The Consequences of the DABUS Case

Die Folgen des DABUS-Falls

Mladen Mladenov, PhD
the Faculty of Economy at the Technical University of Sofia
Sofia, Bulgaria, email: mladenov@tu-sofia.bg

Abstract — Till the introduction of Artificial Intelligence ("AI") there was no program or machine in existence that could approach so close the substance and the specifics of the human cognitive abilities. Now interacting with AI directly or indirectly, voluntarily or involuntarily, the humans and the AI change each other in a constant and continuous manner.

Zusammenfassung — Bis zur Einführung der künstlichen Intelligenz („KI") gab es kein Programm und keine Maschine, die der Substanz und den Besonderheiten der menschlichen kognitiven Fähigkeiten so nah kommen konnte. Wenn nun direkt oder indirekt, freiwillig oder unfreiwillig mit der KI interagieren, verändern Menschen und KI sich gegenseitig auf konstante und dauerhafte Weise.

I. INTRODUCTION

The subject of artificial intelligence ("AI") is among the largely discussed in the academics and business in multitude of aspects: admissible fields of application, effectiveness, personal data protection, impact on human cognitive and psychological development and health and others. Regardless, of the multitude of opinions which often collide and contradict each other, AI is employed in ever more areas of human life.

Till the introduction of AI there was no program or machine in existence that could approach so close the substance and the specifics of the human cognitive abilities. Now interacting with AI directly or indirectly, voluntarily or involuntarily, the humans and the AI change each other in a constant and continuous manner. The interaction between humans and AI renders the former think, discuss and debate about the perspectives of AI, the level of its involvement in human life and in general what should be the nature of AI and the boundaries that it should not be crossed. Such a discussion or debate has not only its moral, cultural and economic aspects but its legal aspects as well.

The present article is analyzing the consequences of a legal case that raises the question whether AI could qualify as "inventor" with respect to objects created thereby which are protected by the rules of and regulations of intellectual property ("ÏP") legislation.

II. IP LEGISLATIVE FRAMEWORK

A. *The Bulgarian Constitution*

The rights of the inventors are guaranteed by the fundamental legislation piece of Bulgaria – the Constitution. According to Art. 54, Para. 3 of the Bulgarian Constitution [1], the rights of the inventors are protected by the law.

B. *The Bulgarian Law on Patents and the Registration of the Utility Models*

Art. 2 of the Bulgarian Law on Patents and the Registration of the Utility Models [2] provides that an inventor could be a person. Furthermore, in the Bulgarian jurisprudence it is widely accepted that only an individual could be an inventor but not a legal entity and the invention process involves creativity which is an attribute to the individuals (humans).

III. DEFINITION OF AI

At present there is no uniform and unanimously accepted definition of AI. The general understanding about the nature of AI varies in a wide range of definitions. For example:

- the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings [3];
- the science and engineering of making intelligent machines [4];
- a young discipline of about sixty years, which brings together sciences, theories and techniques (including mathematical logic, statistics, probabilities, computational neurobiology and computer science) and whose goal is to achieve the imitation by a machine of the cognitive abilities of a human being [5];
- a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. [6];
- The capacity of computers or other machines to exhibit or simulate intelligent behavior [7].

IV. THE DABUS CASE

A. *The DABUS*

DABUS (Device for the Autonomous Bootstrapping of Unified Sentience) is an AI system. According to its patent it teaches various methods for the unification and origination of knowledge as well as both exteroceptive and interoceptive awareness within artificial neural systems consisting of a plurality of artificial neural modules. The unification process occurs at several levels:

1. Continuous connection/disconnection of neural modules to produce ideational chains and networks among neural modules.
2. Bridging of those chains and networks under the scrutiny

of the computational equivalent of a reptilian brain and limbic system (e.g., thalamus, amygdala, and hippocampus) that triggers the formation of more original chains or the reinforcement of those deemed useful. Such chains are the basis of ideas.

3. Classification of the state of the entire collective of neural modules, treating their joint activations and network chains as if they were objects (e.g., 2- or 3-dimensional geometric forms) in the natural environment, detected via machine vision or acoustic processing algorithms, thereby departing from the traditional paradigm of critic functions that produce numerical figures of merit for ideational neural activation patterns, in that locations, topologies, and shapes of chaining patterns serve as a qualitative evaluation of any forming concept or action plan.

4. More effective monitoring/unification via the equivalent of multiple reptilian brains monitoring and controlling such ideational chaining (i.e., a multitrack synthetic mind).

5. The reciprocal bridging of reptilian component back to the collective of neural modules via axonal feedback connections as well as simulated chemical connectionism (e.g., synaptic and neuronal noise through stress neurotransmitters as well as potentiating neurotransmitters to trigger learning/strengthening of newly formed associative chains deemed meritorious by the system).

