entity primarily responsible for the arrangements undertaken for making the compilation.⁷⁸ The output of an intelligent news agent who summarizes information gathered from numerous sources on the Internet is somewhat analogous to the hypothetical posed by the Subcommittee, and the phrase “primarily responsible for the arrangements” is very much the same language used in the definition of “maker” in section 2 of the *Copyright Act*. Should Parliament extend the definition of “maker” to address works created by intelligent agents?

With respect to computer-generated works, some of the options that have been suggested for ownership by commentators include

- (a) the programmer/designer of the agent,
- (b) the investor/owner of the agent technology, and
- (c) the user of the agent.⁷⁹

In some sense, the programmer/designer appears to be directly responsible for making the arrangements necessary for the making of the work. However, at the same time, while the programmer is intimately tied to the technology in question, he or she is also clearly divorced from the particular works created by the agent. A maker of a sound recording is involved with the selection and

contracting of the artists who appear on the recording as well as making other financial and technical arrangements; the programmer has little to do with a news summary created by the agent and little control over the agent. Granting ownership to the programmer is also problematic for the reason that it would mean that the programmer might automatically own everything the program was capable of generating.⁸⁰

A case might be made for the investor/owner of the intelligent agent technology. In the sense that an investor has made financial and technical arrangements for the creation of an intelligent agent’s technology, the investor may be close to the definition of “maker” in the *Copyright Act*. However, the investor in this case has no hand in the logistics *directly* associated with the generation of the work that is to be protected. Makers of cinematographic works and sound recordings hire individuals to create for them with a conception of what the final work will be. More importantly, from a policy perspective, to give ownership of the copyright to the investors should make one pause and ask whether there is a point in having copyright at all. The investor’s only hand in the creation of the works is the provision of money. If copyright ownership is given to investors, then it seems that instead of copyright law, we will have succeeded in creating “producers’ investment laws”.⁸¹

The users of intelligent agents likely have the best claim for ownership as “makers”. Users might be considered most directly responsible for fixing the work in tangible form.⁸² If users provide the computing hardware, telecommunications links, and electrical power necessary for intelligent agents to create works, they might be considered to be primarily responsible for the arrangements undertaken to create the resulting works.⁸³ Users may also select, arrange, edit, and polish the output of the intelligent agents.⁸⁴ Despite the fact that users of intelligent agents might be the closest to meeting the requirements of being a “maker” out of all other available options, they are still not clear candidates for being brought into copyright legislation as such. For one thing, unlike recording studios and movie production companies who make the market for creative works, the users of intelligent agents are not ultimate market-makers who take great financial risks for the creation of the works.⁸⁵ Additionally, it is not clear that users require further incentive through copyright in the output of intelligent agents, in addition to the copyright protection that the user may claim in expression he or she personally contributes to the final product.⁸⁶

A natural tendency is to attempt to somehow fit these works into the penumbra of rights within copyright to ensure that the works will be exploited. Put another way, notwithstanding the fact that no human *author* can readily be designated for such works, *there is a natural urge to vest the ownership right in somebody*, because of the commercial value the created work may

have.⁸⁷ However, it may not really be necessary for copyright to vest in anyone.

The Public Domain: Nobody Should be the Owner

It has been argued that the output of an intelligent agent is likely copyrightable, and that nothing precludes the agent from being an “author”. It has also been argued that neither the agent itself (nor any other person) is a particularly good candidate for owning the rights to the information generated by the agent. The agent is not a good candidate for *practical and economic reasons*, while the natural persons associated with the works in question are *not proper authors or makers* of the works. The user of the intelligent agent appears to present the best case for being a possible “maker” of the works.

Is there a good policy reason in favour of giving the user ownership? It may be argued that the best reason to allocate ownership to the user of the agent is to make sure that the work is brought into public circulation and should be done “if for no other reason” than this.⁸⁸ If there is no copyright protection at all, it is argued that nobody has incentive to share the work and may withhold the work from the public domain,⁸⁹ and that this is not in the public interest.

