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## **EDITORIAL: THE FUTURE OF IP LAW IN AN AGE OF ARTIFICIAL INTELLIGENCE**

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In October 2015, AlphaGo became the first Computer program to beat a professional human Go player, the reigning European champion Fan Hui. Five month later, watched by an audience of over 60 million people worldwide, it was going to beat 18-time world champion and 9 Dan player Lee Sedol, finally catapulting AI into the public limelight and finally turning, for many, Science Fiction into Science. In between these two dates, and admittedly to a somewhat smaller audience, CREATE, the RCUK Centre for Copyright and New Business Models in the Creative Economy,<sup>1</sup> held what was by then already the fourth incarnation of its “Artificial Intelligence and IP law” workshop series, AIP IV, as in previous years in conjunction with the annual Jurix conference.

CREATE has addressed the future of copyright law in an age of AI since its launch in 2012 in two of its work packages, reflecting the different ways in which AI has an impact on copyright law. Artificial Intelligence (AI) impacts on copyright and other IP law in two ways. First, human creators are increasingly assisted by intelligent technology, co-creating works with (partially) autonomous machines, or in some cases leaving the creative process entirely to software programs. Just as the participants of AIP were gathering in Braga, in London, rehearsals began of the first musical conceived, composed and scripted largely by AI, *Beyond the Fence*.<sup>2</sup> Are traditional IP law concepts such as “inventiveness”, “original” and indeed “creator” still appropriate for such an environment? Our research showed that while machine-creation or art (or algorithmic creativity) has a surprisingly long history, going back at least to the 18th century, only now do we find applications reaching the market that require a serious rethink of the role of copyright law in providing incentives and protecting investment for artists and the industries that depend on them.<sup>3</sup> Currently, only the UK provides an explicit regulation for (some) computer generated works, though the strict equivalence with human works may give overly generous protection to works that can increasingly be produced with almost no effort and in quantities previously unimaginable.

AI is not just a new source for creative works, they are also crucially dependent on access to works created by others. The machine learning techniques on which they depend require massive amounts of input, data that can be subject to varying IP regimes. If the robot revolution is going to transform our economy, access to these inputs must be possible at an economically affordable cost – while at the same time, some data sets (or entire works) could acquire significant commercial value they were lacking in the past. Issues surrounding AIs and robots as consumer of creative works were also investigated by CREATE.<sup>4</sup> Should there be, for instance, a right to mine if you have a “right to read” – i.e. a right to data mine all material someone has legal

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<sup>1</sup> CREATE, available at <http://www.create.ac.uk/blog/category/about/> (accessed 8 Dec 16).

<sup>2</sup> M Brown, “World’s First Computer-generated Musical to Debut in London” (2016) *The Guardian* available at <https://www.theguardian.com/stage/2015/dec/01/beyond-the-fence-computer-generated-musical-greenham-common> (accessed 8 Dec 16).

<sup>3</sup> B Schafer et al, “A Fourth Law of Robotics? Copyright and the Law and Ethics of Machine Co-production” (2015) 23 *Artificial Intelligence and Law* 217-240.

<sup>4</sup> C Geib, “From Infringement to Exception: Why the Rules on Data Mining in Europe Need to Change” (2016) *CREATE Working Paper 2016/07* available at <http://www.create.ac.uk/publications/from-infringement-to-exception-why-the-rules-on-data-mining-in-europe-need-to-change/> (accessed 8 Dec 16).

access to? But creators and artists are not the only ones affected by the AI revolution, and not the only (or even the main) profession that will have to face competition for their business models from machines. Lawyers, including IP lawyers, will face even more challenges, working in a rule-based environment that also historically was a much more successful test bed for AI applications.<sup>5</sup> AI will challenge them to develop new, computer-assisted ways to deliver value for clients – either in the form of old services, but delivered faster, cheaper or more consistently, or in the form of entirely new services that are only made possible through assistive smart technologies.

At the same time, traditional business models of the legal profession, in particular the “billable hour”, will come under increasing pressure, and we might even see an environment where substantial parts of the legal profession will compete for jobs with AIs. The recent acquisition of Lex Machina by LexisNexis shows not only how legal AI has become now commercial mainstream, but also how powerful the alliance of software developers and legal content providers/owners such as LexisNexis can be. Lex Machina is a platform that analyses court decisions in (amongst others) copyright and patent law, allowing a user to query a database of court decisions to find out “how likely is a judge to grant or deny a specific motion”, or “how likely is a judge to find infringement of a patent, fair use of a trademark, or a Securities Act violation”.<sup>6</sup> CREATE investigated both aspects of AI assisted copyright practice – new and improved ways to deliver traditional services<sup>7</sup> and also new and more speculative AI-enabled services.<sup>8</sup>

