



# AI and IP: Building a Research Agenda

Centre for Creativity enabled by AI and the City University  
Emerging Technologies Research Network

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## Project Overview

Artificial intelligence poses new questions for intellectual property (IP) law. Can machines be inventors for purposes of patent law? Do creative works produced by AI deserve copyright protection? Is new legislation required to govern AI creativity? Courts, IP offices, and legislators in multiple jurisdictions are considering these questions.

By now, there is a well-developed and comprehensive academic literature which analyses the interface between IP and AI. The extant literature provides thorough legal and conceptual analyses of whether machine learning algorithms can be inventors or authors for the purposes of patent and copyright law. And while there will always be room for further analysis of such questions as technology progresses, there is diminishing marginal returns to such inquiries at this point in time.

The *AI and IP: Building a Research Agenda* project asked the question: What is next for IP and AI research? The project's aim was to identify issues relating to AI's impact on IP law that remain under analysed in academic literature. The project's objective was to produce a list of novel research topics and questions (both doctrinal and interdisciplinary). By identifying potential areas for future research, the project intends to inspire and guide future researchers, particularly PhD students and junior researchers in the fields of law and related subjects. Completing such research will create new knowledge to the benefit of lawmakers and wider society. Such research agendas have proved valuable outside of legal studies.

To create a research agenda for the field of AI and IP, the City Law School hosted the *AI and IP workshop* on March 18<sup>th</sup>, 2022. The workshop brought together a range of senior and junior researchers in the field of IP law and AI. Prior to the event, the workshop organisers identified approximately 150 research outputs (including journal articles, monograph books, edited collections, and reports) relating to the relationship between AI and IP. The research outputs served as a literature review and were circulated among the project participants prior to the event. The workshop provided a venue in which the research outputs were considered, and gaps in the research identified. It was organised by the Centre for Creativity enabled by AI and the City University Emerging Technologies Research Network.

The following report summarises the conclusions arising from the workshop. After introducing the project participants, the report provides a thematic summary of topics and questions related to AI and IP that remain under analysed in academic literature. These questions are loosely grouped into three categories: doctrinal and legal process questions; technical and empirical questions; and economic, philosophical, and sociological questions. These are followed by a list of research outputs considered by the project participants.

## Participants

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## Doctrinal and Legal Process Questions

The extant academic literature contains a thorough doctrinal analysis of the application of IP law to AI generated works and inventions. Much of this literature poses questions of statutory interpretation and focuses on whether the outputs of AI algorithms qualify for patent or copyright protection and, if so, who is the owner of the patent and copyrights. Questions such as ‘must a human person be listed as an inventor for purposes of section 13 of the Patents Act 1977 (UK)?’ or ‘do AI generated works qualify as the ‘original works of authorship for purposes of §102 Copyright Act 1976 (USA)?’ have received very significant amounts of attention. Additionally, a substantial body of literature considers whether the algorithm training process infringes upon pre-existing copyrights and patents.

Far less doctrinal analysis exists in relation to IP rights outside of patents and copyrights. Approximately 5% of the literature surveyed explicitly analysed the impact of AI on IP law outside of the spheres of patents and copyrights. Yet in many cases, these fields pose important and interesting questions of law and legal process.

The role of AI in relation to trademarks remains substantially underexplored. The impact of AI on trademarks is in many ways more subtle than its impact in copyright and patents. Yet, the development of AI technology poses important questions about the impact of such technology on the processes used in trademark law and upon longstanding concepts and doctrines. The clear starting point for such investigation would be to consider the extent to which AI can be used to identify prior mark conflicts or possible cases of infringement. While AI provides possible efficiencies in conducting such processes, questions remain over the ability of machines to understand and properly assess the semantic meaning of two signs. Similarly, questions remain over whether an AI algorithm built for use in one jurisdiction can be easily imported into another jurisdiction, given the diverse approaches to identifying similarity.

*In an unobtrusive and unnoticed way at bureaucratic levels, trademark assessment of prior conflicts was quietly taken over by AI.*

Dev Gangjee

Similar room for exploration exists in relation to design rights and trade secrets. In some cases, these questions are reminiscent of the questions in copyright and patents. For example, article 18 of the Community Design Right Regulation (EU6/2002) provides designers with the right to be ‘cited as such before the Office and in the register?’. To what extent does the designer’s right of attribution apply to designs produced via AI? Alternatively, can AI algorithms be used to identify potentially conflicting registered designs? And to what degree does trade secret law apply to AI related inventions?

While some of the obvious questions of patent and copyright have enjoyed thorough analysis, some questions have received less attention. In relation to patent law, what is the impact of functional claiming in relation to AI algorithms? To what extent can such claiming

enable a broad monopoly over AI algorithms and outputs, or to what extent will such claims fail the indefiniteness and overbreadth doctrines? In copyright, new questions regarding formalities are coming to the fore. If human-authored and machine-authored works enjoy different legal protections (including, for example, machine-authored works not receiving protection at all), then how will the general public know what works are protected by copyright and what works are not protected? Is there a need to expand the role of registration in copyright? In a similar vein, should human-authored and machine-authored works be treated differently? To what extent, if at all, do moral rights attach to AI produced works? Can a creative machine learning algorithm ‘copy’ pre-existing works or are the outputs more appropriately understood as ‘independently created’?

