ARTIFICIAL INTELLIGENCE (AI) COLLIDES WITH PATENT LAW

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ABSTRACT

Artificial intelligence and laws are coming to appoint where revision of laws is required to keep up with the technological advancements. Artificial intelligence is developing rapidly and there are possibilities that it may take over a lot of human endeavours one of which may also be a large part of law profession. Lawyers with their teams spend a lot of time in understanding and placing Patent claims. Hours are spent in investigating and analysing the novelty, utility and non-obvious nature of products and processes for which a claim is to be presented. A substantial expenditure goes into the process of patenting something. Facilitating laws by including AI in the whole process may substantially save us time and money involved in the process. This article explores some of the aspects of IP laws that particularly deal with Patent processes which are placed in the introduction. This article explores a model that may reduce the fear that people have for different biases that may be picked up by the artificial intelligence.

Keywords: Artificial Intelligence, IP, Intellectual Property laws, Patent laws, Hindsight Biases.

INTRODUCTION

The last two decades have witnessed tremendous advancements in information technology, which have fostered a phenomenon level of innovation in products and services offered across multiple industries ranging from Arbitration (Carneiro et al., 2014; Hanke, 2017; Sim, 2018) to legal reasoning (Ennals, 1985; Reed et al., 2007; Rissland, 1990; Susskind, 1986). Artificial Intelligence AI refers to the ability of a computer or a computer operated robot to perform tasks that are generally associated with humans, such as reasoning or learning from past experiences (Copeland, 2019). AI is the combination of science and engineering to create intelligent machines that can react and solve problems in similar manners as the humans do. The term itself coined by John McCarthy in 1955 suggested the term ‘artificial Intelligence’ in a research project proposal, which described AI as a problem of making a machine behave in ways that would be called intelligent if a human were so behaving. McCarthy later in 1989 explains how common sense is looked at while computers show intelligence (McCarthy, 1989). He explains that common-sense reasoning is required in common sense world and unanticipated obstacles explain the response.

Although Artificial Intelligence AI was considered until recently a science fiction, however we, human beings are already interacting with AI based systems every day. Tasks like voice assistants (Canbek & Mutlu, 2016), purchase prediction (Gan et al., 2005), fraud detection (Fawcett et al., 1998; Ford et al., 2014; Jensen, 1997), chatbots and a whole range of other applications, all of them are already applying a number of techniques which fall under the concept of AI.’Most of these technologies cater to the needs of the legal industry.

Just couple of decades ago when the internet was becoming mainstream people use to talk about the limitation of technologies and how such things could not replace a lot of hard physical work done by people. We have come so far to a point where potential laws are being taken over by smart technologies. Technologies which by the use of artificial intelligence are capable of regulating and implementing laws. There is a certain level of fear involved in allowing artificial intelligence to take over human professions such as legislation of implementation of laws. One of the main fears is by all means the loss of jobs or the profession altogether. The artificial intelligence may in some time have enough capabilities to take over complex tasks such as Intellectual property IP protection. We do however need to feed information in the system to develop a pattern that could train the AI to take over the processes that protect IPs. It is an input-out issues, the more information is available for the AI to analyse the better the results could be. The big data is different than other kind of data; it is continuously getting bigger and bigger. The amount of data is increasing because the storage has become cheaper and the computational power is getting better and better.

From a law professor and lawyers' perspective there is a great chance for the Artificial intelligence to make similar mistakes that human being makes, such as hindsight biases in Patent process. The reasons for that are due to the fact that the AI relies on big data for its training and that data could keep on changing. Can we trust all that data since it is an input output pattern? Data is also being created by people through different sources such as YouTube, twitter and several other sources. How would Artificial Intelligence collect all the data for the purpose of analysing a Patent claim is an excruciating question? Our current laws are not keeping up with all these changes and are unable to answer questions such as which data is to be used for processing Patent claims. The authors will try to explore in this this article some of the aspects of IP laws that particularly deal with Patent processes.

The authors explore in this research how AI may affect the IP processes, policies and procedures. It also explores some of the biases such as hindsight bias that could be picked up by the AI while data is brought trained for its analysis.

