AI Innovation at America’s Innovation Agency
AI in Government
May 2021
Overview

1. What is the USPTO?
2. What does the USPTO have to do with AI?
3. Where does AI fit into the lifecycle of a patent or trademark application?
4. What issues arise in our AI development?
5. How will AI steer the global future of intellectual property?
The USPTO: engine of America's innovation economy
What we do

• U.S. Patent and Trademark Office: America’s Innovation Agency

• Promote economic growth and scientific progress in U.S. and worldwide by:
  – Granting patents
  – Registering trademarks

• We give the American people a superpower: Investing in ideas
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;
The United States.

To all to whom these Presents shall come, Greeting.

WHEREAS, Samuel Hopkins of the City of Philadelphia and State of Pennsylvania hath discovered an Improvement, not known or used heretofore, in the making of Oil and Paste, by a new Apparatus and Process, whereby the same is more easily and quickly made, by ethering the raw ashes in a Furnace, 2d by fermenting and boiling them when so ethered in a Vessel, 3d by drawing off and setting the tar, and 4th by boiling the hog's fat into fats which are the raw Paste oil, and 5th, in the making of Oil, can Ether the Ethered ashes as a primer, which operation of leaving the paste ashes in a Furnace preparatory to their Distillation and boiling into raw oil, are known to wholesomeness; and produces a much greater Quantity of oil. These are therefore in pursuance of the Act, entitled "An Act for the encouragement of useful Arts", to grant the said Samuel Hopkins, his Heirs, Administrators and Assigns, for the term of fourteen Years, the sole and exclusive Right and Liberty of using and working in the said District of making the said raw ashes, pretence to their being distilled and boiled in Water, according to the above Act and Meaning of the Act aforesaid. In Testimony whereof, I have caused these Letters to be made Patent, and the Seal of the United States to be hereunto affixed.

Given under my Hand at the City of New York the thirty first Day of July in the Year of our Lord one thousand seven hundred Ninety.

City of New York July 31, 1790.

I hereby certify that the foregoing Letters Patent were delivered to me in pursuance of the Act intitled "An Act for the encouragement of useful Arts" so that I have examined the same and find them conformable to the said Act.


U.S. Patent X1
(Hopkins, 1790)
U.S. Patent 10635966  
(Krizhevsky et al., 2020)
U.S. Patent 10956819
(Shazeer et al., 2021)

Ibid.
U.S. Patent 4516948
(Obara, 1984)

Ibid.
The USPTO & AI: influencer, consumer, contributor
AI influencer

• Constitutional and statutory mandate: **secure IP rights to innovators.**
  – IP: foundation of the innovation economy.
  – USPTO’s goal: provision timely & reliable IP rights.

• Office of the Under Secretary of Commerce for Intellectual Property
  – Principal policy advisor to the Administration on all IP matters—including AI & IP.
## AI consumer

• Our examiners have **one of the hardest jobs in the world**—and it’s only getting more challenging with each day.

• More on this later.
AI contributor

• **USPTO Open Data**
  – Hundreds of terabytes
  – Remarkably rich data on our nation’s scientific advances and commercial history.

• **The Pile** (Gao et al., 2020)

• Small but growing ecosystem of “AI for Patents” technologists
AI for examination
Why we examine

• Examination: ensure that a patent or trademark application satisfies the statutory requirements.

• Patents must:
  – Have eligible subject matter.
  – Be novel and non-obvious.
  – Disclose the claimed invention well enough to (1) show possession, and (2) enable others to use it.