6. The integration of multiple cortical simulations into one through at least one final network layer.

7. The invention of significance to the totality, or any part thereof, of neural activations and chaining topologies within such a system through the formation of reactive neural activations and chaining topologies that constitute a subjective or emotional response thereto, regardless of their veracity (i.e., consciousness) and the use of such subjective response to strengthen or weaken the system's self-reflective notions as they form. [8]

B. *The inventor of DABUS*

Stephen Thaler is the inventor of DABUS. He earned a Ph.D. in Physics from the University of Missouri-Columbia, his thesis research dealing with radiation damage in silicon. In conducting this research, he simulated such damage in computational lattice models, forerunners of modern-day artificial neural networks. Following his 15-year career at McDonnell Douglas, he set out on his own, filing patents that by no accident dealt with purposely and gainfully damaging neural nets. He is currently President and CEO of Imagination Engines, Inc., a company specializing in computational creativity and catering primarily to DoD. He is also known for his forays into both human and machine consciousness, actively publishing and lecturing on these topics.[9]

Stephen Thaler filed a patent application on DABUS on 02.01.2015 at the US Patent and Trademark Office and was issued a patent # 10,423,875 B2 on 24.09.2019[10]

C. *The Inventions of DABUS*

According to Stephen Thaler DABUS has produced two inventions that are patentable:

- a food container constructed using fractal geometry, which enables rapid reheating; and
- a flashing beacon for attracting attention in an emergency.[11]

D. *Patent Application Attempts and Results*

Stephen Thaler has filed national and international patent applications indicating DABUS as an inventor, thus, challenging well established practice to consider and accept as inventors only humans.

The results of his attempts to register DABUS as an inventor with a patent are negative so far save for one case. A brief description of the patent applications in various jurisdictions follows:

1. Australia

The Australian Patent Office refused to proceed with the patent applications of Stephen Thaler. Consequently, the latter appealed the refusal and the Federal Court of Australia ruled: "an inventor as recognized under the Act can be an artificial intelligence system or device. But such a non-human inventor can neither be an applicant for a patent nor a grantee of a patent. So, to hold is consistent with the reality of the current technology. It is consistent with the Act. And it is consistent with promoting innovation".[12]

2. EPO

The European Patent Office (ËPO") rejected Stephen Thaler's patent applications. On the grounds that an inventor should be a natural person and an AI cannot assign patent rights to the applicant.[13]

3. Germany

The German Patent Office also refused to process the patent applications of Stephen Thaler. The resolution of the German Patent Office was appealed before the Federal Patent Court of Germany. On 11.11.2021, the court issued a ruling stating that AI-generated inventions are patentable, but a natural person must be named as the inventor. The court further stated that the applicant can declare the involvement of an AI machine.[14]

4. New Zealand

The New Zealand Patent Office rejected the patent applications of Stephen Thaler. The New Zealand High Court upheld the resolution of the New Zealand Patent Office in March 2023.[15]

5. South Africa

The Companies and Intellectual Property Commission of South Africa (The South African IP Office) granted Thaler's application. This fact was confirmed in the July 2021 issue of its Patent Journal. The patent indicates DABUS as an inventor and states that the invention was autonomously created by an artificial intelligence. It should be noted that South Africa operates a depository system for issuance of patents. The granting of a patent results in a check of only basic formal requirements. The 1978 Patent Act of South Africa provides various grounds for patent revocation if the patent is challenged.[16]

6. UK

The UK Intellectual Property Office ("IPO") has rejected Thaler's patent applications. The resolution of the UK IPO was supported by the judgements of the High Court [17] and the Court of Appeals [18]. However, the UK Government issued a statement on the position of the UK IPO in which it stated "There is no evidence that UK patent law is currently inappropriate to protect inventions made using AI. We are also sensitive to concerns that unilateral change now, risks being coun-

terproductive. So, we will advance international discussion so that inventions devised by AI are appropriately protected in the future."[19]

7. USA

The US Patent and Trademark Office (USPTO) also refused to allow the application, stating that legislation and Federal Circuit case law on inventorship "require that an inventor must be a natural person". Thaler brought an action before the Virginia Eastern District Court. On 02.09.2022 the court ruled in favour of the USPTO. The ruling was confirmed by a consequent ruling of the Court of Appeals for the Federal Circuit [20] and the US Supreme Court. The efforts of Stephen Thaler to register DABUS, an AI, as inventor have met the opposition of most of the national patent offices of the countries listed above, as well as their courts. The South African IP Office makes an exception by registering DABUS as an inventor and stating in the patent that the invention is autonomous product of AI.

