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Morgan Lewis

SILICON VALLEY FIRST CUP OF COFFEE SEMINAR SERIES

UPCOMING SEMINARS:

2022 Artificial Intelligence (AI) Boot Camp

December 13	Patenting of AI Inventions in Europe
December 14	Hot Topics in AI Under Consideration by the Executive Branch
January 11	Digital Health
January 12	CFIUS Focus on Transactions Involving AI and AI Companies
January 17	Artificial Intelligence in the Securities and Commodities Industry: A Primer

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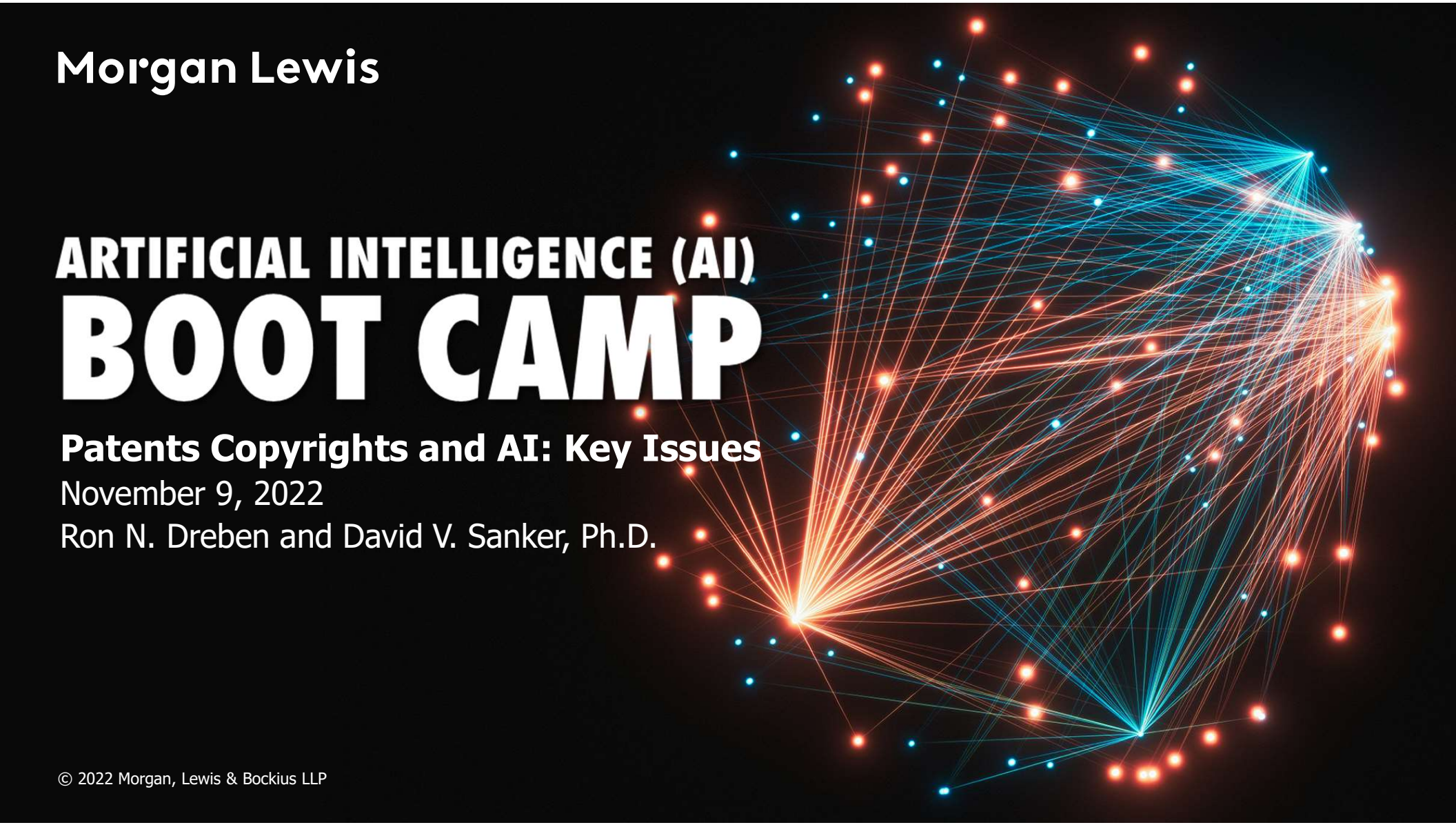


ARTIFICIAL INTELLIGENCE (AI) BOOT CAMP

Patents Copyrights and AI: Key Issues

November 9, 2022

Ron N. Dreben and David V. Sanker, Ph.D.