The Impact of Artificial Intelligence on the IPR'S

As the artificial intelligence and the new technologies evolve, the IPR's protection became a necessity. The digital revolution of the late twentieth century and the emergence of internet as a worldwide communication means, is creating a continuous pressure on IPR's adaptation (Abbott, 1999). The World Intellectual Property Organization WIPO has adopted many treaties which could be one response to the emergence of revolutionary new technologies and IPR's protection.

The IPR's in digital technology era has shown that laws, policies, treaties and conventions are encountering many challenges in the way they are protected. Novel digital technologies may be an additional response to transform the possibilities to create effective policy mechanisms and means of implementing Digital Right Management (DRM) systems. Artificial intelligence (AI) seems to be a promising digital technology that may enable a more transparent, efficient and reliable management of IPs intellectual properties (Frosio, 2017). Artificial Intelligence (AI) and robots has been the subject of science fiction for some time, however they have become a reality that we have to work with. The AI market is predicted to grow from $ 8 billion in 2016 to more than $ 47 Billion in 2020 according to market intelligence firm (IDC) (Soni et al., 2019). AI is

set to increase rapidly, being enabled by the convergence of big data, ready availability of processing power, alongside the cost-effective infrastructure being available. If each AI is different in its specific implementation, we also admit that many modern AI relate to intellectual property (Hacker, 2018) issues may also arise out of this development. In fact, AIs have the potential to engage in acts of content creation by replicating aspects of human cognition. In addition, many AI systems undergo a training process, where they develop their own decision-making algorithms and rules by practicing decision making and using feedback to improve future decisions (Roll & Wylie, 2016). In addition, AI systems are frequently used to examine huge volumes of input data to detect statistical features. However, AI may experience limitations in some IP issues, especially due to one major reason and that is because most of the IPs is a human creation.

Human Brains are good at Learning

Children are a good example of how human being learns; we are a learning machine. In case of AI we are trying to build something that can learn and is not naturally born like children. We are trying to build neural networks artificially so that they can learn on their own. We would train them to learn in some parameters. The large part of that technology is still dependent on how we train it. While the human mind is built over experiences and it builds to a certain level while we age. Children learn and keep on learning throughout their life, on the other hand Artificial intelligence requires a lot of data to analyses object. In order to process all the data AI requires massive competition resources. Lots of data is required for training (images, pictures, objects). There is an enormous amount of difference between a human being generating an Intellectual Property and an artificial intelligence generating or registering an IP. Both require different kind of cognitive, neurological, and practical skills (Rychlak, 1991). Human beings are now regularly assisted by the AI in creation of IPs (Schafer, 2016). While the artificial intelligence is the reality, the laws that protect human endeavours and needs are still to catch up with the artificial intelligence being used in the generation and creation of IPs.

Autonomous Behaviour

Increasingly we see the use of technology that supports the creation of more technology or patentable objects. Replace this with smart technology that can think for itself and thereby becomes a creator or co-creator of the IP. So far, we are looking at one level only where there is a co-creator, an even deeper question of creator's loom over our shoulders. A complete autonomous behaviour that is supported by artificial intelligence is going to be an aspect that completely stretches the policies and laws that currently support protection of intellectual property. A current example of AI developing music (Fairchild, 2016), which is considered a complex creative task. For the purpose personhood most of the law still does not contemplate the idea of legal personhood for AI (Pearlman, 2017).

Creating music is generally considered as a creative task and requires years and years of training. It's not only the training that builds a good musician it also requires a creative mind. This creativity is built over several experiences which can generally be considered as human experiences. These experiences could be sad, happy, excited and numerous other experiences which are linked with emotional existence of human behaviour. Music could be inspired by sad feelings that the musician has, and he acquired these feelings because his heart got broken by

somebody. This music could also be developed because the creator of this music is happy, and this happiness is because a reason that exist in the life of that person.

Now when we compare these emotions to artificial intelligence, they are algorithmic thinking for the machine. Humans have very different and complex emotions as compared to AI (Martınez-Miranda & Aldea, 2005). AIs behaviour is not associated with any feelings or for any real experience that may exist in human behaviour. Artificial intelligence would collect its information from the big data that it is connected with and develop music. It may also collect statistical information that helps it understand the human need, assuming that the music is serving human appetite.

