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Must Inventors Be Human?
… and Other Questions about AI

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Advanced Patent Law Institute

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Useful Inventions - Patents

Life Sciences

- Drug discovery
- Synthetic biology
- Medical image analysis

Electronics & Physical

- Circuit design
- Materials science
- Physical structures

Patent Questions – AI and Inventing

- Can an AI be an "inventor"?

  - What about the AI's programmers?

- What does it mean to be "novel" and "nonobvious" when an AI gets involved?

  - "*Person* of skill in the art" and "Level of skill in the art"

- How can we articulate/explain the "invention" when an AI comes up with an "invention"?

  - The disclosure must "enable a person of skill in the art to make and use the invention"

  - AI's "black box" problem – does it impact enablement?

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Artificial Inventor Project:
Fractal Container and Neural Flame

Fractal Container Specification and Drawings.

A container for use, for example, for beverages, has a wall with and external surface and an internal wall of substantially uniform thickness. The wall has a fractal profile which provides a series of fractal elements on the interior and exterior surfaces, forming pits and bulges in the profile of the wall and in which a pit as seen from one of the exterior or interior surfaces forms a bulge on the other of the exterior or interior surfaces. The profile enables multiple containers to be coupled together by inter-engagement of pits and bulges on corresponding ones of the containers. The profile also improves grip, as well as heat transfer into and out of the container.
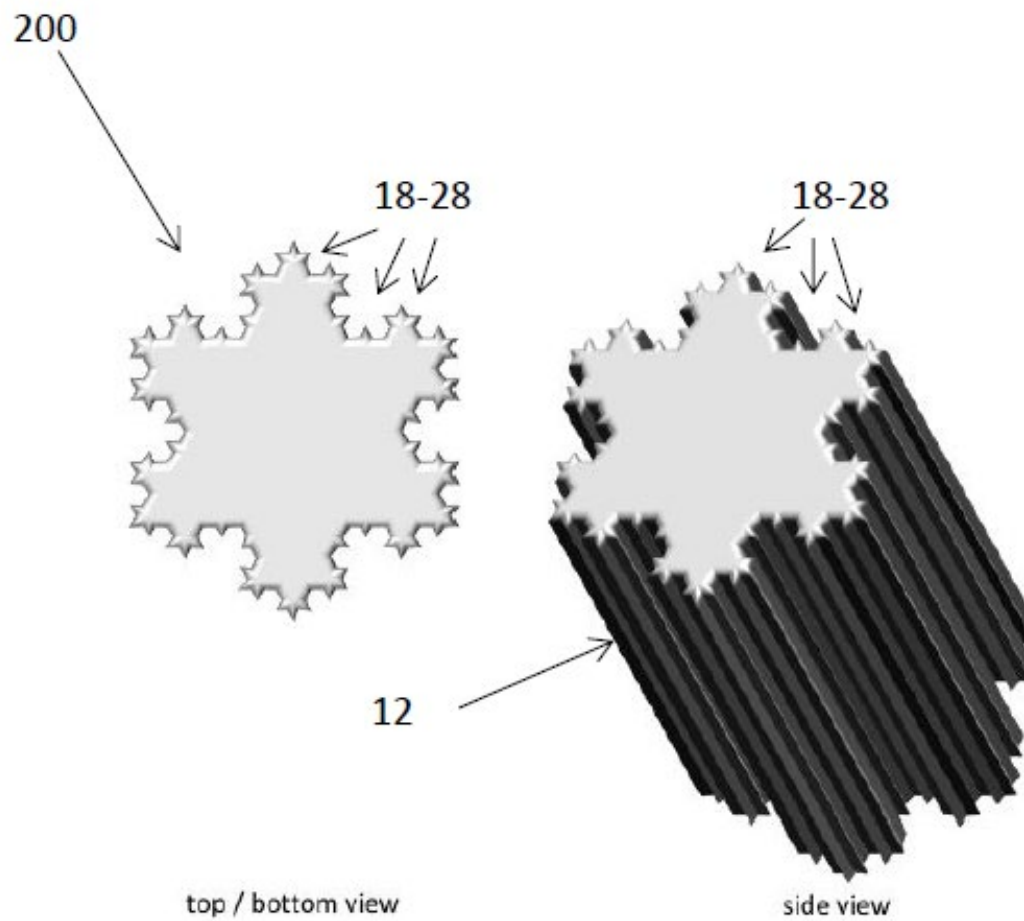Pending: PCT, USPTO, EPO, UKIPO

Neural Flame Specification and Drawings.

