



A US-China Comparative View of AI Challenges to Patent Law: Inventorship

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- Global challenge: **What is the challenge?**
- Why **NOW?**



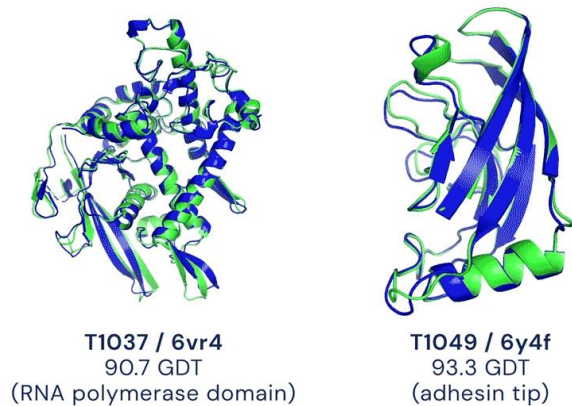


A PARADIGM CHANGE OF THE CREATIVE PROCESS:

The Rise Of Centaur (Human + AI) Creators

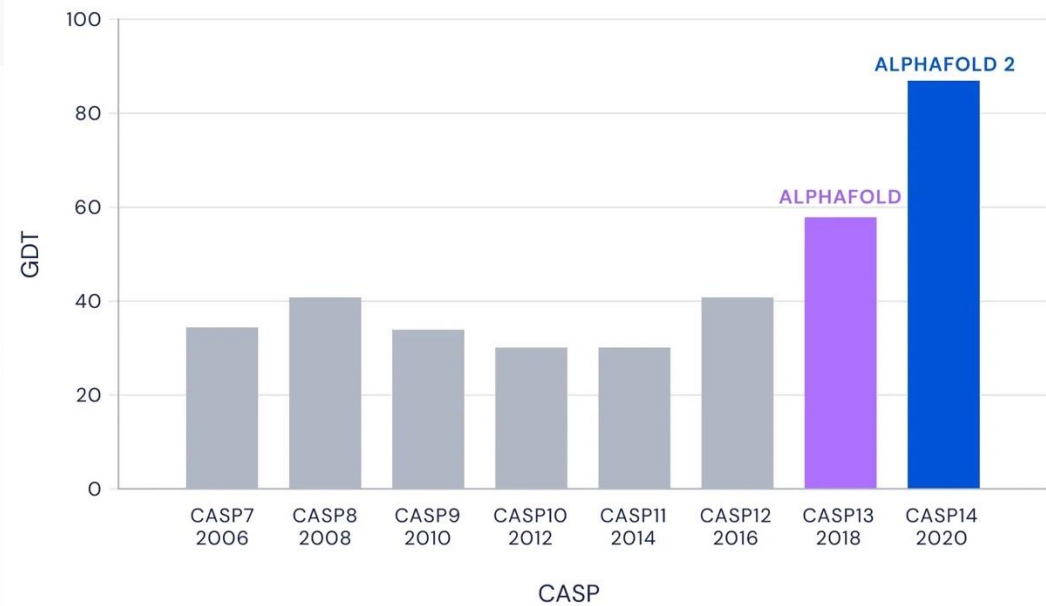


A GOOD EXAMPLE FOR THE CENTAUR'S POWER: **ALPHA-FOLD, NOT DABUS!!**



● Experimental result
● Computational prediction

Median Free-Modelling Accuracy



As the Alpha-Fold example illustrated, we will see a major AI challenge to the US inventorship doctrine: “**inventorless inventions**” – meaning in some circumstances, no human being in the inventing synergy can be identified as the inventor under the conventional inventorship doctrine, even though she has made significant contribution to the claimed invention. **Why?**

AI's Challenge to Inventorship: Inventorless Inventions

- The primary meaning of the word 'invention' in the Patent Act **unquestionably refers to the inventor's conception** rather than to a physical embodiment of that idea. *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 60 (1998)
- **Conception is the touchstone of inventorship**, the completion of the mental part of invention. *Sewall v. Walters*, 21 F.3d 411, 415 (Fed. Cir. 1994).
Conception is defined as “the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice.” *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367,1376 (Fed. Cir. 1986).