Reason for bringing this assumption out was because maybe the artificial intelligence would develop music not for human appetite but rather for the satisfaction of other artificial intelligence objects. Scary as it might seem that could be true. The reason why autonomous behaviour is being discussed is so that we can understand how this autonomous behaviour affects IP laws.

Patents

There are challenges with patenting AI systems and platforms. In fact, an AI system is usually mimicking a human task. The example of Microsoft's Inner Eye project is an AI system helping oncologists target cancer treatment in a shorter time. It manages to accomplish this task by using machine-learning techniques in the analysis of magnetic resonance imaging scans of patients and delineate tumours from surrounding healthy tissue and bone. The oncologist himself previously accomplished this task by drawing by hands contours on 3D images. In case a patent application is submitted for this task done by the machine, it would be rejected because one of the fundamental requirements of patentability, which describes how the invention works, is not met in this case.

Even in the case of claiming the source code or description of how an AI system works, that is disclosed in the patent application, patent would be rejected. This may constitute an impediment to patenting because a patent is not granted for a mathematical method or any other method for accomplishing a mental act including methods of teaching reading (*section 1(2), Patent Act 1977 UK*). However, there is an exception according the English law which stipulates that in case of AI related inventions, and to avoid rejection of patent, the technical field contribution may be evoked. Furthermore, the English Court of Appeal goes to the four step program, which is to properly construe the claim (a), to identify the actual contribution (b), to ask whether the contribution falls solely within the excluded subject matter (c) and to check whether the actual or alleged contribution is technical in nature. The collision in all these patent laws in inevitable when it comes to artificial intelligence (Hattenbach & Glucoft, 2015).

Patents Law in the Hands of AI

Consider a scenario where artificial intelligence is used as a main registering officer for the patents that are being developed by people. Now consider another scary scenario where the AI is developing patent and trademark registrable instruments on its own. Both of these situations are a challenge for the current laws all over the world. These intellectual property instruments require a certain level of creativity, which again at the moment is possessed by human beings. The current laws and policies cater to the needs of human creators, generators and

originators. The machine that learns by itself by using information that is gained through several inputs can develop artificial intelligence which in turn can originate a unique design or inventions and possibly a process that can be patented. It may also be able to generate information that could be copyrightable. That information could be an expression of an idea a diagram or a written work, charts source codes or even photographs and as we mentioned above music. There is a good chance that the artificial intelligence can also develop trademarks which may be unique. That could all be achieved through complex algorithms. The only problem is we are looking at the situation where the behaviour of computers for the purposes of artificial intelligence is autonomous and is not supported by human decision-making.

Can the AI created IP patentable, some researchers do believe that it is patentable (Loney, 2018). Loney, define the situation by taking an analogy of auto pilot. He explains that while autopilots are there and are developing in their functions to a level where they may also be able to land a plane, the human presence could be there to oversee the entire situation.

IP and Patentable Subject Matter

Let us examine some of the laws and on a larger jurisprudential understanding try to understand how patents function under those laws. When we go to the US laws the larger requirement for a patent to be recognized is to be non-obvious (Barton, 2003) or to have inventive step as is known in Europe. Codified at 35 United States Code, Sec 103 states,

> *"If the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains".*

Sometimes it is also called an ultimate test of patentability of a product or process and acts as a stick to prod other to find an even more difficult method for achieving their invention (Meurer & Strandburg, 2008).

In different countries having a patent would grant you exclusive right over your product or process for a period of time and duration of protection may vary from one legislation to another. This in itself is an important factor that asks for a patent product or process to be of non-obvious nature. Here it is important to mention that obviousness is to be looked at in context of what is obvious, the product of the process should be a technical advancement over existing knowledge and not just an obvious advancement. This test is taken in relation to the person for whom that knowledge is obvious (Thorne & Priestley, 2012). An example of an invention in the field of physics would be obvious to a person of a certain level of knowledge in the field of physics. In the same way it would be non-obvious for that same person if that knowledge does not exist before the point of reference. Most of the laws all over the world require this test and consider this as an important factor that determines whether something could be patented or not. In United Kingdom for example Windsurfing International Inc. v Tabur Marine, (Colston, 1999) it was held that it was important to identify inventive steps for a patent to be achieved. It also places a test of obviousness where a normal skilled person was to see what common general knowledge was. If we can draft laws that can to some extent feed this understanding of obviousness or non-obviousness in machines the whole process could be performed by artificial intelligence possessing enough information and computational strength in its data. Currently the laws are silent on this aspect. Mosaicking which is another complex process is allowed in the test