But what exactly is the “public domain”? Just as there are many definitions of property, there are many definitions of the public domain.⁹⁰ Professor Litman has described the public domain as “a commons that includes those aspects of copyrighted works which copyright does not protect ...”.⁹¹ This description of the public domain as an “information commons” is very apposite in the context of information that is available to intelligent agents on the Internet. Intelligent agents that create news summaries from information gathered from numerous sources on the Internet illustrate both the type of raw material in the commons that authors rely upon in order to create new works and how it is that authors rely on such raw material.⁹² The Supreme Court has recently emphasized the necessity of a vigorous public domain, and the role that authorship plays in maintaining a balance between the public interest and obtaining a just reward for the creator in stating that, “[w]hen an author must exercise skill and judgement to ground originality in a work, there is a safeguard against the author being overcompensated for his or her work”.⁹³

Some commentators have emphasized that the public interest is not necessarily served by the public domain.⁹⁴ This is likely true. Copyright protection is necessary in order to create incentives for the creation of works that will populate the public domain. At the same time, if the public domain is related to the concern that excessive copyright may raise the cost of access to informational resources, then the public domain represents a space that is bounded by the minimum intellectual property rights necessary to provide incentives.⁹⁵ It is a

continual balancing act between the benefit of incentives produced by copyright protection and the increased cost of access to the very raw material that feeds new works. Many commentators feel that the recent trend in both Canada and the United States has been to expand and strengthen copyright law as a knee-jerk reaction to the challenges that digital technologies present,⁹⁶ resulting in what might be termed an “information arms race”.⁹⁷

To grant copyright to someone such as a user of intelligent agents for *no other reason* than on the basis that users of intelligent agents must be motivated to bring the computer-generated works into public circulation⁹⁸ is an extreme proposal. The law and policy of copyright always requires a balancing of legal rights with the public interest and a consideration of the effect that broadening the subject matter of copyright will have on the public domain. Preferably, such consideration would include economic analysis on whether such legislation addresses an actual market failure or an actual lack of incentives for production.⁹⁹

If none of the ownership options are suitable, the user should not gain ownership simply because it is the “best of the worst” available options. It is important when dealing with possible extensions of intellectual property rights into new realms to ask whether these extensions still bear the hallmarks of classic intellectual property.¹⁰⁰ Ultimately, it is the creativity of *authors* that copyright seeks to foster, and thus, to give undue weight to the economic incentive that should be given to “makers” and “owners” would be a mistake. It is true that there is a need to further innovation and investment, but to disproportionately value these aspects while ignoring doctrinal difficulties means that we are no longer within the proper ambit of copyright and may actually be sacrificing the public interest by taking an unbalanced approach to copyright.

IV. Database Protection

In theory, many of the doctrinal difficulties discussed above *might* be alleviated through the introduction of *sui generis* database protection laws. Database protection laws would specifically protect the investment made by database producers, which as discussed already, appears to be the real thrust behind the argument that the assignment of copyright for works created by intelligent agents to a person would be in the public interest.

The European Union (EU) adopted a Directive for the legal protection of databases on March 11, 1996,¹⁰¹ but Canada is unlikely to follow suit (at least anytime soon). In a report released by Industry Canada on the status and future of Canadian copyright reform, the issue of database protection was deemed to be one that fell within their most long-term reform agenda.¹⁰² Even if Canada were to adopt database protection laws, would

the works created by an agent even qualify as a “database” under EU-like legislation?¹⁰³

A close reading of a set of four decisions released by the European Court of Justice (ECJ) on November 9, 2004 appears to show that information created by intelligent agents may not in fact fit the definition of “database” under EU database legislation. Cases C-46/02, C-203/02, C-338/02, and C-444/02 all deal with sporting schedules and fixtures used for the purpose of betting, and are the first ECJ judgments to interpret the EU database directive.¹⁰⁴ One of the key holdings of the ECJ was that *sui generis* protection is reserved only for databases for which it can be shown that there has been a substantial investment in the obtaining, verification, or presentation of their contents. The investment must also have been made and used for seeking out existing materials and collecting them in a database (not for the creation of materials that make up the contents of a database).

Thus, under EU-like database protection laws, there is a need to make a distinction between collections of information for which investment was made to collect and verify existing materials (protected as a “database”) and for which investment was made for creating new materials (not protected as a “database”). In practice, this may be a very difficult distinction to make. It certainly has been the case that the demarcation between compilations and non-compilations under copyright in Canada has been difficult to draw,¹⁰⁵ so distinguishing between databases and non-databases may be just as difficult.