Host

Andrew J. Gray IV

Presenters

Ron N. Dreben

David V. Sanker, Ph.D.

Morgan Lewis

Overview

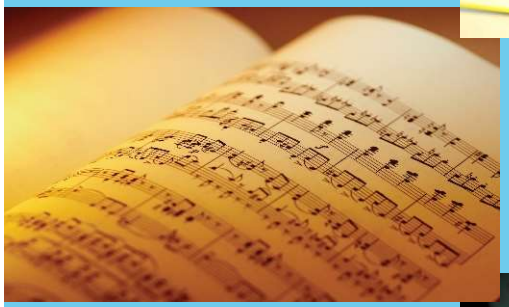
- Artificial intelligence (AI) is already creating content and inventions that could be protected by copyright and patents if the authors/inventors were human.
- What are the key IP issues in the U.S. when an author/inventor is arguably the AI?
- Examples of AI generated images, text, video and music
- Is AI generated content subject to copyright or patent protection?
- Can AI generated content infringe copyrights or patents?
- IP, big data and machine learning databases

Protected by Copyright

- An original work of authorship (e.g., music, artwork, photos, film, books, and software) fixed in a tangible medium of expression
- Copyrights last a long time
  - 95 years from publication or 120 years from creation (whichever is shorter) for works made for hire
  - life of the author plus 70 years for individual authors (even if assigned to a company)

Art/Images

Books



Songs

Video

AI as the "Author"

Who is the author of AI output? There are several options:

- the programmer
- the user of the AI program
- the AI system
- the employer of the user/AI
- joint authorship
- no one

Protected by Copyright

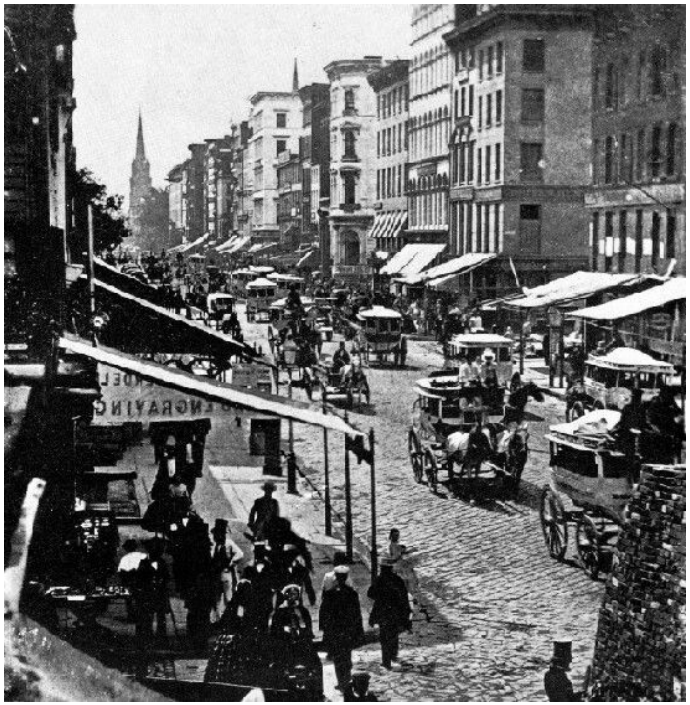
- Constitutional basis for copyright: "To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries"
- To be registrable with the U.S. Copyright Office, a work must be fixed and original, meaning:
  - (1) it must not be copied from a preexisting source and
  - (2) it must possess "at least some minimal degree of creativity." Feist, 499 U.S. at 345.
- The U.S. Copyright Office Compendium states: "Because copyright law is limited to 'original intellectual conceptions of the author,' **the Office will refuse to register a claim if it determines that a human being did not create the work.**"

Selfie Taken by Monkey

Naruto v. Slater, No. 16-15469 (9th Cir. 2018)