AI's Challenge to Inventorship: Inventorless Inventions

- Conception is “complete only when the idea is so clearly defined in the inventor’s mind that **only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.**”
Burroughs Wellcome Co. V. Barr Labs., Inc., 40 F.3d 1223, 1227-28 (Fed. Cir. 1994) (**AlphaFold and its progeny: “Conception”?**)
- On the other hand, “merely posing the problem to be solved, or suggesting a desired result to be accomplished” does not constitute conception. **“No matter how specific the identified problem is, conception does not happen lacking a settled and operative solution.”** See *Morgan v. Hirsch*, 728 F.2d 1449 (Fed. Cir. 1984). See also *Singh v. Brake*, 222 F.3d 1362 (Fed. Cir. 2000).

The Anatomy of an Inventing Process – ~~“black box”~~ (Michelle and Surrendran, 2015)

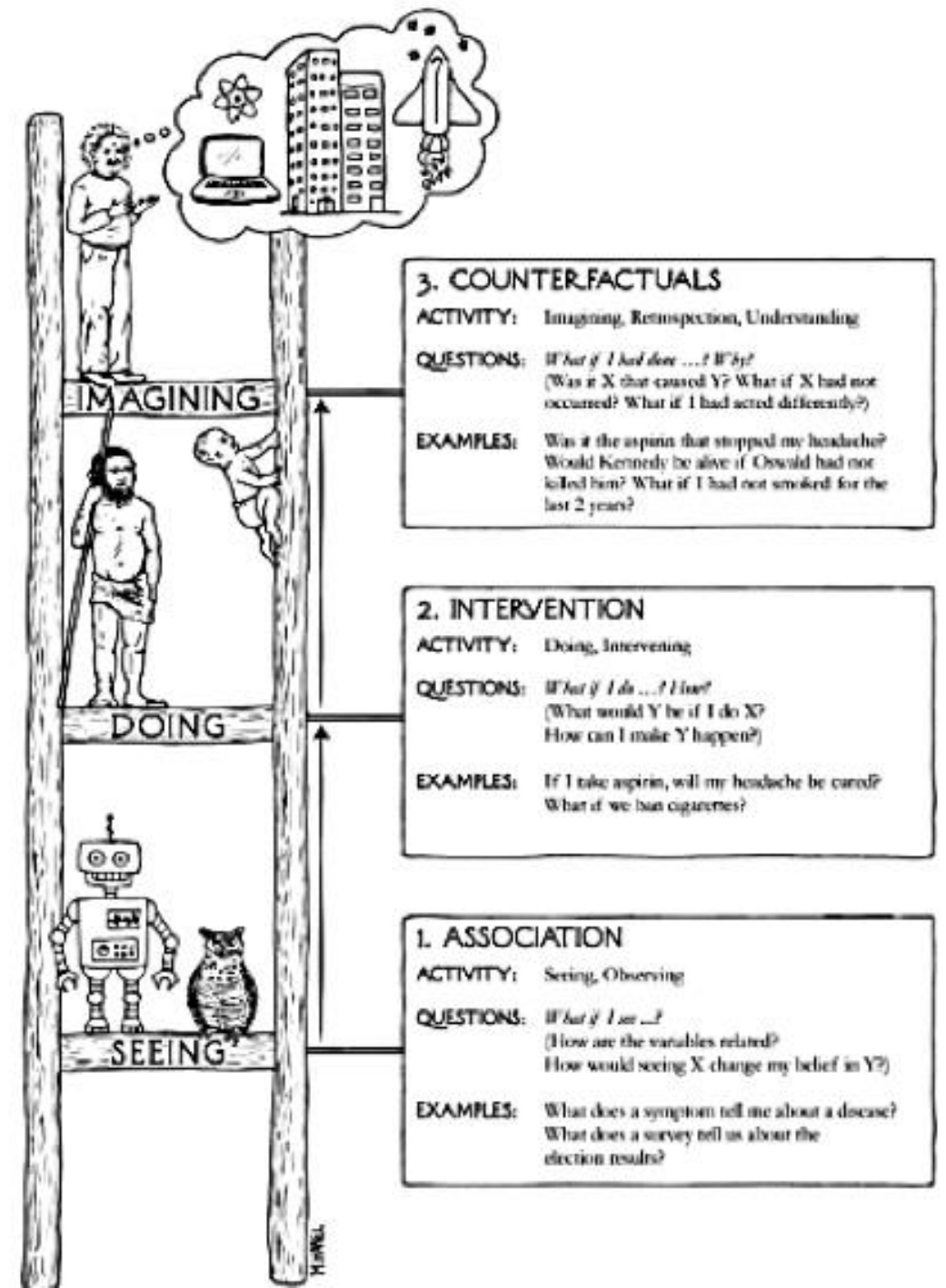
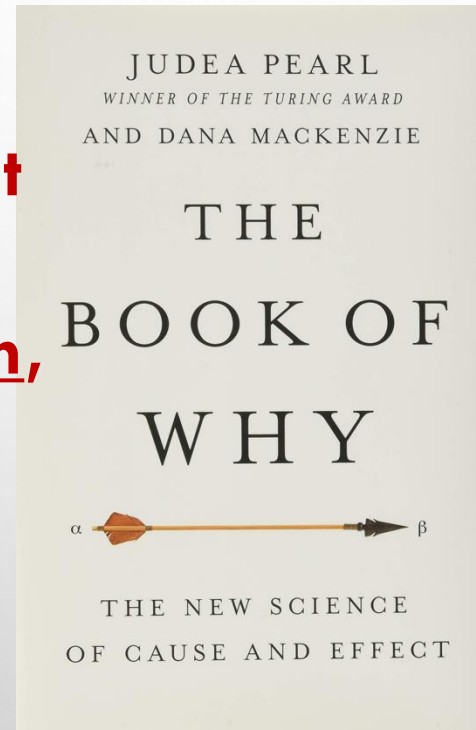
- i. **Problem identification:** an invention usually begins with the “detection of a problem”. “Seeing” the problem that leads to an invention means that there is a specific need to do something differently. (**Human**)
- ii. **Problem defining/framing:** for an efficient invention to start, clarity is always required about the specific problem to be solved. Sometimes the identified problem needs to be further broken into a series of “solvable” sub-problems or questions. (**Human**)
- iii. **Problem / Solution exploration:** an inventive solution usually requires an understanding of existing solutions and their strengths and weaknesses, partly because most inventions involve an evolutionary recombination of existing technologies. This step also involves searching for and predicting potentially novel structural arrangements of principles that meet the defined requirements. Narrowing down solutions may also involve other screening techniques, such as trial and error experiments, until a “working concept” is developed. (**AI or Human + AI**)
- iv. **Invention synthesis and evaluation:** filtering potential solutions into a working concept is also critical to the inventing process. This relates heavily to the inference and reasoning task of identifying how known principles could be integrated into a working concept that meets the problem requirements. (**Human + AI**)
- v. **Invention design:** the working concept needs to be further refined to a robust solution that reliably meets the requirement parameters – refining is an engineering design activity that requires detailed specification and testing. (**Human + AI**)