To reach out to computer scientists, lawyers and creators, crossing disciplinary boundaries just as much as boundaries between academia and practice, CREATE initiated the AIIP workshop series, holding events in Amsterdam, Bologna, Salzburg and Braga. These workshops brought together researchers from all across Europe with experts from the US and Australia, university-based researchers with those working in application-oriented institutions such as the Fraunhofer Institute, and industry outfits such as Docketalarm<sup>9</sup> and TrademarkNow.<sup>10</sup> I am particularly grateful to Tom Gordon from the Fraunhofer Institute and co-investigator on the EU-funded MARKOS project,<sup>11</sup> and Anna Ronkainen, co-founder and Chief Scientist of TrademarkNow, for serving as co-chairs on the programme committee for AIIP since the first event in Amsterdam.

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<sup>5</sup> T Bench-Capon et al, “A History of AI and Law in 50 Papers: 25 Years of the International Conference on AI and Law” (2012) 20 *Artificial Intelligence and Law* 215-319.

<sup>6</sup> Lex Machina, “Copyright Litigation” available at <https://lexmachina.com/copyright-litigation/> (accessed 8 Dec 16).

<sup>7</sup> See e.g. O Conetta and B Schafer, “Self-enforcing or Self-executing? What Computational Copyright Can Learn from LKIF Transaction Configurations for Eurobonds” (2012) available at <http://www.create.ac.uk/publications/self-enforcing-or-self-executing-what-computational-copyright-can-learn-from-lkif-transaction-configurations-for-eurobonds/> (accessed 8 Dec 16).

<sup>8</sup> E Täks et al, “Report on a Computer Assisted Copyright Reform Observatory” (2014) available at <http://www.create.ac.uk/publications/report-on-a-computer-assisted-copyright-reform-observatory/> (accessed 8 Dec 16).

<sup>9</sup> Docket Alarm, available at <https://www.docketalarm.com> (accessed 8 Dec 16).

<sup>10</sup> TrademarkNow, available at <https://www.trademarknow.com> (accessed 8 Dec 16).

<sup>11</sup> MARKOS project, available at <http://www.markosproject.eu> (accessed 8 Dec 16).

I am even more grateful to Anna and TrademarkNow for coming up with the idea of a best paper competition in the field of AI and IP to mark the (preliminary?) conclusion of the workshop series, as CREATE draws to an end in 2016. They generously sponsored the competition, not just financially but also by dedicating time for sitting on the awards committee.

This special edition of *SCRIPTed* contains the winner of the essay prize competition, which was announced at AIP IV in Braga. As a question we chose: “How will Artificial Intelligence change the practice of Intellectual Property law?”, leaving it intentionally open if contributors wanted to focus on AI as a problem to be regulated, or a tool of regulation – a competitor of creators or a competitor of lawyers and courts.

Our overall first prize went to a paper written by a team of researchers from the University of Bournemouth: Marcella Favale, Neil McDonald, Shamal Faily and Christos Gatzidis. Their paper, “Human Aspects in Digital Rights Management: The Perspective of Content Developers”, reports results of the MADRGIAL project that is “aimed at understanding how game developers make sense of Digital Rights Management (DRM) technology when developing video games, and explored the complex perspectives of content producers, users and legislators”.<sup>12</sup> DRM, the paradigmatic example of the ability of law to become “self-enforcing” in digital environments, has been recognised as a radically new alternative to traditional legal enforcement ever since Larry Lessig used it to illustrate the relation between software code and legal code as complementary tools of social control in his 1999 book, *Code and Other Laws of Cyberspace*. However, despite revolutionising the academic discussion regarding the nature of law and regulation in online contexts, the actual success of DRM remained limited. Part of the reason is technological in nature. DRM is an essentially dumb form of access control – it embodies copyright law in the same way a physical door lock can be said to embody the law of real property. Legal AI by contrast requested from its earliest days an isomorphism between the legal rule and its representation in code – for this more ambitious approach at self-enforcing laws, the case for Lessig’s equivalence is easier to argue.

Just as important as the technological shortcomings are however questions concerning the relation between technological tools and the humans that use them. We can see this clearly in the “sister project” to DRM, “Privacy by Design”. Promoted as a solution to intricate online data protection questions since the turn of the century, it has now become clear that unless these approaches are based on a sound understanding of the human-computer interface and a rigorous focus on “usable privacy”, their uptake and efficient use will be limited. Similarly, much better research is needed to explore the way in which right holders and customers interact with DRM if it is to fulfil its full potential. This requires interdisciplinary research that brings together computer scientists, lawyers, psychologists and behavioural economists. It is to this discussion that our prize winner makes an important contribution. The panel was in particular impressed by the interdisciplinary nature of the research and the clear synergies that emerge between the different types of expertise, while maintaining the rigour of the underlying disciplines.