The present invention discloses devices and methods for attracting enhanced attention. Devices include: an input signal of a lacunar pulse train having characteristics of a pulse frequency of approximately four Hertz and a pulse-train fractal dimension of approximately one-half; and at least one controllable light source configured to be pulsatingly operated by the input signal; wherein a neural flame emitted from at least one controllable light source as a result of the lacunar pulse train is adapted to serve as a uniquely-identifiable signal beacon over potentially-competing attention sources by selectively triggering human or artificial anomaly-detection filters, thereby attracting enhanced attention.
Pending: PCT, USPTO, EPO, UKIPO

A machine architecture called "DABUS" conceived of the instant inventions.

DABUS' AI-created Beverage Container

Core Sources of Intellectual Property Law

- **U.S. Const., Art. I, Sec. 8, Cl. 8** – Patent and Copyright Clause
  - [The Congress shall have power] "To promote the progress of science and useful arts, by securing for limited times to authors and *inventors* the exclusive right to their respective writings and discoveries."

- **35 U.S.C. Sec. 100, 101, 102** – Patent Act
  - "The term 'inventor' means the *individual* … who invented or discovered the subject matter of the invention."
  - "*Whoever* invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, …"
  - "A *person* shall be entitled …"

The Dictionary Act:
Of Individuals and Persons

- "In determining the meaning of any Act of Congress, or of any ruling, regulation, or interpretation of the various administrative bureaus and agencies of the United States, the words 'person', 'human being', 'child', and 'individual', shall include every infant member of the species homo sapiens who is born alive at any stage of development."
  - 1 U.S.C. Sec. 8(a)

- "The words 'person' and 'whoever' include corporations, companies, associations, firms, partnerships, societies, and joint stock companies, as well as individuals"
  - 1 U.S.C. Sec. 1

Can an AI be an Inventor?

- "As stated previously, only natural persons can be 'inventors.'"
  - *Beech Aircraft Corp. v. EDO Corp.*, 990 F.2d 1237, 1248 n.23 (Fed. Cir. 1993)

Can an AI be an Inventor?

- "In the United States a patent application can be filed only by a natural person, the inventor …"

  - *Karrer v. United States*, 152 F.Supp. 66, 69 (Ct. Cl. 1957)

Are "Individuals" Limited to Natural Persons?

- Torture Victim Protection Act: yes (SCOTUS)

- FOIA: yes (9th Cir.)

- Ethics in Government Act: yes (DC Cir.)

- Bankruptcy Act: it depends (varies by circuit, issue)

- Criminal statutes protecting "individuals" as crime victims

  - Damage to computers: no (9th Cir.)

  - Identity theft: yes (4th Cir.)

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Other Patent Law Issues

- AI and Invalidating Patents
  - Using AI to find prior art – and to connect the dots between multiple references
  - Is everything "obvious" to an AI?
- AI and Infringing Patents
  - Can an AI be an infringer?
  - "Black box" problem – how can we determine what the AI actually does?
  - Using AI to determine infringement / find infringements?

USPTO Gets In On the Act
(87 FR 44889, published 8/27/19)

1. Inventions that utilize AI, as well as inventions that are developed by AI, have commonly been referred to as "AI inventions." What are elements of an AI invention?

   For example: The problem to be addressed (*e.g.,* application of AI); the structure of the database on which the AI will be trained and will act; the training of the algorithm on the data; the algorithm itself; the results of the AI invention through an automated process; the policies/weights to be applied to the data that affects the outcome of the results; and/or other elements.

