New Challenges of Copyright Authorship in AI

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Abstract – In this paper we explore the new challenges facing Artificial Intelligence with systems able to generate new creations such as poems, songs, pictures or news, and the ownership of their rights.

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1 Introduction

In 1948 Alan Turing, considered as the father of Artificial Intelligence, took a sabbatical year to write a manifesto about the intelligence of machines \cite{1}. In fact he began with the sentence “You cannot make a machine to think for you”. This statement that seemed obvious at that time, is being more than questioned nowadays as we present in this paper.

As computers evolved through the ages, new ‘intelligent’ forms appeared. In the 60’s Joseph Weizenbaum created Eliza \cite{2}, a program able to emulate a computer therapist and able to maintain a simple conversation as figure 1 shows. In the future Eliza would be considered as the first chatbot, and would serve for inspiration for many others, as for example Iphone’s SIRI, Ikea’s Anna or Cleverbot \cite{3}.

![Fig. 1 Conversation with Eliza on Emacs.](image)

During these years were established the theoretical fundamentals and principles that would serve as the basis of AI in the future, like neural networks by McCulloch and Pitts (1943) \cite{4}, fuzzy logic by Lotfi Zadeh (1965) \cite{5}, genetic algorithms by John Holland (1970’s) \cite{6}, among others.

During the 70’s, new types of ‘intelligent’ systems appeared as SHRLDU created by Terry Winograd \cite{7}. This system provides an interface in natural language to interact with geometric figures and the movements that can play with them in a virtual environment. Other example is LUNAR \cite{8}, developed by William Woods which provided and interface in natural language capable of answering questions related to lunar rock samples. This is considered as the first Question Answering system.

During the 80’s, Expert Systems were born. They supposed a step ahead in the field of AI as they deal with very specific knowledge emulating the view of an expert in a field, connecting the information through reasoning strategies of several stages. Two famous examples are Dendral \cite{9} and MYCIN \cite{10}. Dendral was created by Edward Feigenbaum, served for the study of chemical components. Written in LISP (a very used language in AI), it automated the decision making process and problem solving behaviour of organic chemists. In fact this expert system was used for more than 10 years and served as basis of many others like MYCIN, created by Edward Shortliffe, which was a medical expert system created to diagnose illness. Written in LISP as well, MYCIN had improvements in the reasoning stage and served as basis for many medical expert systems.

In the 90’s, AI was introduced in our homes, with intelligent washing machines, cameras, phones, and a set of infinite devices. With the emerge of the Internet, AI is focused in the user needs, providing intelligent search engines like Google, recommendation systems as Amazon, translators as Babylon or Google Translator, sentiment analysis systems as those dedicated to understand ‘user’s comments in Twitter or social networks, and thousands of mobile apps dedicated to provide a service to a final user.
All of these systems have in common that they are unable to think as humans do. Even, they are unable to draw conclusions or slightly generate new knowledge. But what happens if a system is able to create? What happens if joined to select the information efficiently they are able to compose a poem, a new song or even a picture? Is our legal system prepared for that? Who would own the rights of this work? The machine? The programmer? Recently there have appeared systems capable to do so. That is why in this paper we want to review the authorship of these new creations.

2 Artificial art creations

The 10th of February of 1996, Gari Kasparov was beaten at chess by the IBM machine Deep Blue [11]. The tournament ended 4-2 being Kasparov the final winner. How intelligent was Deep Blue to beat in two games the current chess champion? In fact Deep Blue used a very slowly but efficient process, brute force. It was able to process 200 million positions per second and had stored 12 billion moves. With these data, how is it possible that Kasparov had won 4 times? Because he had creativity, and was able to generate new movements and strategies.

Today, 20 years after Deep Blue, our ‘intelligent’ machines have a reduced creativity by their own. In fact A. Turing said that “The intelligence of the machine is the intelligence of his creator”. The weakness of the machines nowadays is creativity. That relies in humans. But, what happens when a machine is able to create? Who owns the rights of that creation? This question is raising as new systems have emerged, like the poet robot WASP (Wishful Automated Spanish Poet) [12]. Using as reference poems of famous Spanish writers, grammatical patterns, news (to connect his creations with the events that are happening now) and a wide vocabulary able to match into a poem, this system is able to compose new poems. To do so, he uses an evolutionary algorithm, which creates first a draft of a poem and in successive iterations (supervised by a human), is improving the quality of the poem. In this case, who is the real composer of the poem? If I want to write a book with these poems, whom belongs the copyrights of them?