However, in all four judgments, the ECJ made it clear that the purpose of the database directive is to promote and protect investment in data storage and processing systems for existing information, which contribute to the development of an information market. Incentive to create materials that are capable of being collected subsequently in a database is not the proper subject matter of database protection laws in the EU.¹⁰⁶ As discussed in previous sections of this paper, the act of summarizing news items gathered from the Internet is the result of the exercise of skill and judgment. However, if an agent’s activities are limited so that the agent will only seek, collect, verify, and present existing materials, then it is possible that such investment would attract protection under database legislation.

These types of distinctions make eminent sense from a broader information policy perspective. As noted by one commentator, database law should focus on its purpose, which is to serve the needs of commerce for investment in commercial databases and avoid focus on content protection.¹⁰⁷

Conclusion

Some commentators would argue that there is no principled basis for not welcoming computer-generated works into the family of copyrighted works, and

that copyright is flexible enough to deal with the legal difficulties presented by intelligent agents. It is true that copyright has “survived” the challenges that photography, sound recordings, and broadcasting have posed for notions of authorship.¹⁰⁸ However, intelligent agents reveal that copyright law, as malleable as it is, can only be stretched so far. The idea that copyright is flexible enough to incorporate computer-generated works was mainly premised on the idea that artificial intelligence technology had not reached a point where a machine (or agent) could truly be considered an author.¹⁰⁹ Times change.

In this paper, it has been argued that intelligent agents are not prohibited explicitly from being “authors” under Canadian copyright law, and that they are capable of creating “original” works as interpreted by Canadian case law. International law also does not appear to prohibit the output of intelligent agents from being deemed material that may be copyrighted. At the same time, giving copyright ownership to intelligent agents leads to an unworkable situation. Users of agents seem well-positioned to own the copyright, but from a doctrinal standpoint, they do not meet the requirement of authorship under copyright law. They are also not particularly well-positioned to be defined as “makers” by the Canadian legislature, as that would be inconsistent with the intent and policy goals of the *Copyright Act*. As a result, it is concluded that the best solution is for no copyright ownership to be vested in anyone.

Preventing anyone from owning the copyright to information generated by intelligent agents avoids incoherence in Canadian copyright law by preventing the conflation of the notion of authorship with the notion of ownership. It is also consistent with the need for the author to be one who “[s]ucceeds in exercising minimal personal autonomy in her fashioning of the work”.¹¹⁰ Autonomy is one of the fundamental characteristics of agents exhibiting artificial intelligence, and while agents cannot be rights bearers, it should be recognized that they are the ones responsible for the originality of the works that they create.

It is important to note that not giving copyright ownership to anyone does not mean that there is no longer *any* incentive for human users and creators to use and create intelligent agent technologies. Investors and programmers still have great incentive to develop new technologies and license their use, as they may own the intellectual property over the technology itself.¹¹¹ There also still exists a great deal of incentive for human users to use the intelligent agent to generate works. If the user decides to extract commercial value from the output of the intelligent agent, not having copyright ownership over the output does not preclude the user from adding expressive value to it. As a result, the user may claim copyright in expression *he or she personally contributes* to the final product, but not on the raw output of the agent.¹¹² Thus, the user still has incentive to use the

agent, extract commercial value out of it, and receive copyright protection for the portion of the expression that he or she has actually authored.

It might be argued that it would be difficult, if not impossible, to prove what original content the agent generated versus what valuable expression the user added,¹¹³ but this is a question of evidence. Just because evidence may be difficult to obtain does not render laws useless. In fact, artificial intelligence technology itself may provide a solution, by offering some sort of audit trail. Digital rights management (DRM) technology has proven that technological solutions can create some very strong boundaries for a user's manipulation of digital information. In fact, the effect of the existence of DRM and technical protection measures (TPM) technology should also be considered by policymakers when considering copyright reform in this area.

Notes:

¹ Intellectual property litigation relating to the provision of news has worked its way up to the top appellate courts in both Canada and the United States. For a couple of recent examples, see *Robertson v. Thomson Corp.* (2004), 243 D.L.R. (4th) 257 (Ont. C.A.), leave to appeal to S.C.C. granted, [2004] S.C.C.A. No. 519, and *New York Times Co. v. Tasini*, (2001) 533 US 483 (United States Supreme Court).

