This submission is my personal view and does not represent the position of my university.

WIPO Question 7 (i)

This response is from a high level, conceptual view as opposed to a detailed technical one. As a result, many of the technical issues will be simplified so that the focus remains on the position being put forward.

The creation of IP is typically driven by an underlying motivation such as monetary gain or the need to solve a problem. During this process, several intellectual tools are used such as prior knowledge, experience and, trial and error to develop unique solutions to problems. Since an individual's or team's experiences and approaches are unique, it has become necessary to protect the rights of those who developed the ideas.

Therefore, the first question that needs to be discussed is, "Has AI reached the point where it can be considered to have the same IP rights as humans?". Or to put it another way, "Can AI be considered to have reached a level of intelligence where it can create IP that can be considered to have been developed independently and with same the quality as humans?".

To answer this question, one must understand the true aim of AI. From a long-term point of view, the goal of AI is to create an artificial entity that is intelligent in the same manner as a human. It should be self aware, have emotions, be able to appreciate works of art, learn from experience, problem solve and so on.

As it stands, the current research in AI, while rapidly advancing, is still a great distance from that goal. This is largely due to our inability to understand ourselves beyond those areas that are easily measured and modelled such as intelligence and experience.

For example,

- What is self awareness?
- What is consciousness?
- What is meant by common sense?
- How do we reason?
- How do we improvise?
- How do you create a universal model of ethics?

Even if the answers to these questions have been determined, how would that knowledge be encoded into a computer program?

Over the years, the discipline of AI seems to have gone through a series of peaks and troughs. During the peak times, someone, somewhere, has made advances such that a specific area of AI is able to perform at the same level or better, in one or more activities, previously thought to be human centric. For example, the playing of chess. At these points, it is natural to believe that the world is one step closer to the final goal of AI.

The troughs follow the peaks when it is discovered that the specific advancement in question was possible because what was thought to be unique to humans could be broken down into a set of rules, described

mathematically and written into a computer program. It should be noted that one of the reasons why AI is so compelling, when compared to standard programming, is its ability to discover those rules on its own and/or develop new ones. In specific areas, AI can create better generalized solutions than standard programming.

Currently, with the rapid rise of machine learning (a sub-area of AI), AI is enjoying a peak period. What is missing in the current discussion, is that machine learning is not new. Machine learning, in its simplest form, is the discovery of patterns within a set of data to create rules that enable useful outputs to be obtained. This is achieved by the system learning through experience within the confines of that data and without human intervention i.e. self-programming. What is new, is the easy access to and collection of massive amounts of data due to cloud technology, the internet, decreasing costs of storage and rapid increases in computing power. This has enabled machine learning to expand rapidly and give the mistaken impression that the world is rapidly approaching the final goal of AI.

It has been shown that selecting the wrong data set can introduce bias in the results of the machine learning solution being developed. In other words, tweaking the data and the model can change the results. In fact, research is ongoing to provide users of machine learning the ability to understand how the model works and to make corrections to any incorrect assumptions within the model as the learning takes place. Therefore, the successes of the machine learning process are dependent on the programmers, the data scientists and the actual data used. If any of these factors are varied, a different outcome may be achieved. It can therefore be concluded that the outcome is dependent on a human and not just the machine learning software.

This is not different from any other tool used to create IP. If you use the compiler incorrectly, you are unlikely to develop the right code. If you ignore the tools within a word processor, you may use incorrect grammar or spell a word incorrectly.

Another point to consider is that the solution generated by machine learning is based on self-programming where the data is inputted, the machine learning model analyzes it and generates a solution. In other words, with standard computer programming, the developer writes the code to create the solution while in machine learning, the computer performs this function. Here lies the problem, in many cases, the developer does not know how the machine learning solution works and this gives an air of mystery and uncertainty. This is one of the reasons why autonomous vehicles are required to have a human driver present. Therefore, because the developer does not know the underlying reasons for the AI generated solution, he/she can't say for certain if the invention is viable. Also, they are unable to determine to what extent prior work may have influenced the solution.

Another problem with this approach is that AI solutions cannot improvise (or are limited) when the domain changes in an unexpected way. In fact, it is our ability to improvise that has resulted in the need for a set of powerful computers and vast databases of information to beat the best chess and Go players from around the world. Many have argued that the machines displayed true intelligence by beating the experts. However, it could be that our human weaknesses such as stress, negative emotions and fatigue, led to the losses. Given time, the best players of the world may learn how to beat the machines because of the ability to improvise and innovate.

Consider the issue of the copyright for literary works. Any AI program that generates literary work, such as a story, does so based on patterns and rules it has learned usually through analyzing the works of others. In some cases, this is an attempt to mimic how persons analyze the literary works of others and

then frame their own style within that experience. The primary difference is that the AI program has no self-awareness, it does not understand what it has produced, it does not understand why it has value, it cannot express feelings and it has no past to draw from. It is simply following the rules. It therefore is unable to create its own style or be controversial since it has no past life to draw from.

Therefore, the literary work generated by the AI solution is based on the skills of the developer and the model that is created and applied.

At some point in the future, we may consider the art generated by AI to be equal to that of humans. The issue here may not be whether the AI is intelligent but whether the works of the best writers can be broken down into a set of rules that a computer can implement. If it can, then that would change the definition of what it means to be creative or unique and perhaps our definition of what can be protected. Consequently, if the point is reached where a computer can create high quality writing, how would we as humans now view ourselves and our writing?

Finally, there is the issue of what test can be used to determine if the final goal of AI has been reached. Current advances in natural language processing have shown that the Turing test is no longer a suitable solution. Nevertheless, the current ineffectiveness of the Turing test demonstrates that any new test that is created may be negated by future advances in AI. This is probably a result of the inability to answer the previously listed questions.

In conclusion, AI at its current juncture has not reached the final goal. It may appear to be intelligent but without the essential areas of self-awareness, consciousness, ethics and so on, it is hard to see how one can attribute the same rights and values of humans with respect to intellectual property to AI. Instead, those rules would apply to the users of the AI-based software since they are providing the data and the model with the aim of solving a problem, in much the same way as one would do with non-AI software.