What's Old is New: Non-Human Authorship *Before* AI

- The question of "human authorship" is not new
  - [T]he constitution is broad enough to cover an act authorizing copyright of photographs, so far as they are representatives of original intellectual conceptions of the author." *Burrow-Giles Lithographic Co. v. Sarony,* 111 US 53, 58 (1884)(rejecting per se rule that "a photograph is the mere mechanical reproduction of the physical features or outlines of some object . . . and involves no originality of thought")
- What does it mean to be "created" by a human being?
- What is the requisite amount of human contribution?
  - The Copyright Office "will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author." Compendium 313.2

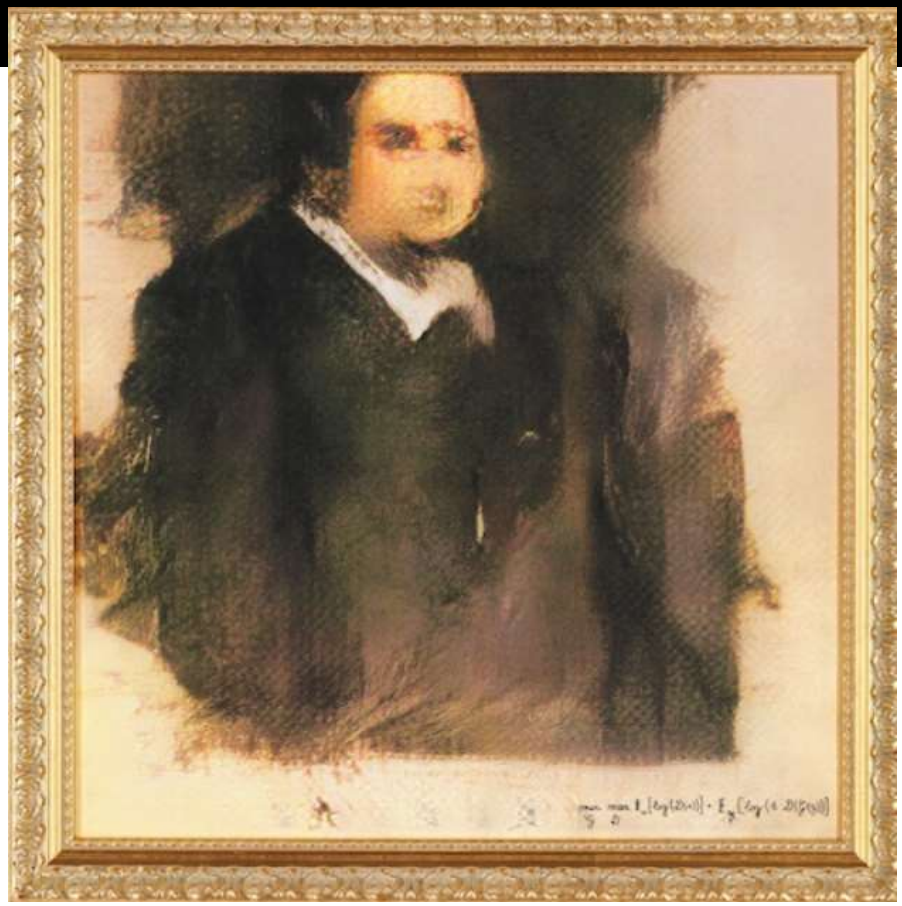


New York in the 1800s.

GAN Generated Art (Generative Adversarial Network)

Portrait of Edmond De Belamy

- The Paris based collective that produced the work, Obvious, fed the system 15,000 portraits from between the 14th and 20th century as part of the AI system's training.
- Sold for $432,500 at Christie's auction house.
- The signature, in cursive Gallic script, is a mathematical formula



Another Example of GAN AI

Generated at thispersondoesnotexist.com

And the winner is …

- An AI Generated Artwork Won First Prize at a Colorado State Fair.

GPT-2 (Generative Pretrained Transformer)

Input text: Malfoy hadn't noticed anything.

GPT2 Continuation: "In that case," said Harry, after thinking over it, "I suggest you return to the library."

He then walked over to a bookcase at the back of the library and pawed through it. For a few seconds he stared at it, almost careering through the counter, then he turned and went back to the bookshelves and started up again, but in a little while a new book had appeared. It was *Hogwarts and Its History* by Gilderoy Lockhart. He let out a long, soft sigh of relieve and seized it with both hands.