² The term "intelligent agent" is used in a number of ways to describe sophisticated computer technology. Agents may be either hardware- or software-based. In this paper, "intelligent agent" refers to software technologies that have the capacity for *autonomous* and *decentralized* action. Intelligent agents have been given various names, depending on the context surrounding their use, and are sometimes also referred to as "bots" or "spiders".

³ Giovanni Sartor, "Agents in Cyberlaw", Proceedings of Workshop on the Law of Electronic Agents (2002), online: <<http://www.cirfid.unibo.it/~agsw/lea02/pp/Sartor.pdf>> (last accessed: April 2005).

⁴ Nicholas R. Jennings & Michael J. Wooldridge, *Agent Technology Foundations: Applications, and Markets* (London: Springer-Verlag, 1998) at 4.

⁵ Curtis E.A. Karnow, "Liability for Distributed Artificial Intelligences" (1996) 11 *Berkeley Tech L.J.* 147 at 164.

⁶ Robin Cowan & Elad Harison, "Intellectual Property Rights in Intelligent-Agent Technologies: Facilitators, Impediments and Conflicts" (2001), online: <<http://www.itas.fzk.de/e-society/preprints/ecommerce/CowanHarison.pdf>> (last accessed: April 2005).

⁷ See Ian Kerr, "Spirits in the Material World: Intelligent Agents as Intermediaries in Electronic Commerce" (1999) 22 *Dalhousie L. J.* 190, where Professor Kerr discusses this and other issues in detail.

⁸ *eBay, Inc. v. Bidder's Edge, Inc.*, 100 F. Supp. 2d 1058 (N.D. Cal. 2000). For a general discussion on whether intelligent software agents can be considered to be infringing copyright through their actions, see also Sapherstein, M., "Intelligent Agents and Copyright: Internet Technology Outpaces the Law ... Again" (1997) *B.C. Intell. Prop. & Tech. F.* 102801.

⁹ Ralph D. Clifford, "Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?" (1997) 71 *Tul. L. Rev.* 1675 at 1692. Mr. French was successful in publishing the world's first novel ("Just This Once") written partially by a computer. He was attempting to create an artificially intelligent software program that would emulate the writing style of Jacqueline Susann.

¹⁰ This art that has even graced the walls of London's Tate Modern Gallery and the San Francisco Museum of Modern Art. Samples of works created by AARON and a copy of the AARON program may be downloaded from Kurzweil CyberArt Technologies. See "Kurzweil CyberArt Technologies", online: <<http://www.kurzweilcyberart.com>> (last accessed: June 2005).

¹¹ William T. Ralston, "Copyright in Computer-Composed Music: HAL Meets Handel" (2005), forthcoming in *Journal of the Copyright Society of the USA* (copy on file with author). Also see Clifford, *supra* note 9.

The aim of this paper is not to downplay the importance of copyright law protection. Rather, it is to serve as a caution against a natural urge and intuition to assign copyright to computer-generated works created by intelligent agents without having first made careful deliberation. Particularly where copyright protection is to be potentially extended into new areas, context-specific economic analysis and empirical evidence of an actual market failure may be quite helpful. If these works are eventually brought within copyright law or some type of *sui generis* intellectual property protection regime, it is important that broader information policy perspectives are understood to properly limit the scope of the protection given.

¹² See Darin Glasser, "Copyrights in Computer-Generated Works: Whom, If Anyone, Do We Reward?" (2001) *Duke L. & Tech. Rev.* 24.

¹³ Some of the intelligent agents currently available to gather and present news may be found at: Intelligent-Agents, online: <http://www.intelligent-agents.com/BOTSPOT/Windows/Tracking_Bots/News_Bots/> (last accessed: April 2005).

¹⁴ L. Balavijendran, S.N. Cheong, A.K. Mustapha, "Enhancing News Reading Experience Through Personalization of News Content and Services Using Intelligent Agents", (2003), 4 *ICEIS* 404.

¹⁵ The flash media presentation may be viewed at: Robin Sloan & Matt Thompson, "Epic", online: Epic <<http://www.robinsloan.com/epic/>> (last accessed: June 2005).