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<sup>12</sup> BU Research Blog, “MADRIGAL: Making Sense of DRM in Game Development” (2015) available at <http://blogs.bournemouth.ac.uk/research/2015/09/08/madrigal-making-sense-of-drm-in-game-development/> (accessed 8 Dec 16).

Our second place went to a very different type of paper, written in a form that has become, regrettably in my view, almost extinct in academic writing. “Artificial Invention: Mind the Machine!”, by Shamnad Basheer from Nirma University, chooses a dialogue form, more specifically a trial dialogue, to explore issues of computer creativity, ownership and the law. Dialogues as a mean for knowledge elicitation and communication marks the beginning of western philosophy in the person of Socrates. In Indian thought too, dialogues and the dialogical form is pivotal. The Upanishad is structured around a dialogue between the young boy Nachiketa, who meets Yama, the deity of death. In the dialogue between the two, the nature of man, knowledge, the Soul or Self (Atman) and the nature of liberation are getting discussed and explored. The dialogue form would continue to play a preeminent role in Indian logic, *samvada* (dialogue) and *pariprasna* repeated questioning, informing not only the approach to philosophical education, but also to the nature of logic itself.

Law of course requires both an ability to conduct a dialogue or argument on behalf of one’s client, and an ability, as judges, to derive information from the dialogue displayed before them. This ability to learn from observing a dialogue, crucial for judicial decision making, is regrettably often neglected in legal education and legal academic writing. Legal AI, by contrast, has long recognised the essentially dialogical nature of legal dispute – the MARKOS system mentioned above utilises for the evaluation of copyright licenses the CARNEADES argumentation framework that takes the procedural and dialogical nature of legal argumentation to its heart. Long before CARNEADES, there was ALICE, one of the first prototypical AI systems that also utilised dialogues, and following her a long series of dialogue bots leading to today’s Siri and, crucially for lawyers, IBM’s ROSS. The famous Turing test takes the form of a dialogue – or indeed a trial, as does its modern successor, the Loebner Prize. The panel was therefore particularly pleased to see a revival of this form of knowledge presentation also in a legal paper, and commented favourably on the author’s skill in dissecting competently and knowledgeably complex legal issues in such an engaging format.

One key concern for CREATE is also capacity building in the intersection between computer technology, law and economics, training a new generation of interdisciplinary researchers. To support this concern, we also ran a competition for best student paper. I was particularly delighted that for the discussion of this award, I had to leave the (virtual) room, as the eventual winner had written her paper under my supervision as her dissertation in our Law, Technology and Innovation distance learning LLM. Erica Fraser’s paper, “Computers as Inventors – Legal and Policy Implications of Artificial Intelligence on Patent Law”, discusses the implications for our patent system if AIs become inventors (and indeed, what this conceptually means). While there is now also, thanks to the CREATE project, an emerging literature on copyright implications of computer generated art, there has been hardly any analysis on the legal implication of AIs as inventors. This mirrors also the interests of the AI community. While computer creativity is a lively research field, the type of creativity that is studied mainly comes from the arts – robots that paint, compose, write poetry or dance have all been developed. Yet, comparatively little research has gone into AIs that develop new tools, methods or products that solve problems in the physical world. Fraser’s paper analyses both existing and possible near-future examples of robot-innovators, drawing conclusions that indicate that the disruption of the patent system that this technology will bring could be even more severe than the challenges to our copyright regime caused by robot-artists.

I'm delighted that these three excellent papers have also found a home with *SCRIPTed*. *SCRIPTed* was launched in 2002 as part of the AHRC-funded *SCRIPT* project on IP, IT and Medical law at the University of Edinburgh. Its role from the beginning was also to promote our vision of open access, creative commons-enabled academic publishing – long before misguided government science policies led to a deluge of predatory “open access” online “journals” that essentially charge inexperienced authors for putting their papers on a blog. In contrast, *SCRIPTed* not only maintains rigorous peer review and excellent editorial support for authors, combining the best of the US law school journal and the traditional peer reviewed journal, it remains free for both authors and readers, thanks originally to AHRC funding through *SCRIPT* and later *CREATE*, and now a generous grant from the School of Law of the University of Edinburgh – though we keep looking for sponsors that would enable us to build on the success of these past 14 years. All the papers in this special edition problematise the nature of knowledge production in an environment where new technologies change the rules of the game faster than parliaments can respond. New forms of knowledge dissemination and new forms of control over information of the type that *SCRIPTed* spearheaded will also play a pivotal role in the new data ecosystem, where both humans and machines consume and produce, create and invent.