To: **WIPO Secretariat** Budapest, 14 February 2020

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Subject: Comments to the DRAFT ISSUES PAPER ON INTELLECTUAL PROPERTY POLICY AND ARTIFICIAL INTELLIGENCE prepared by the WIPO Secretariat

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Dear Sir/Madame,

with reference to the Draft issues paper on intellectual property policy and artificial intelligence prepared by the WIPO Secretariat ("**WIPO**") dated 13 December 2019 (the "**Draft**"), the team of the above authors (jointly "**we**"), would like to take part in the consultation and share our views around the possible intersection between Intellectual Property (IP) and Artificial Intelligence (AI).

As per the request of WIPO, we will provide our comments on the arising issues broken down to the areas identified by the WIPO. During our assessment we focused on the following main areas: patents, copyright and related rights, technology gap and capacity building.

We are of the view that the area of patents and copyright may have similar issues arising when it comes to the intersection of IP and AI in relation to inventorship/authorship and ownership, for the sake of readability, we have aggregated our remarks to those and summarized them under one point. So, our comments are structured as follows:

SECTION NO	NAME OF THE RELEVANT AREAS
Section 1	Patents and Copyright: Issue 1,6: Inventorship/Authorship and Ownership
Section 2	Patents: Issue 1: Inventorship and Ownership
Section 3	Copyright and related rights: Issue 7: Infringement and Exceptions
Section 4	Technology Gap and Capacity Building: Issue 2: Regulatory Challenges

SECTION 1: Patents and Copyright: Issue: Inventorship/Authorship and Ownership

— **Conditions necessary to qualify as inventor or author**

We agree with WIPO that one of the very basis questions of our contemporary digital revolution is that whether AI may be qualified as the inventor of a patent or creator of a copyrighted work. AI is already able to either independently or partially independently create inventions/articles that otherwise would qualify eligible for patent/copyright protection. But what does it really mean to create independently?

The functioning and – eventually – the performance of the AI application depends completely on the way the designer constructed it.

Moreover, it is to be highlighted that the designer normally constructs the AI with an aim and desired result, such as "make money from mutual funds units" or "write an article about climate change". The AI will pursue this goal of its designer. But does it mean that the AI independently pursue this goal? We should not forget that the original purpose was determined by the designer.

Therefore, before we analyse whether AI may be named as the inventor/creator, we should answer the question whether AI is able to function and perform individually, separated from its designer, or is it inextricably linked to the designer?

This also raises the question that – if the view were to be accepted that AI is permitted to be named as the inventor of a patent, or creator of a copyrighted work – what is the level of

involvement of AI is necessary in the creation of the patent/copyrighted work? Is it necessary that the patent/copyrighted work to be invented/created entirely by AI? Or would partial involvement suffice? In case of the latter, what level of involvement would be needed?

— Legislative challenges

While in China a court ruled[1] that an article written by AI could be protected by copyright and as a consequence AI may be qualified as the author of the article, almost at the very same time, the European Patent Office (EPO) refused two patent applications[2] relative to inventions that were created by AI.

The argument of the EPO underscored that the European Patent Convention indicates a clear legislative understanding that the inventor is a natural person. Therefore, AI cannot be indicated in the application form as the inventor of the patent. The EPO also emphasised that AI does not have legal personality and therefore cannot have legal rights, such as to be designated as the inventor in the patent application.

What kind of consequences arise from the dissenting views of the EPO and the Chinese Court?

What level of IP regulation and limitation/restriction should be introduced in relation to AI created works? Does the legislator need to pass laws which confers either legal personality on AI systems, or alternatively ensure protection otherwise for the benefit of the artificial intelligence application?

— Meaning of ownership over an AI model

A trained AI model results from the application of training procedures on a dataset, thus the "extraction" or "abstraction" of its knowledge content into a predictive capability regarding yet unseen datapoints.

As regarding the training procedure: in the typical case, the majority of knowledge inherent in the procedure is in fact "open science", much of it is published in openly accessible preprint servers (like ArXiv.org), and even the prototype algorithmic realizations are often available under permissive (e.g. MIT style or BSD style) software licenses. And though personal experience can never be excluded from the efficient usage of such procedures in training, it has to be noted, that the procedures are not to be considered proprietary.