¹⁶ Julie Hilden, "Will the Future Bring Even More Important Copyright Issues Than The Ones Raised by Online File-Swapping?", online: *FindLaw's Legal Commentary*, <<http://writ.news.findlaw.com/hilden/20050524.html>> (last accessed: June 2005).

¹⁷ Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach* (New Jersey: Prentice-Hall, 1995) at 151.

¹⁸ Cowan, *supra* note 6.

¹⁹ Note that Google has applied for a patent on technology that will rank news stories by the quality and credibility of the source. See Barry Fox, "Google Searches For Quality Not Quantity", online: *NewScientist.com* <<http://www.newscientist.com/article.ns?id=mg18624975900>>. See also Ed Oswald, "Google Plans to Rank News By Quality", online: *BetaNews* <http://www.betanews.com/article/Google_Plans_to_Rank_News_By_Quality/1114819973> (last accessed: June 2005).

²⁰ Karnow, *supra* note 5 at 171. See also Kerr, *supra* note 7 at 207.

²¹ Sartor, *supra* note 3.

²² House of Commons, Standing Committee on Communications and Culture, *A Charter of Rights for Creators* (Ottawa: Minister of Supply & Services, 1985).

²³ Harold G. Fox, *Canadian Law of Copyright and Industrial Design*, 3rd ed. (Scarborough: Carswell, 2000) at 318.

²⁴ Arthur R. Miller, "Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?" (1993) 106 *Harv. L. Rev.* 977 at 978.

²⁵ Pamela Samuelson, "Allocating Ownership Rights in Computer-Generated Works" (1986) 47 *U. Pitt. L. Rev.* 1185 at 1193.

²⁶ Glasser, *supra* note 12 at para 25.

²⁷ Samuelson, *supra* note 25 at 1196.

²⁸ See Bressolles, B., "Determining Appropriate Relief For Unexpected Transactions Concluded Through The Use Of Autonomous Software Agents" (2004), University of Toronto LLM Thesis, (on file with author)