V. OPTIONS FOR LEGISLATIVE CHANGES

The successful registration of DABUS as an inventor formed a global precedent that resulted in multitude of discussions about the necessity and the usefulness of granting inventorship quality to AI. In an article, published in the March 2023 issue of Maine Law Review, named "DABUS, An Artificial Intelligence Machine, Invented Something New and Useful, but the USPTO is not Buying It" [21], its author Trevor F. Ward, proposes the following options to grant statutory inventorship quality to an AI after the occurrence of the DABUS precedent:

1) *To use the copyright principles for forming concept of the inventorship quality of AI;*

2) *To create a sui generis category of invention;*

3) *To eliminate the inventor requirement;*

4) *To grant personhood status to AI machines;*

5) *To list upstream/downstream stakeholders as inventors and owners;*

6) *Not to grant patents for AI-generated inventions;*

7) *To maintain the Status Quo.*

All of the above suggestions have their strong and weak points, their risks and their advantages.

If we have to limit this article only on the risks, here are a few thoughts in that regard:

a. The principles of the copyright could hardly solve the necessity for granting an inventorship quality of the AI. Inventorship is not typical for copyright objects. Therefore, using the copyright principles to form a special inventorship quality only for AI but use the patent principles for humans might create ambiguity and complications in the future application of the legislative requirements for the copyright and the intellectual property. There is a risk of mixing the legislative foundations and philosophy of both types of immaterial rights;

b. The creation of a sui-generis category of invention poses certain threads as well. If we take this step and open the door for sui-generis type of inventios dedicated to the AI, then this process might continue and result in further creation of other sui-generis rights for other "types of inventors" be it human or other non-human. At certain point the exceptions might exceed the normal cases, which will impact the development of innovations negatively;

c. Elimination of the inventor requirement will create a dramatic impact on the IP legislation, as practically the creator of the patented innovation is the inventor. If the requirements for inventor are removed, then no regard will be given to the very person that brought the patented innovation to being. Such legal framework leaves uncertainties and unclarities about the transformation and reorganization of the inventor rights will they be performed by the owner of the patent or will they be canceled;

d. Granting personhood to AI machines poses a risk for granting rights to the AI that exceed the rights of inventor and go to all spheres of the human rights. Unlike the legal entities, which have personhood but are represented by humans, who execute rights and obligations on their behalf, as the legal entities cannot manifest their will and take legal actions, the AI could manifest will and therefore could take legal actions. Thus, by granting personhood to the AI, it could practically be allowed to the AI to enjoy full legal capacity as every human being. Such alternative might create conflict situations between AI and humans or between AI and AI;

e. Listing upstream/downstream stakeholders as inventors and owners has no significant practical effect, but creates multitude of uncertainties and unclarities about the rights of the AI stemming out of his nominal but not ultimate quality of inventor, respectively owner of a patent;

f. Granting no patents for AI-generated inventions poses a risky scenario, although quite remote, in which the owner/inventor of the AI will over benefit from the invention productiveness of the AI they own, respectively have invented;

g. Maintaining the Status Quo contains the risk of suppressing the ever-growing discussion on the AI's potential for inventorship, as one of the multitudes of discussion topics related to AI and thus at certain point in future to face time pressure for finding a solution, when finding a solution could be no longer postponed.

VI. CONCLUSION

The AI generated inventions face two problems – inventorship and ownership. At present the inventorship quality is dedicated only to human beings regarding objects of the intellectual property, as it is considered that the inventorship is strictly and immediately related to creativity and the quality of creativity is typical only to humans. In order to justify whether the quality of creativity could be assigned to machines, first a consensus should be reached on the meaning of creativity. Is creativity an exclusive capacity of the human mind or creativity has a broader meaning which includes the results of the combinations and computing work of a machine.

While the question of inventorship could be widely debated, the question of ownership at this point seems to have a rather straightforward answer. The ownership right over IP objects (such as patents) presumes material interests, presumes management of such rights in view of accumulation of wealth for the inventor, as means for wellbeing, protection and develop-

ment. Does AI need to possess its own means for wellbeing, protection and development? If so, could the AI manage itself such means and would it manage them out of any conflict with separate human individuals or the human society as a whole? The answers to such questions could be various but most probably the majority of the answers will offer a conservative approach and understanding.

Last but not least, before discussing the inventorship and ownership potential of AI, first and foremost a general consensus should be reached on the question, what is an AI? What are its qualities, characteristics, capabilities, restrictions, limitations, duration of operation, etc. Thereafter, a regulation on the AI has to be adopted. The European Commission is pioneering in this direction and is trying to elaborate the first piece of legislation on the AI – the AI Act.

VII. REFERENCES

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