of obviousness. It is like combining different references to point of arts or disclosures to understand the obviousness of an object and process. While mosaicking is not allowed at the stage of novelty it is allowed at the stage of obviousness. This step can be performed by artificial intelligence but there is a risk of bias that may exist in the artificial intelligence due to the data that has been fed into it. A human hand is required to guide this process at this stage.

Most of the times in a patent, novelty plays a major role, any claim made by the creator for a patent must be novel (Hall, 2003). First for such a novel idea or product or process the elements are the ones that cannot be found in a single prior art reference. Here is where the AI can help; given the computer power and enough input of data certain references could be created for a very large inventory of processes or products. Arguably there could be a very little chance for the artificial intelligence to go wrong on finding the right reference or the novelty in an item. The artificial intelligence in such a case would be a wonderful tool to do novelty assessment or analysis. It would also be a wonderful tool to do a single prior art reference test. The current laws are also silent on the use of AI for the assessment of Novelty. There however is no legal bar on use of such technology for such kind of assessment. The right to challenge a certain assessment could be built in the system. Once challenged by the originator or creator of the IP, the AI can change the parameters of the information available to test the novelty of an item.

There is the human bias, which is called hindsight bias; human mind Belize invention seems obvious every time somebody invents a product or process. Similar hindsight bias could exist in artificial intelligence as well, remember the date of fed into the artificial intelligence is the data that usually is going to come out of it. If at certain point Artificial intelligence starts thinking on its own that bias and possibly many other biases could exist in the machine learning. This is the point where we need human supervision to manage the machine.

However, among the advantages that AI has, one can assert that AI has a major strength, which consists in the repeatability of results due to the strict rules (algorithms) it follows. In fact, AI should provide the same results based on the same inputs. Physical exhaustion or lack of experience does not affect the performance of AI.

Discussing a Model that Could Solve the Problem

We have a fear that the AI would take over all the processes of laws and would ultimately take over creations of humanity. For all our endeavours of intellectual property we need to keep human being at the core of our considerations. We need a model that keeps the human being available as a kill switch for overriding biases that may be picked up by the artificial intelligence. The following model may just provide some solutions if backed by legislation.

A common bias of hindsight obviousness that exists and has been viewed in the obviousness test many times can also become part of artificial intelligence thinking. A reasonable empirical research is available to show that hindsight bias exists in the legal process and it does affect the patent process (Giroux et al., 2016; Lunney & Johnson, 2012; Mandel, 2006). In general, sometimes we consider the likely hood of an event after it has occurred (Roese & Vohs, 2012), it affects our judgment on the test of obviousness. It is one the most cited bias in judgments of different sort (Christensen-Szalanski & Willham, 1991). The more basic problem that may arise with patents when patent investigation or enquiry is being made by the artificial intelligence would be the process that is very hard core for the system. The AI system may move through millions of documents and inventions that would be in also creations that may have not

been patented already. Some laws recognize inventions by people who may have not patented them yet. Considering the enormous amount of material available on different online systems this investigation would compare millions of objects and may unnecessarily stop a patent as well. While the novelty of an item can be investigated by the AI human support in the decision making in understanding utility and the non-obviousness can create value and stability in the patent process. The AI can provide substantial support in the process of understanding the non-obviousness of an item or an object. The major task of novelty investigation can be handled efficiently by the AI. Considering the magnitude of information and comparison available to investigate from the AI when supported by proper systems can overcome challenges. The laws can still require an appeal process to allow challenge to the aggrieved parties.