- at p. 12. Also see Karnow, *supra* note 5 at 164 and Kerr, *supra* note 7 at 244.
- ²⁹ *Copyright Act*, R.S.C., 1985, c. C-42 [the Act].
- ³⁰ Contrast this with the United Kingdom and New Zealand, which have enacted specific copyright provisions with respect to computer-generated works. These provisions are discussed in greater detail in Part II, under the heading “Authors, Makers, and Owners” of this paper.
- ³¹ See recent (March 24, 2005) joint announcement by Industry Canada and Canadian Heritage of upcoming amendments to the *Copyright Act* online: <<http://strategis.ic.gc.ca/epic/internet/inippd-dppi.nsf/en/ip01217e.html>> (last accessed: April 2005). See also Industry Canada, “Supporting Culture and Innovation: Report on the Provisions and Operation of the *Copyright Act*,” online: <<http://strategis.ic.gc.ca/SSG/rp00863e.html>> (last accessed: April 2005).
- ³² See *CCH Canadian Ltd. v. Law Society of Upper Canada*, 2004 SCC 13, 30 C.P.R. (4th) 1, 236 D.L.R. (4th) 395 [*CCH Canadian*].
- ³³ See *CCH Canadian*, *supra* note 32 at para. 15, where the Court summarizes the two competing views with reference to *University of London Press Ltd. v. University Tutorial Press Ltd.*, [1916] 2 Ch. 601 as an example of the “sweat of the brow” or “labour”-based approach and *Feist Publications Inc. v. Rural Telephone Service Co.*, 499 U.S. 340 (1991) as an example of the “creativity” approach.
- ³⁴ *CCH Canadian*, *supra* note 32 at para. 16.
- ³⁵ Daniel J. Gervais, “Canadian Copyright Law Post-CCH” (2004) 18 *IPJ* 131 at 139.
- ³⁶ *CCH Canadian*, *supra* note 32 at para. 31.
- ³⁷ As discussed previously, unpredictable behaviour is a direct result of the autonomy of intelligent agents and their capacity for decentralized action. See *supra*, notes 3, 5, 20 and 28.
- ³⁸ See Gervais, *supra*, note 35 at 139.
- ³⁹ Barry Sookman, *Computer, Internet, and Electronic Commerce Law* (Toronto: Carswell, 1991-) at 3–33.
- ⁴⁰ Jane Ginsburg, “The Concept of Authorship in Comparative Copyright Law” (2003) 52 *DePaul L. Rev.* 1063 at 1063.
- ⁴¹ Fox, *supra* note 23 at 318.
- ⁴² Ginsburg, *supra* note 40 at 1077.
- ⁴³ Clifford, *supra* note 9 at 1691.
- ⁴⁴ Samuelson, *supra* note 25 at 1202. See also Ralston, *supra* note 11 at 223.
- ⁴⁵ *Copyright Act*, *supra* note 29 at s. 15.
- ⁴⁶ Miller, *supra* note 24 at 1072.
- ⁴⁷ Alan Durham, “The Random Muse: Authorship and Indeterminacy” (2002) 44 *William and Mary Law Review* 569 at 640.
- ⁴⁸ Miller, *supra* note 24 at 1073.
- ⁴⁹ Samuelson, *supra* note 25 at 1209.
- ⁵⁰ Samuelson, *supra* note 25 at 1209. See also Ralston, *supra* note 11 at 224.
- ⁵¹ This difficulty with legislative intent is reminiscent of the recent Supreme Court of Canada “Harvard Mouse” case: *Harvard College v. Canada (Commissioner of Patents)*, 2002 SCC 76. Much of the argument turned on the Supreme Court’s perception on whether or not it was appropriate for the court to grant patent protection for higher life forms when the oncomouse technology was not within the contemplation of the legislature.
- ⁵² An interesting sidenote here: what happens if the line between man and machine becomes blurred? This would change the analysis, since while cyborgs are not human, they are not machines either.
- ⁵³ See article 6bis of the Berne Convention, “Berne Convention For the Protection of Literacy & Artistic Works,” online: *Cornell University*, <<http://www.law.cornell.edu/treaties/berne/overview.html>>.
- ⁵⁴ Sam Ricketson, “People or Machines: The Berne Convention and the Changing Concept of Authorship” (1991) 16 *Colum. VLAJ. L. & Arts* 1 at 21.
- ⁵⁵ Miller, *supra* note 24 at 1050.
- ⁵⁶ New Zealand has also done so.
- ⁵⁷ See *Copyright, Design and Patent Act*, (U.K.), 1988, c. 48, s. 9(3).
- ⁵⁸ See Ginsburg, *supra* note 40 at 1070.
- ⁵⁹ *Copyright Act*, *supra* note 29.
- ⁶⁰ See *Kraft Canada Inc. v. Euro Excellence Inc.*, (2004) 33 C.P.R. (4th) 246 at paras. 27–28:
- the author of a film is the professional who directs the shot and creates the effects, rather than the person who presses the camera button on command . . . [T]o argue that everyone who may have been involved in the project, including the mailroom attendant who glanced at the computer screen and proposed that the position of the elephant’s feet be changed, is to invite chaos.