Last year, SONY CSL Research Laboratory created an intelligent software able to compose pop music. In fact, they launched a project (funded by the European Research Council (ERC)) dedicated to music, named Flowmachines. As a result, two new songs ‘Beatles’ style were born [13]. As in the poet example, human help is needed. In this case, the composer has to select genre, style, and compose the lyrics. With this information, the program is able then to search into his huge music database and compose a melody according to the criterion. But the problem is still the same as in the previous case, if I create a music cd using this software, who owns the rights?

In the scope of Artificial Intelligence and art, several enterprises like ING bank, Microsoft, and some others, launched a project to study Rembrandt’s pictures and compose a new one. The result can be seen in picture 3, it is a 3D image with the same artistic style of Rembrand [14].
So for the Rembrandt project they studied the most typical features in his paintings, and in particular they created 14 layers consisting in 148 million pixel gathered from 168,263 painting pieces from all of his 346 paintings. The result as seen in picture 3 is a portrait very similar to his paintings with the same style, so, what would be the price of this painting?

3 Economic impact of copyright protection

The copyright protection is offered by national laws not to every creation but only to those that are more than mere ideas. Unlike the patent law, the monopolistic right given by copyright is not offered to ideas themselves but to their expression [16].

Once the creation has crossed the line of the ideas, it can fall into the scope of the copyright law, giving raise to a monopolistic right to its rightsholder to exploit the work, being also entitled to act against those who would use the work without permission. In other words, if there is no copyright protection over one creation, anyone could use it and exploit it in the market without having to ask for authorization and without having to pay any sum.

Some studies reveal that when there is no copyright protection, the lack of incentives impacts directly in the investment in creation of new works [17]. In fact, if there are no revenues for the exploitation of works, it is very difficult for companies and particulars to justify the use of time and money to create them.

A recent study, published in October 2016 by the European Union Intellectual Property Office, points out the major role that copyrights and, in general, intellectual property rights, are playing in the European economy, revealing that IPR-intensive industries are generating 27.8% of all jobs and more than 42% of total economic activity in the EU [18].

4 To be or not to be a copyright protected work

Although legal frameworks vary enormously from land to land due to different regional situations, in the copyright field national legislations are based on the same principles because most developed countries have joined the major international conventions in this area, being their basic concepts consistent with them.

What is the difference between a copyright protected work and a non-protected creation? Can every kind of work be protected by the copyright?

Under the umbrella of copyright protection can fall any type of creation as long as it accomplish with some general conditions. Irrespective of the artistic merit or the economic effort given on the creation, copyright laws protect every kind of work, regardless of its mean of expression.
Fig. 6 Types of Work Protected Under Most National Copyright Laws [Source: WIPO, 2015].

National laws usually impose a floor to protection by prescribing some minimum qualitative standards. At this point, this is not the place to explore the situation in all the main jurisdictions but it is representative for the purposes of this paper to mention some of them.

In this sense, Germany includes the prerequisite of the work being a “personal intellectual creation” (Persönliche Schöpfung) [19], in the sense that the works must contain something of the author’s personality [20]. In the same line, the Spanish copyright law speaks of “creations” (creaciones) [21] and the Italian legislation speaks of “intellectual works having a creative character” (opere dell’ingegno di carattere creativo) [22].

In general terms, by using terms such as “originality” or “creativity”, they are predicating that a work may only be protected if it is the result of an author’s efforts, the consequence of the human intellect.

The work must have its origin in a human being, irrespective of its economic value, the efforts dedicated to its creation or the importance of such agent in the market [23].

5 Non-human authorship

As already analysed, due to several copyright treaties, copyright protection standards are almost the same worldwide, being one of these principles that a creation may only be covered by copyright protection if it is the result of an exercise of human intellect.

It is doubtless that machines can be used as an instrument by the authors and the works created through this process will fall under the scope of copyright protection worldwide. In this sense, photographic works can only be created with the help of mechanical instruments (e.g. photographic cameras) and they fall into the scope of copyright protection as long as the camera is used as an instrument and it does not create itself without the intervention of a human being.