Hagrid strode into the room, his large feet gleaming in the lamps, a mixture of shock and awe on his face.

"Professor – yes?"

"Hello, Hagrid, it's good to see you," said Harry, but he also knew that whatever he'd written in the note would be read by everyone in the school – Professor McGonagall, the Headmistress, the rest of the teachers, and even some third-year students who just started class.

Hagrid climbed carefully over the stack of books and opened the book, shining gold letters high in …

https://deeplearninganalytics.org/train-a-gpt-2-transformer-to-write-harry-potter-books/

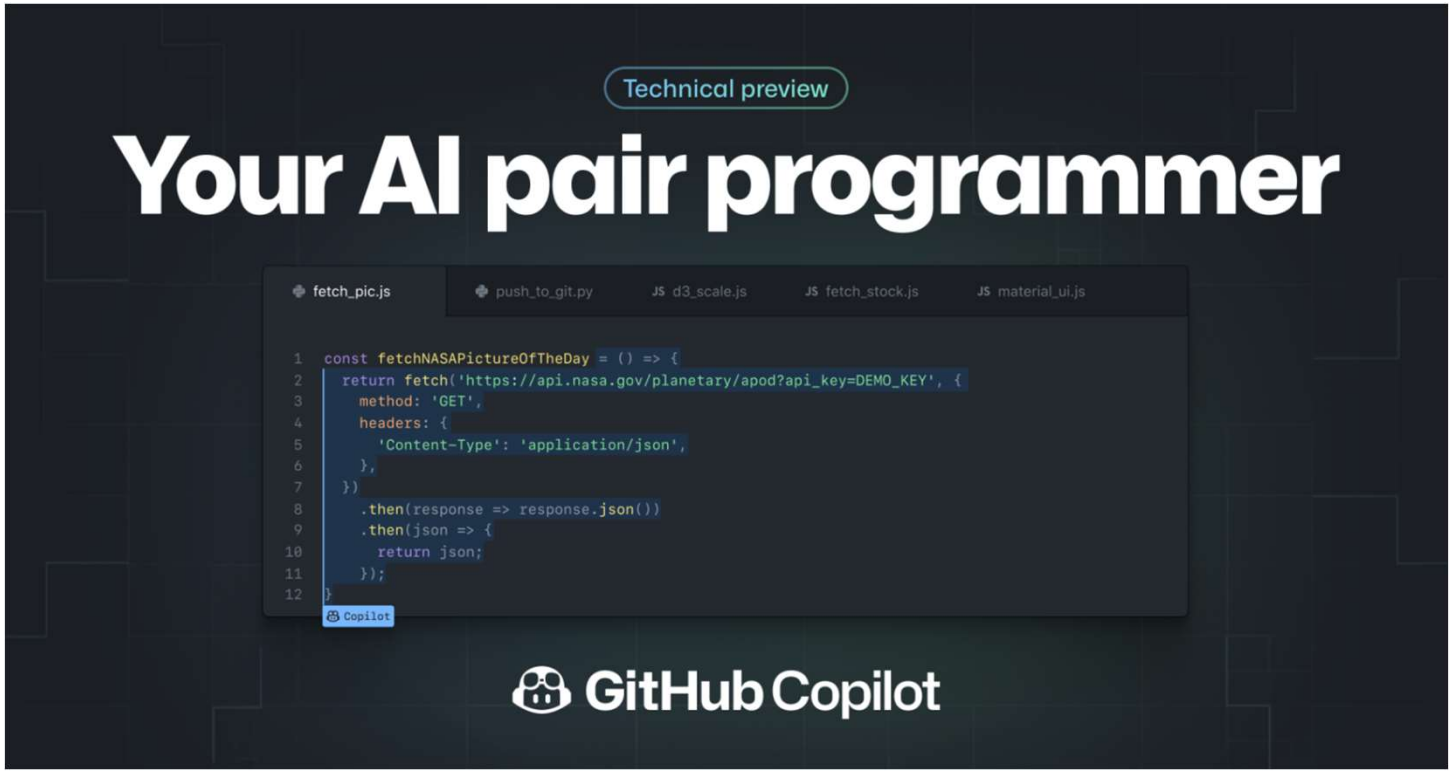
AI Writers – My Experience

I tried an AI text generator. I wrote the first two sentences of this, and the AI did the rest!