- See also Ginsburg, *supra* note 40 at 1071.
- ⁶¹ See *Copyright Act*, *supra* note 29 at ss. 5(1)(b), 15(2)(b)(i)(A).
- ⁶² Unfortunately, there is very little in the way of Canadian case law that aids in considering the definition of “maker” under the *Copyright Act*, *supra* note 29. There is one recent Federal Court case that compared the television reproduction of a boxing event to a “cinematographic work” and stated that, “Under section 2 of the Act, the maker is the person who undertakes the arrangements necessary for the making of the work. In this case, it is clear from the uncontradicted testimony of the plaintiff’s representative, Mr. Yvon Michel, that it was the plaintiff that assumed the direction and the coordination of all the arrangements necessary to the production and logging of programs in both English and French that were broadcast on May 28, 1999, on the Indigo and Viewers’ Choice networks, respectively. The plaintiff also assumed all production costs (exhibit P-2). Consequently, unless the contrary is proved (given the presumption established in paragraph 34.1(1)(b) of the Act) the plaintiff is the only owner of the copyright in these two programs as provided by section 3 of the Act.” See *Interbox Promotion Corp. v. 9012-4314 Québec Inc.*, (2003), 34 C.P.R. (4th) 329 at para. 24.
- ⁶³ Fox, *supra* note 23 at 283.
- ⁶⁴ See recent (March 24, 2005) joint announcement by Industry Canada and Canadian Heritage of upcoming amendments to the *Copyright Act* online: <<http://strategis.ic.gc.ca/epic/internet/inippd-dppi.nsf/en/ip01217e.html>> (last accessed: April 2005).
- ⁶⁵ See Standing Committee on Canadian Heritage, Interim Report on Copyright Reform, online: Government of Canada <<http://www.parl.gc.ca/infocomdoc/Documents/37/3/parlbus/commbus/house/reports/herirp01/herirp01-e.pdf>>, (last accessed: April 2005).
- ⁶⁶ See Bressolles, *supra* note 28 at 17, citing the Restatement (Second) of Agency § 1 (1958).
- ⁶⁷ Anthony J. Bellia Jr., “Contracting With Electronic Agents” (2001) 50 *Emory Law Journal* 1047 at 1059.
- ⁶⁸ See section 19 of Uniform Law Conference of Canada, *Uniform Electronic Commerce Act*, online: University of Alberta <<http://www.law.ualberta.ca/alri/ulc/current/euecafa.htm>> (last accessed: April 2005) for the following definition of electronic agent: “means a computer program or any electronic means used to initiate an action or to respond to an electronic documents [sic] or actions [sic] in whole or in part without review by a natural person at the time of the response or action.”
- ⁶⁹ Kerr, *supra* note 7. Kerr notes that “Despite a recognition that electronic devices can operate autonomously and can enter into contracts without human oversight, the operations of such devices are still treated in UECA as nothing more than the extensions of human action”.
- ⁷⁰ Lawrence Solum, “Legal Personhood For Artificial Intelligences” (1992) 70 *N.C. Law Review* 1231 at 1231.
- ⁷¹ Kerr, *supra* note 7 at 215.
- ⁷² Solum, *supra* note 70 at 1282.
- ⁷³ A similar distinction might be made with respect to the relevance of “intentionality” and sentence in the context of contract law. These considerations are not relevant with respect to the question of the ability of artificial intelligence programs to serve as trustees, but may be relevant with respect to the question of artificial intelligence programs as holders of constitutional rights. See Solum, *supra* note 70 at 1281–1282.
- ⁷⁴ Solum, *supra* note 70 at 1281.
- ⁷⁵ Solum, *supra* note 70 at 1284.
- ⁷⁶ Glasser, *supra* note 12 at para. 31.
- ⁷⁷ See *Copyright Act*, *supra* note 29 at s. 13(4).
- ⁷⁸ Fox, *supra* note 23 at 318.
- ⁷⁹ Sookman, *supra* note 39 at 3–36.
- ⁸⁰ Users who purchase the program might reasonably expect to be able to use the software program in order to create and use the output. Samuelson, *supra* note 25 at 1207. See also Glasser, *supra* note 12, where problems with giving ownership to programmers are canvassed.
- ⁸¹ Ginsburg, *supra* note 40 at 1091.
- ⁸² Glasser, *supra* note 12 at para. 21.