Lastly, there is room to analyse the potential overlapping legal protection offered to AI algorithms and products. To what extent do doctrines within IP law prevent or encourage multiple layers of legal protection for AI algorithms and outputs? And to what extent is overlapping protection justifiable, and consistent with prior IP law practice? In some cases, such as MAR Covid-19 vaccines produced in part through creative AI algorithms, legal policies such as IP waivers may affect not only patents, but a wide range of different IP rights.

## Technical and Empirical Questions

As policy makers debate new regulation of AI generated inventions and outputs, it is important to have a thorough and complete grasp of the state of the art. Yet outside of a few well-known and high-profile examples, much of the technical details of AI algorithms and their operation remain mysterious. This is to be expected given that some of this information may be protected as trade secrets. Nevertheless, research into the technical and empirical realities of AI algorithms and outputs is needed to guide rational policymaking.

The production of case studies that explore the operation of creative AI algorithms and outputs will be particularly valuable. Important empirical and technical uncertainty over the relative contributions of humans and machines towards the final outputs of creative AI algorithms remain unanswered. Yet understanding and assessing those contributions is important if we are to properly assess the application of IP (including inventorship and originality doctrines) to the outputs of said algorithms. Similarly, the training process of AI algorithms remains largely unknown. Where is AI being trained and on what data? To adequately assess whether training truly does expose individuals to IP infringement liability, or to assess whether such individuals may benefit from text and data mining exceptions, an accurate picture of the training process would be helpful.

*Where (in what jurisdiction) are creative AI algorithms being trained and upon what data?*

Martin Kretschmer

This is not to say that case studies are the only method that ought to be used to construct an adequate picture of creative AI algorithms. Gathering statistical and quantitative data is also likely to be helpful. While much has been written about how creative AI algorithms will change the realities of IP law, there has been little attempt to assess the scale of the impact of AI upon IP law. For example, how many patentable inventions would plausibly qualify as

‘AI invented’? If lawmakers are considering changing the law to accommodate such inventions, an estimate of how many inventions would likely benefit from such a change in the law would be desirable.

## Economic, Philosophical and Sociological Questions

Creative AI algorithms pose interesting and valuable humanities and social science questions that remain under explored. In this area, the economic questions are highly pressing. Proponents of recognising AI inventors for purposes of patent law sometimes claim that such recognition will have a beneficial effect on innovation incentives. On the other hand, is there any evidence of a market failure in relation to AI related outputs? The claim can equally be made that creative AI algorithms reduce the costs of innovation and creativity. If so, the public goods market failure that underpins the justification of IP rights may be becoming less pronounced. Which effect will dominate? Will patents encourage greater innovation? Or is the real effect of creative AI algorithms to weaken the case for the patent system altogether as the costs of innovation fall?

Historical economic case studies may reveal important information in this regard. While developments in machine learning pose new questions, IP lawyers have struggled to accommodate computer generated outputs for over fifty years. In some cases, studying the attempts to regulate such outputs may prove valuable. To illustrate, in the Copyright, Designs and Patents Act 1988 (UK), the UK Parliament adopted a unique provision for ‘computer-generated works’. Section 9(3) of the legislation provides protection to works that are produced without a human author. The section was subsequently adopted in various other (common law) jurisdictions. To date, however, there has been no attempt to evaluate the effect of that clause. Did the clause have any noticeable effect on businesses? Did it lead to enhanced creativity? Before adopting new provisions to IP legislation, lawmakers might consider the effects (if any) that previous legal changes have had in this field.

*Businesses did not appear to notice when s9(3) was added to the Copyright, Designs, and Patents Act 1988 (UK).*

Enrico Bonadio

Creative AI algorithms also pose philosophical questions about the value of human creativity. Extant philosophical literature has focused significantly on the conceptual question of whether machines can be ‘inventors’ or ‘authors’, properly so called. But there remains interesting space to explore how AI is changing our values. In a world where AI can produce all our hit pop songs, is human creativity still uniquely valuable? And, if so, is it so valuable that it is worth encouraging such human creativity through IP rights, with all the deadweight, enforcement, and administrative costs that are associated with such a policy mechanism? For some, the cost of IP rights may be enough to make encouraging human creativity no longer attractive. In a related vein, the development of AI makes us question whether IP is fundamentally anthropocentric, in the sense of viewing human beings as the central or most

important entity in the universe. If so, IP law in the future may increasingly valorise the process of creation, rather than the end product. Will IP seek to protect what is uniquely and distinctly human?

## *Is IP law inherently and essentially anthropocentric?*

Uma Suthersanen

Interesting questions of power and politics also exist in relation to creative AI algorithms. In particular, if creative AI algorithms are awarded new or enhanced IP rights in the future, who stands to win and who stands to lose? Concerns have been raised that allowing the owners of AI algorithms to own the outputs of such algorithms may lead to mass acquisition of property rights and wealth of a small number of organisations and individuals. If the extensions of IP law in the twentieth century was, as some have claimed, a 'second enclosure' movement, where intangible commons of the mind were subject to property rights *en masse*, are we now on the precipice of a third enclosure movement in which the outputs of machines become privatised?

## **Concluding Thoughts**

In recent years, significant academic attention has considered how IP law applies to AI products and processes, and how AI may change the practice and doctrine of IP law. Yet, said academic attention has focused on a rather narrow (although undoubtedly important) set of issues within the topic. Researchers may wish to widen the focus away from the doctrinal question of whether machine learning algorithms can be authors and inventors, and towards a range of questions that have so far been under-analysed, yet will add real value to how IP law interacts with AI in the future. It is hoped that this report will help spark future research on these issues.

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