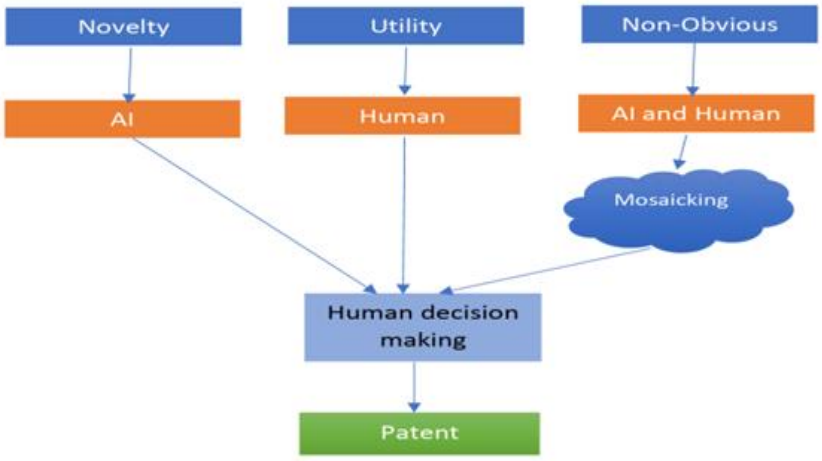

FIGURE 1
PROPOSED COURSE FOR LAWS TO FOLLOW FOR FUTURE IN CASE OF PATENTS

The Figure 1 shows how laws could be drafted to overcome the fear of people, where human being feels that everything will be taken over by artificial intelligence. Three of the main requirements for a patent to be registered are novelty, utility and non-obviousness. Figure 1 shows a model that contains substantial human hand available in the system to overcome some of the hindsight bias and other biases that could be created by an overburdened artificial intelligence system.

Since the artificial intelligence picks up a lot of information from the big data that is connected to it would be appropriate at some point for the artificial intelligence to test the novelty of a product or process. Since the artificial intelligence is only testing single reference prior data according to the law, it could be done by searching through several databases that the artificial intelligence is connected to.

This would require some level of training for the artificial intelligence. Would also require huge amount of computational Strength. There could be a human hand at the other end where the AI has done its job of searching and testing the novelty of a product or a process.

Currently the laws do not actually require the use of artificial intelligence; they just require novelty to exist.

The next requirement of utility could be tested by human being. Since most of the inventions products and processes should serve human and its assessment could be done by human beings who are experts on relevant social context. The tricky part is going to be the non-obviousness part; here two elements could join in to test the nonobvious nature of a product or process. Artificial intelligence and human being who have related knowledge to test the obviousness of a product or process could somehow work together at this level to come up with the best possible decision. Mosaicking which is not allowed at the novelty stage is allowed in the test of obviousness. Novelty is all about single reference of a prior art. On the other hand, mosaicking is allowed to some extent to test the non-obviousness of a product or process. This could be done jointly by artificial intelligence and human being. Together hindsight bias could be avoided. After testing novelty, utility and non-obviousness the whole decision could be left to human being to grant a Patent. This model has a tendency to be entertained by modern laws, where human fear could be overcome through legislation that defines and defends human interest in intellectual property.

CONCLUSIONS

The current IP laws need severe upgrading to come up to par with the artificial intelligence that is continuously growing. If they are not upgraded the artificial intelligence would keep on becoming smarter to such a point where the current laws would not be able to serve human needs. Using smart mixed AI and human models like the one mentioned above, could solve the fear problem that human being has and could also serve in making the process of achieving intellectual property rights more smooth, transparent and affective. Most of the laws are not designed substantially to work algorithmic (Hacker, 2018). This is the main reason behind the discretions are provided to most of the judges when they are deciding the cases. The approach to completely convert the IP process to algorithmic decision-making lacks for the time being legal infrastructure and human experiences.

The Artificial Intelligence (AI) coupled with IP can empower IP creation processes. In fact, AI is now delivering real value to companies that need to solve difficult and complex issues. The IP daily tasks can be time consuming for human beings as the magnitude of the data increases. Thus, AI technology enables professionals the time to focus on more strategic decisions. It will also drive improved accuracy by reducing reliance on human investigation procedures. For IP professionals, the real opportunity brought by AI, is the access to the impenetrable and inaccessible volumes of data. AI will help IP professionals generate business insight that can open up new markets and deliver a better understanding of what and where the next generation of IP investment should come from.

The challenges arise in the context of AI systems that remove the need for human input in the creation of certain types of content, which was until recently the sole preserve of humans. However, AI is unable to exercise skill, labour and judgement or engage in intellectual contribution for the time being.

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