⁸³ In the special case where the user of the intelligent agents also happens to be the programmer of the agents, there is an even stronger case for assigning ownership to the user/programmer. However, it is questionable how likely this scenario may be given that complex intelligent agent systems are multiple agent systems that

... imply at least the causal input of multiple independent programmers of the basic scripting or authoring software, a vast number of users creating distinct intelligent agents, and an unpredictable number of agent to agent interactions on an unpredictable number of interwoven platforms, operating systems, distributed data and communications programs, each of which in turn incorporates at least some further limited programming

See Karnow, *supra* note 5.

⁸⁴ Samuelson, *supra* note 25 at 1203.

⁸⁵ Samuelson, *supra* note 25 at 1227.

⁸⁶ Samuelson, *supra* note 25 at 1224.

⁸⁷ Pamela Samuelson, "Copyright, Digital Data, And Fair Use In Digital Networked Environments" (1995), online: Proceedings of Conference on the Electronic Superhighway <<http://www.lexum.umontreal.ca/conf/ae/en/samuelson.html>> (last accessed: April 2005).

⁸⁸ Glasser, *supra* note 12 at para. 42.

⁸⁹ Samuelson, *supra* note 25 at 1226.

⁹⁰ James Boyle, "The Second Enclosure Movement and the Construction of the Public Domain" (2003) 66 *Law and Contemporary Problems* 33 at 68.

⁹¹ Jessica Litman, "The Public Domain" (1990) 39 *Emory Law Journal* 965 at 968.

⁹² In the words of Professor Boyle, "[a]s has frequently been pointed out, information products are often made up of fragments of other information products; your information output is someone else's information input". See Boyle, *supra* note 90 at 43.

⁹³ *CCH Canadian*, *supra* note 32 at para. 23.

⁹⁴ Edward Samuels, "The Public Domain in Copyright Law" (1993) 41 *Journal of the Copyright Society* 137 online: <<http://www.edwardsamuels.com/copyright/beyond/articles/public.html>> (last accessed: June 2005).

⁹⁵ James Boyle, "The Opposite of Property?" (2003) 66 *Law and Contemporary Problems* 1 at 29.

⁹⁶ Kevin A. Janus, "Defending The Public Domain In Copyright Law: A Tactical Approach — Part I" (2000) 14 *IPJ*. 379 at 396.

⁹⁷ Charlotte Hess & Elinor Ostrom, "Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource" (2003) 66 *Law and Contemporary*

Problems 111 at 111. As Professor Boyle points out, blindly maximizing intellectual property would lead to the conclusion that as copying costs approach zero asymptotically, intellectual property rights must approach perfect control. See Boyle, *supra* note 90 at 42.

⁹⁸ Glasser, *supra* note 12 at para. 42. See also Samuelson, *supra* note 25.

⁹⁹ Pamela Samuelson, "Should Economics Play a Role?" (2004) 1 *U. Ottawa Law & Tech. Journal* 1 at 13.

¹⁰⁰ Margaret Ann Wilkinson, "National Treatment, National Interest and the Public Domain" (2004) 1 *U. Ottawa Law & Tech. Journal* 23 at 48.

¹⁰¹ Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the Legal Protection of Databases, 1996 O.J. (L 77) 20.

¹⁰² Industry Canada, *supra* note 31 at p. 46.

¹⁰³ Sartor, *supra* note 3.

¹⁰⁴ See Court of Justice of the European Communities, Press Release N° 89/04, (9 November 2004), online: Court of Justice of The European Communities <<http://curia.eu.int/en/actu/communiqués/cp04/aff/cp040089en.pdf>> (last accessed: April 2005). Judgments available online: <<http://www.curia.eu.int/jurisp/cgi-bin/form.pl?lang=en>>.

¹⁰⁵ See Robert Howell, "Database Protection And Canadian Laws; Second Ed. (State of Law as of March 31, 2002)" online: <http://www.pch.gc.ca/progs/ac-ca/progs/pda-cpb/pubs/database/database_e.pdf> (last accessed: April 2005).

¹⁰⁶ See paras. 33-34 of Case C-46/02, online: <<http://www.curia.eu.int/jurisp/cgi-bin/form.pl?lang=en>> (last accessed: April 2005).

¹⁰⁷ Jacqueline Lipton, "Balancing Private Rights and Public Policies: Reconceptualizing Property in Databases" (2003) 18 *Berkeley Technology Law Journal* 773.

¹⁰⁸ Samuelson, *supra* note 87.

¹⁰⁹ Miller, *supra* note 24 at 1073.

¹¹⁰ Ginsburg, *supra* note 40 at 1092.

¹¹¹ Although beyond the scope of this paper, it is interesting to note what role liability under patent law might play. The conflation between copyright and patent subject matter in high technology areas continues to confound the legal community. The argument that an owner of a patent for a process used by an intelligent agent to claim rights in information resulting from the patented process (as a "product") is questionable, but certainly not outrageous. For a more general discussion under U.S. law regarding artificial intelligence software and patent law, see Eric Schaal, "Infringing a Fantasy: Future Obstacles Arise for the United States Patent Office and Software Manufacturers Utilizing Artificial Intelligence" (2004) 11 *Vill. Sports & Ent. LJ*. 173.

¹¹² Samuelson, *supra* note 25 at 1224.

¹¹³ Samuelson, *supra* note 25 at 1225.