I never thought I'd find the perfect person. I finally did in the most unexpected way. I met a woman who had experienced fertility issues with her mother. This woman was beautiful and funny and smart. She was a stay at home mom who was always trying to do more. Her mom was in her 30's and her dad was also in ...

Sassbook AI Writer | Versatile AI Text Generator

Software Code Helper



DALL-E and other Text-to-Image Tools

- Text-to-image tools like DALL-E 2 are trained by crawling and scraping the internet for content, some of which is copyrightable subject matter and trademarks.
- Getty Images has banned the upload and sale of illustrations generated using AI art tools like DALL-E.
- Shutterstock says it will provide compensation to artists whose works are used to train AI image-generating models.

Sponge Bob in Best Buy

Homer Simpson in Psycho

Spider Man in Ancient Rome

AI as a Tool for a Human Author

- A copyright registration was granted for a graphic novel using the commercial AI art generator Midjourney
- The Copyright Office recently indicated that the registration may be canceled.
- Applicant needs to show there is sufficient human authorship.
- The Copyright Office has the authority, under CFR 17 § 201.7, to cancel a registration after giving a claimant 30 days to defend their registration.

Music

- Beatles song "Daddy's Car" (created with authorization of Sony)

  - This is one type of example of a Deepfake

Deepfakes

Copyright Infringement – The Fair Use Factors

In determining whether the use made of a work in any particular case is a fair use, the factors to be considered shall include:

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
4. the effect of the use upon the potential market for or value of the copyrighted work.

17 U.S.C. § 107.

Fair Use: Key Considerations

Weighs in Favor	Weighs Against
• Adds value by using the original work as raw material for creation of new work or information • Not a substitute for the original • No ready market or means to pay for the use • Widespread use would not negatively impact the potential market for the original or derivative works	• Is a substitute for the original / derivative • There is an existing market or means to pay for the use • Widespread use would substantially impact market for the original or derivative works • Uses more of the work than reasonable for the purpose

Do unauthorized AI uses infringe?

Probably Not	Probably Yes
OUTPUT:" [T]o the extent that a work is produced with a machine learning tool that was trained on a large number of copyrighted works, the degree of copying with respect to any given work is likely to be, at most, *de minimis*." EFF	OUTPUT: "[I]f a developer uses copyrighted content as training data in a GAN without authorization and markets a resulting tool that enables the creation of synthetic content, liability should be assigned to him or her. In addition, if a user of that unauthorized tool then creates synthetic content with it, such content would also be unauthorized and there should be liability assigned to that user as well." – Getty Images

Fair Use Cases Likely to be Considered in AI Cases 1

A.V. ex rel. Vanderhye v. iParadigms, LLC, 562 F.3d 630 (4th Cir. 2009)

- **Fair Use**: Commercial plagiarism-screening service converted student papers into digital code for use in a database to compare the similarity of typewritten characters used in other student works. The Fourth Circuit held that such use was a "highly transformative" fair use because its use of the "works was completely unrelated to expressive content and was instead aimed at detecting and discouraging plagiarism"

Google Books, 804 F.3d 202 (2d Cir. 2015)

- **Fair Use**: "Complete unchanged copying . . . justified as fair use when the copying was reasonably appropriate to achieve the copier's transformative purpose and was done in such a manner that it did not offer a competing substitute for the original." Here, the purpose was "to provide a search function," which the court viewed as "a transformative use, which augments public knowledge by making available information about [] books without providing the public with a substantial substitute for [] the original works or derivatives of them"

Authors Guild, Inc. v. HathiTrust, 755 F.3d 87 (2d Cir. 2014)

- **Fair Use**: "Without foreclosing a future claim based on circumstances not now predictable, . . . we conclude that . . .fair use allows . . . Libraries to digitize copyrighted works for the purpose of permitting full-text searches."

Image Search Cases (Perfect 10, Inc. v. Amazon.com, Inc. (and Google), 508 F.3d 1146 (9th Cir. 2007) and Kelly v. Arriba Soft Corporation 336 F.3d 811 (9th Cir. 2003))??