As regarding the data, on which the training is carried out, there is the more obvious case of public availability and permissive licensing, but it can be more commonly argued, that the data content can typically be of a proprietary nature. In the special case of data regarding natural persons (and their behaviour), the "ownership" structure is many times complicated by the fact, that the original persons observed (thus forming the observational basis of the said data) are to retain some rights with respect to the data produced. This is in itself a dominant concern of data protection regulation, but the aspect of monetization / value / ownership is maybe not adequately refined in a purely data protection based framework. (Think: data marketplaces, the original subject's rights to re-sell her data, and so on.)

With regard to the notions above, one of the basis questions is, in what form, extent and manner can a predictive model (an "AI") can be thought of as being the intellectual property of a given subject? Short: In what way and meaning can an "AI" (model) be owned?

— Possible owners of AI models

The complete cycle of AI model training can be conceived roughly as such:

Data collection and processing -> model training (application of optimization procedures on the data and initial model parameter set) -> model (as a set of model parameters) -> prediction as a service (the model that gives back output for inputs) -> (human or automated) decision fallen based on the prediction -> data collection during model operation ("feedback")

[1] Shenzhen Nanshan District People's Court: Shenzhen Tencent Computer System Co., Ltd. vs. Shanghai Yingmou Technology Co., Ltd.
[2] Application number: 18 275 174.3 and 18 275 163.6

Thus, for each stage, one can try to argue, that the given step being essential, the actor carrying it out can be considered at least partial "owner" of the AI model (as intellectual property).

More in detail:

- The model has no more input that the data itself, so all model structure can be causally linked back to the data itself. Thus, with come extreme rhetoric, one could argue, that the model (and by the way, an infinite amount of other, potential models, that we will maybe never capable of discovering - though they may or may not constitute models of interest and value) was "inherent" in the data, thus, who owns the data, would own the model.

- The training procedure can be considered essential, in this case, we argue, that the person's knowledge, who executed a training procedure is the main cause of the model's performance and value, so whoever trained the model, has the right on it. This is problematic, since as stated above, a substantial, even dominant portion of the training procedures is open knowledge.

- The resulting model, considered as a set of specific numeric parameters is the intellectual property itself, in the resulting form after the training procedure. This would be the most intuitive stance to take. The problem of identifiability arises in this case. If we consider a model as a strictly defined set of weights, mathematical procedures can be applied, that ascertain, that this given set of parameters ("weights") is exactly identical to this other. That seems satisfactory for model identifiability. Nonetheless, work in model pruning, as well as a recent strand of research into what is called "the Lottery Ticket Hypothesis" confirms, that it is far from true, that the given deep neural model's performance can be attributed to the totality of all its parameters. In fact, a change in one, or a lot, or even a great majority of the model's parameters can in essence cause no difference in their performance. A model with a very lot of uninfluential parameters can be considered identical from the practical sense to a one without those, but from the mathematical perspective, they are definitely distinct. Since human choice has been used eg. to "prune" some of the parameters, and not others, thus this constitute a modification important enough to mandate, that the resulting new model is no longer the same as the original? (What if performance drops 0.1%, but it can be deployed to a mobile phone now, since it became smaller?) If someone takes a model from someone else, prunes it, who owns the result? In what technical ways can ownership of an overparameterized model be defined?

- Choice from the available and predicted options in case of an AI model, or just the choice to "let it run and carry out its actions" is and should be considered essential activity from the agent operating the AI model. (This has strong implications on objective liability). Thus one could argue, that the essential part of an AI's operation is this: it either supplies predictions for a deciding human agent, or the agent decides on its continued operation in every time instance. Thus, one could argue, that the "owner" of the AI model is whoever operates it, and generates "service" or "actions". Thus, the IP holder would also be the operator, in case AI happens to carry out "discovery" tasks. (We as humans at least choose to pursue one avenue of generative design created by an AI agent, and choose not to pursue another...)

Which of the above cases can be considered valid legal reasoning, thus, who owns an AI model and in what way or form?

— Ownership by an AI model

On the other end of the spectrum, the question of an individual agency with respect to an AI model is asked - since the ownership of any kind of individual property by the AI for example as "inventor" would entail some kind of well definable and describable form of individual agency, which is irreducible to other factors.