• Registered trademarks must:
  – Be (or will be) used in commerce.
  – Be distinctive.
Lifecycle of an application

Step 0: Turning Ideas into Applications
Lifecycle of an application

Step 1: Preprocess the Application
Lifecycle of an application

Step 2: Examine the Application
Lifecycle of an application

Step 3: Issue and Beyond
Examination is one of the hardest jobs out there!
Patent Examining Corps

- Over 8,500 USPTO Patent Examiners!
- Each is a technical expert in their domain.
- Goal: ensure that patent grants from the USPTO are reliable.
- How?
  - Develop comprehensive understanding of the claimed invention.
  - Make sure it’s patentable and described in sufficient detail.
  - Ensure it hasn’t been done before.
  - Apply the facts, law, and judicial precedent to determine whether a patent should be granted.
Trademark Law Offices

• Over 600 USPTO Trademark Examining Attorneys!
• Each is a skilled trademark law practitioner.
• Goal: ensure the integrity of the U.S. trademark register.
• How?
  – Verify applicants’ assertion that a mark is used (or will be used) in commerce.
  – Make sure that the mark won’t be confused with other marks used in United States commerce.
  – Apply the facts, law, and judicial precedent to determine whether a trademark should be registered.
Experts: necessary but insufficient!

- USPTO invests in recruiting top-tier talent.
  - But examination is hard even for them!

- How do you prove that something *doesn’t* exist without trudging through everything that *does* exist?

- Needle in a haystack
  Needle in 1000 haystacks.
Progress makes their jobs harder!

- Economic growth & technical innovation: great for the world.
- Makes examination even more difficult!
- A lot has changed in 231 years.
1790
Why AI is hard—and what to do about it.
AI @ USPTO:
incredibly domain-specific

• Many AI solutions being marketed to federal agencies.
  – Pretrained models.
  – Question answering.
  – Image classification & segmentation.

• Problem: patent examining isn’t your typical business.
  – Nor is bank regulation.
  – Nor public health and disease prevention.
  – Nor national security and defense.

• We need **domain-specific solutions** to solve highly specialized problems.
  – Patent models trained on patent data using patent-appropriate metrics.
  – Trademark models trained on... you get the drift.
Proof of existence

- Mature technology considerations:
  - Cost, speed, resiliency, interoperability, security.
- AI: all of the above, but also:

Can it be done at all?

- If yes, how?
- If no, when might technology catch up?
- Standard procurement models: great for executing known solutions.
  - But much risker to attempt “discovering the unknown”.
Getting it done

• Great, a solution exists...
  Can your organization make it happen?
  – Workforce skills?
  – Infrastructure?
  – Change management?
  – Feedback loops?
  – Business alignment with customers?
  – Leadership alignment?
Current and future strategies

• Current
  – Collaborations with industry leaders.
  – Prototyping pilots and cloud sandboxes.
  – User engagement—taken to the next level.

• Future
  – Open challenges.
  – Staged procurement.
  – Resource reuse.
AI & the global future of intellectual property
AI inventions

• How do we best support AI innovators?
• What’s special about AI inventions?
  – Complex and often-ambiguous technology.
  – Disclosure requirements.
  – Subject matter eligibility.
AI for invention

• What role will AI play in invention?
• Idle daydream? Well...
  – Technology: night and day between 2016 and 2021. What will 2026 & beyond bring?
  – Legal: we’re already there.
Inventing with AI

• Spectrum of AI involvement:
  – From tab-autocomplete (e.g. Gmail, MS Word)
  – To full-on document generation models.

• Generative models:
  – Adequacy of disclosure?
  – Novelty & non-obviousness?
  – Attribution?
We’re barely scratching the surface...

...of AI innovation.
...of AI for USPTO examination.
...of AI & IP.
USPTO AI engagements

• Industry practitioners & researchers.
• Federal agencies.
• IP Offices.
• International bodies & forums.
• Public stakeholders at large.
AI & IP events

• [June 25] **AI & Patents @ ICAIL 2021**
• [October 21] **AI in Government**
• [Quarterly] **Patent Public Advisory Committee** (AI subcommittee)
• Expect continued engagement from USPTO on AI.
  – [AI Landing Page @ USPTO](#)
Thank you!

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U.S. Patent and Trademark Office

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