2. What are the different ways that a natural person can contribute to conception of an AI invention and be eligible to be a named inventor?

   For example: Designing the algorithm and/or weighting adaptations; structuring the data on which the algorithm runs; running the AI algorithm on the data and obtaining the results.

3. Do current patent laws and regulations regarding inventorship need to be revised to take into account inventions where an entity or entities other than a natural person contributed to the conception of an invention?

USPTO Gets In On the Act
(87 FR 44889, published 8/27/19)

4. Should an entity or entities other than a natural person, or company to which a natural person assigns an invention, be able to own a patent on the AI invention?

> For example: Should a company who trains the artificial intelligence process that creates the invention be able to be an owner?

5. Are there any patent eligibility considerations unique to AI inventions?

6. Are there any disclosure-related considerations unique to AI inventions?

> For example, under current practice, written description support for computer-implemented inventions generally require sufficient disclosure of an algorithm to perform a claimed function, such that a person of ordinary skill in the art can reasonably conclude that the inventor had possession of the claimed invention. Does there need to be a change in the level of detail an applicant must provide in order to comply with the written description requirement, particularly for deep-learning systems that may have a large number of hidden layers with weights that evolve during the learning/training process without human intervention or knowledge?

USPTO Gets In On the Act
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7. How can patent applications for AI inventions best comply with the enablement requirement, particularly given the degree of unpredictability of certain AI systems?

8. Does AI impact the level of a person of ordinary skill in the art? If so, how?

For example: Should assessment of the level of ordinary skill in the art reflect the capability possessed by AI?

9. Are there any prior art considerations unique to AI inventions?

10. Are there any new forms of intellectual property protections that are needed for AI inventions, such as data protection?

11. Are there any other issues pertinent to patenting AI inventions that we should examine?

12. Are there any relevant policies or practices from other major patent agencies that may help inform USPTO's policies and practices regarding patenting of AI inventions?

Categories of AI Inventions

- Where the AI is the <u>invention</u>
  - Section 101
  - Black box
  - Enablement
  - Scope of what is claimed

- Where the AI <u>helps</u> the human inventor
  - Just another technology tool?
  - Or is the human helping the AI?

- Where the AI is the <u>inventor</u>
  - Legal restrictions
  - Conceptual limitations

Europe's Approach?

- European Parliament Commission on Civil Law Rules
  - 2017 Proposal to create "electronic personhood" for robots

- Included a call for the European Commission "to elaborate criteria for an 'own intellectual creation' for copyrightable works produced by computers or robots"
  - … but not a parallel mention of patentability of AI-created inventions.

What is the Motivation of the EP Proposal? See the Preamble

- whereas from Mary Shelley's Frankenstein's Monster to the classical myth of Pygmalion, through the story of Prague's Golem to the robot of Karel Čapek, who coined the word, people have fantasised about the possibility of building intelligent machines, more often than not androids with human features;

- whereas now that humankind stands on the threshold of an era when ever more sophisticated robots, bots, androids and other manifestations of artificial intelligence ("AI") seem poised to unleash a new industrial revolution, which is likely to leave no stratum of society untouched, it is vitally important for the legislature to consider all its implications;

- * * *

October 28, 2019: UK IPO Weighs In

- "Where the stated inventor is an 'AI Inventor', the Formalities Examiner request a replacement F7. <u>An 'AI Inventor' is not acceptable as this does not identify 'a person' which is required by law.</u> The consequence of failing to supply this is that the application is taken to be withdrawn under s.13(2)."

    - https://www.gov.uk/guidance/formalities-manual-online-version/chapter-3-the-inventor (Section 3.05, updated 10/28/19) (emphasis added)

October 30, 2019: USPTO Extends Inquiry to Copyright, Trademark, and Trade Secret Law

- Can/should AI be authors?
- If human is required, what should be the contribution of the human to obtain copyright?
- Training Data fair use?

- Should companies who own AI, own the work?
- AI protection and promotion of goals of Copyright laws?
- Current law offer adequate protection of AI infringement?