Contemporary (LLM-Based) AI's Weakness and Strength

1. Lacking capability to understand causation, It is virtually impossible for AI to detect **real-world challenges**, nor can they properly **frame** the challenge into a series of creative problems / questions to be tackled.
2. AI can be excellent at **predicting** solutions in certain cases where **the problem space is properly defined**, thus reducing the cost of invention.
3. Compared with conventional lab tools (including conventional computer aid), **AI is now capable of generating something novel, surprising and potentially valuable.**

Reason for AI's Weakness

In a nutshell:
Contemporary AI can be remarkably good at detecting correlation/association, but has a weak capability to grasp Causation.



How Should Patent Law Adapt? Different Academic Views...

1. **Public Domain** (“The End of Patent Law As We Know It”, Tom Dornis 2020, https://yjolt.org/sites/default/files/23_yale_j.l._tech._97_ai_patent_0.pdf).
2. **“Artificial Inventors”** (*The DABUS Case*, Ryan Abbott, <https://artificialinventor.com>)
3. A Mid-ground **Humanistic Approach**: Grant Patent, but Focus on the “Human Contribution” (“Significant Human Contribution in the form of Constructive Conceptions”, Yuan Hao, 2022, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4186684)

My Proposal: **Constructive Conception**

The **human researcher(s)** of a Centaur Inventing Synergy can be *deemed* as having *constructively* conceived of the inventive idea, if he/she simultaneously fulfills the following three pre- conditions:

- (i) she is the one that **discovered / defined the specific problem** to which the AI eventually predicted the solution;*
- (ii) she is the first human being that **grasps the inventive-step / non-obviousness** of the specific and settled idea of the solution; and*
- (iii) she makes an **adequate disclosure of the AI's specific role** in the inventing process.*

Yuan Hao, *The Rise of Centaur Inventors*, 104 Journal of The Patent and Trademark Office Society 71, (2024)

Rationale for “Constructive Conception”:

1. It acknowledges human beings’ unique role of problem finding and framing in the new inventing paradigm;
2. It put human agency at the center;
3. It leaves space for the argument that the **non-obviousness** doctrine should pay more attention to the problem finding/framing part, particularly in the AI age;
4. It’s supported by deeper IP principles such as the principles of dignity and efficiency.
5. Moderate change in the common mid-ground between IP Utilitarianists and IP Humanitarians, so consensus would be easier.

USPTO Draft Inventorship Guideline for AI-assisted Inventions (Feb. 13, 2024)

- “This guidance explains that while *AI-assisted inventions are not categorically unpatentable*, the inventorship analysis should focus on *human contributions*, as *patents function to incentivize and reward human ingenuity*. Patent protection may be sought for inventions for which *a natural person provided a significant contribution to the invention*, and the guidance provides procedures for determining the same.”
- USPTO: the interpretative approach
 - Coherent with the third school of academic views: humanistic centered proposal of focusing on human researcher’s contribution
 - **What Constitutes “Significant Contribution”?**

USPTO Draft Inventorship Guideline for AI-assisted Inventions (Feb. 13, 2024)

- **Rationale:** The patentability of AI-assisted inventions on the human contributions supports this policy objective by *incentivizing human-centered activities and contributions*, and by providing patent protections to inventions with significant human contributions while prohibiting patents on those that are not invented by natural persons. This approach supports the USPTO's goal of helping to ensure our patent system strikes the right balance between protecting and incentivizing AI-assisted inventions and not hindering future human innovation by locking up innovation created without human ingenuity.

USPTO Inventorship Guideline for AI-assisted Inventions (Feb. 13, 2024)

- Principle 2: Merely recognizing a problem or having a general goal or research plan to pursue does not rise to the level of conception. A natural person who only presents a problem to an AI system may not be a proper inventor or joint inventor of an invention identified from the output of the AI system. However, **a significant contribution could be shown by the way the person constructs the prompt in view of a specific problem to elicit a particular solution from the AI system.**
- Principle 4: In some situations, the natural person(s) who designs, builds, or trains an AI system **in view of a specific problem to elicit a particular solution** could be an inventor.

Chinese Inventorship Law

Provision 13, *Implementing Regulations of the PRC Patent Law*:

“Inventor” or “creator” referred to in the patent law means any person who makes inventive contributions to the substantive features of an invention-creation. Any person who, during the course of accomplishing the invention-creation, is responsible only for organizational work, or who offers facilities for making use of material and technical means, or who takes part in other auxiliary functions, shall NOT be considered as inventor or creator.

Chinese Inventorship Law – Two Relevant Cases

1. *DJI V. SIPO*, (Supreme People's Court IP Division, 2020), Zui Gao Fa Zhi Xing Zhong No. 183

- Holding: The Inventiveness of a patented tech solution can arise both from 'problem solving' and from 'problem posing.' When the difficulty of technological advancement lies in identifying the problem, if the non-obviousness of 'posing the problem' is not considered from the perspective of an ordinary person skilled in the art, it may lead to hindsight bias and underestimating the inventiveness of the technical solution at issue.

Chinese Inventorship Law – Two Relevant Cases

2. *Suzhou Kaituo Pharma. v. Zhou*, (Supreme People's Court IP Division, 2023), Zui Gao Fa Zhi Min Zhong No. 2912

- The discovery of a technical problem is often the starting point of an invention, reflecting the inventor's ability to grasp the essence beyond appearances, through innovative thinking and choices in the process of discovering and solving problems, which also requires considerable effort and creative labor. Once the inventive problem is defined, it can guide the inventor in selecting specific technical means for experimentation and improvement to problem solving and gradually perfect the solution. Thus, **if the discovery of the technical problem and the proposal of the inventive concept play a key role in the R&D activities and contribute creatively, it can generally be claimed that the individual should be recognized as the inventor of the creation.**



THANK YOU! QUESTIONS?

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