On the one hand, one could argue, that the necessary and sufficient condition for any kind of action from an AI model's part is the prior application of a training procedure by a human agent on a given available dataset, all the observed agency from the model's activities are caused by the aforementioned procedure, thus the observed agency is in totality to be ascribed to the original principal. This in turn entails, that everything what an AI model does (e.g. "invents") is still the action of the person of original agency (e.g. the person undertaking the training or the operation of the AI). This in itself has strong

implications for legal liability in case of any automated actions by an AI model / software agent (in case of the "operator" as well as the "creator"). But as already stated above, the decision of the operator can have serious impact on the results of a model's actions, and it is arguable, that the final objective responsibility always will lie on the operator of the model. ("I just switched it on, let it run, and it killed everyone. Sorry, not my fault.")

On the other hand, some novelty or surprise can, and will routinely be observed in case of a model's operation. In any IP generating case, e.g. discovery of novel molecules or scientific laws, design patterns, works of art,... we explicitly design the AI model to generate unseen, unexpected an useful / valued data, that we did not anticipate or know in the same form before. Without this, the application of the model would be useless. Thus, we explicitly acknowledge, that at least in the form we see the data, there was a radical shift from prior the application of the model. So the reasoning, that all knowledge was inherent in the data already might be in the strictest sense true, but is not useful or enlightening, since we are not just wanting the acknowledge of the existence of a concept, design or law, we would like to attribute value to its explication (exploration, invention, formalization, "creation" - in case of artworks). If we take this seriously, the operators are a bit less responsible for the resulting discovery, since the could not have done it without the model's "creative" (or "search") ability. If this constitutes only a special case of tool usage by the human principals, remains to be defined.

This question essentially goes back to the basic question: Who is responsible for the operation and actions of an AI model?

SECTION 2: Patents: Issue 1: Inventorship and Ownership

In the case of inventions that are generated by AI on one hand and by human on the other hand:

What happens when the author sells a Machine Learning solution, does not transfer ownership of IP rights (he is offering a license for it), and the client is creating a specific environment for the development of the solution? Is this final version owned in joint ownership or is this fully owned by the client? (example: Machine Learning solution processing the data of the client, which highly contributed to the development of the Machine Learning solution)

SECTION 3: Copyright and Related Rights: Issue 7: Infringement and Exceptions

AI has the possibility to create art by listening to music or analysing artworks. Training AI systems often requires large volumes of training data to ensure that the system develops its decision-making algorithms based on data that reflects the full range of scenarios that it might encounter when operating in the real world. In this case AI might engage into copyright infringement:

Who is responsible for that? Is it the person that provided specific data to the AI for creating something similar?

What if that person uses Big Data and he is not aware of what's there specifically? Should he keep clear and exact records of what's there so he can know what he is authorized to use or not?

On one side, should all states create an exception for computational analysis for non-commercial purposes (processing data for scientific research) and, on the other side, respect other IP rights in relation to data?

SECTION 4: Technology Gap and Capacity Building: Issue 2: Regulatory Challenges

— Regulatory challenges

We would need to adequately assess whether the overregulation of AI and consequently the narrowing down of application areas where and how companies, organisations, researchers, public services, institutions, individuals or other entities can successfully apply AI, would result in global competitive

disadvantage. Even if it remains to be seen how China for instance would regulate AI, it is clearly visible that EU, due to historical and cultural reasons is more conservative and concerned and less risk-taking with AI.

It is to be highlighted that from a global perspective it should not be overlooked that AI and the appropriate deployment and application of technology tools will heavily determine the market actors' global role in the 21st century. To put it simple, first and foremost, if Europe takes a more conservative approach and overregulate the regulatory landscape of AI, the EU is going to be overtaken by many actors in the global AI rally.

Furthermore, we should not forget that originally patent and copyright protection was designed to encourage innovation and sharing ideas by providing protection for created works.

In order to avoid thwarting the digital innovation and hence economic growth we should bear in mind the possible negative consequences of overregulation of the IP landscape in relation to AI innovations/creations. On the other hand we believe that traditional values and protection of human rights, especially the appreciation of human creativity must be <u>appropriately balanced out</u> with economic interest.

What is the right approach when it comes to the regulation of IP and AI? Should we stick to minimum level of regulation and leave behind the overprotecting approach?

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