In 2014 this formal demand of a human being behind the creation was reviewed when photographer David Slater was making a series of snapshots and, in an oversight, a monkey stole his camera. The monkey took several pictures. Many of the images were of poor quality or were out of focus, but others were, at least, curious to see. The legal dispute was whether the work was protected by copyright, even though it was the animal who took the photographs. The dispute took years to resolve. Finally, the US copyrights office ruled that this type of works cannot be protected because it has not been directly the result of the effort of a human being.

However, in United Kingdom, the monkey could never be considered as the author of the work, but David Slater would, if he could demonstrate that he put the means and participated actively, as far as possible, in obtaining the work [24].

In this sense, what would happen if the creator of an artistic work was a machine programmed by a human being? Couldn’t it be understood, at least, that a human being has put the means and participated actively in the new creation? Couldn’t it be understood to be similar to the protection granted to the images captured by a photographic camera, which never ceases to be a machine whose parameters have been configured by a human being to obtain the definitive work?

Non-human creations are in most cases expressly taken out of copyright protection ab initio. No matter whether we considered that the work itself has creativity, according to most national laws across the world, the work created by a non-human author can never be considered as a copyright protected work and therefore excluded of any kind of monopolistic right in favour of its author.

In this sense, once the machine has “learned” to create autonomously, according to the law, the results of this process could fall out of the scope of copyright protection (e.g. the paintings created by the “Next Rembrandt” project above described), no matter how much value may these paintings have in the market or how relevant the might be in economic or industrial terms.

It is clear that one of the main purposes of intellectual property regulation is to favor creation, which, as we have seen, has a very important influence on the economy nowadays. If works "created" by machines do not fall into the scope of protection of intellectual property, what incentive do the creators of the code through which they create the works have? Is not it time to review the applicable regulations to encourage creation in all its aspects?
6 Legal challenges for the future of copyright authorship

The concept of authorship has traditionally been one of the less controversial subjects in the copyright field, but the evolution of the artificial intelligence is bringing attention back to this concept and giving rise to explore a possible modification of such notion [25].

Machines don’t yet run the world but they are becoming more independent, being able to create without direct intervention of the human beings in the creation process by executing algorithms already learned.

In this sense, although continental Europe countries have a strong moral rights orientation in their copyrights regulations favouring natural persons over economic or industrial agents, the European Parliament has open the door to reconsideration of authorship concept in light of the evolution of Artificial Intelligence.

In line with the above, the European Parliament (2014/2019) has issued in January, 2017 a report dedicated to the impact of Artificial Intelligence in the civil law standards. Such report includes a section expressly dedicated to intellectual property rights, where it is demanded the importance of coming forward with “a balanced approach to intellectual property rights” and “the elaboration of criteria for “own intellectual creation” for copyrightable works produced by computers” [26]. This is just the beginning of a change that is yet to come.

7 Conclusions

Artificial Intelligence has been evolving through the ages as seen in this paper. The software that have recently appeared, are able to ‘create’ new artistic works by themselves, being poems, songs or new pictures. But technology advances faster than law. All these creations raise a set of new problems to our legal system, like the author or the rightsholder of copyright. Our legal system is not yet prepared for these new issues.

Works created by machines are unprotected and the do not fall in the scope of intellectual property legislation. There is no incentive for programmers to generate software codes capable of creating artistic work if those programmers are not going to have a "monopoly" on their work in the same way as a writer or a music composer would be. But, as we have evaluated about the classical copyright, this new kind of AI artistic work may suppose a great impact to the world economy. That is why in this paper we propose a review of the legal system in this aspect, to find a right place in the copyright law for these creations.

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9 References


[21] Art. 10.1 Real Decreto Legislativo 1/1996, de 12 de abril, por el que se aprueba el texto refundido de la Ley de Propiedad Intelectual, regularizando, aclarando y armonizando las disposiciones legales vigentes sobre la materia

[22] Art.1 Legge 22 aprile 1941 n. 633 Protezione del diritto d'autore e di altri diritti connessi al suo esercizio (Testo consolidato al 6 febbraio 2016)