Fair Use Cases Likely to be Considered in AI Cases 2

Fox News Network, LLC v. TvEyes, Inc., 883 F.3d 169 (2d Cir.), cert. denied, 139 S. Ct. 595 (2018)

- **Not Fair Use**: Company recorded TV programming to create searchable database, which allowed customer to watch up to 10 minutes of the selected programs. Even though use was "somewhat transformative" in making access more efficient – it was not fair use because it did not alter the content itself or the purpose for which it was used – and content owners were entitled to license such use.

The Andy Warhol Foundation v Goldsmith (2d Cir. March 2021)

At Supreme Court now!

- **Not Fair Use**: In this important case, the Second Circuit held that not all transformative works can be fair use as that would eviscerate the copyright owner's exclusive right to control derivative works. The court held that Warhol's use of photographs of Prince was not "transformative". The court said that to be transformative, the secondary use must be "fundamentally different and new". Oral argument at the Supreme Court occurred earlier in October.

Machine Learning, Big Data and Database Protection

- Machine Learning (ML) is a subset of AI techniques which use statistical methods to enable machines to improve with experience based on "training" from many examples (or Big Data) in databases
- A database is protectable under U.S. copyright law as a "compilation" if the factual information has been "selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship." 17 U.S.C. § 101
- *Feist Publications, Inc. v. Rural Telephone Service Co.*, 499 U.S. 340 (1991)
  - "[E]ven a directory that contains absolutely no protectible [sic] written expression, only facts, meets the constitutional minimum for copyright protection if it features an original selection or arrangement," i.e., the author "chooses which facts to include, in what order to place them, and how to arrange the collected data so that they may be used effectively by readers."
  - The Copyright Act does "not permit the 'sweat of the brow' approach."
- No omnibus U.S. federal database protection law

Planner 5D v Meta (Facebook) – Copying for Machine Learning Purposes

- Planner 5D v Meta (Facebook) et al (consolidated cases Northern District of California)
  - Planner 5D alleged that Facebook, Princeton and other institutions copied, misappropriated and shared a very large dataset of room-decoration objects and scenes for machine learning purposes
  - The Copyright Office and the court found defects in Planner 5D's copyright applications
  - The copyright claims were twice dismissed, but Planner 5D brought amended copyright claims
  - Planner 5D sought reconsideration of the Copyright Office refusal of its applications
  - Defendants argued that the copyright claims should be dismissed (again) pending Copyright Office reconsideration
  - The court disagreed and permitted Planner 5D's copyright case to proceed. Trial is set for March 2023.

Where is the US Government Today on AI?

USPTO

- **Should a work produced by an AI algorithm, without involvement of a natural person, be protected by copyright?**
- If human involvement is required, what kind of involvement should suffice?
- **Is current law clear enough about "ingesting large volumes of copyrighted material" for AI?**
- Does current law adequately address whether an AI created work infringes copyright?
- Should an entity other than a natural person own the copyright in an AI work?
- How does AI impact the need to protect databases? Are current laws adequate?
- What can we learn from the legal systems of other countries?

US Copyright Office

- "[T]he Office must adjust to changing technology when administering the U.S. copyright registration system. . . .
- **[T]he Office will only register original works of authorship created by a human being.**
- The increase in machine-created works layers new levels of complexity to the U.S. registration process. . . .
- **Policy-wise, the . . . appropriate use of copyright-protected works as input for training AI applications is still being developed in U.S. law . . . ."**

Can You Patent AI-Based Inventions?

David V. Sanker, Ph.D.

Morgan Lewis

Presentation Overview

1. Background in Artificial Intelligence
2. Patenting Inventions That Use AI
3. The Extra Hurdle Imposed Under § 101 (Alice)
4. Protection of Your Data Too

Background in Artificial Intelligence

- The term "Artificial Intelligence" is very broad, encompassing at least (i) Machine Learning, (ii) Natural Language Processing (NLP), (iii) Speech Recognition and Generation, and (iv) Image Recognition.
- Most inventions that use AI are using machine learning, so the presentation today focuses on machine learning.

Background in Artificial Intelligence

- For training a machine learning model, users must provide a structured set of training data.
- There are many different machine learning algorithms. These can generally be split into supervised training techniques and unsupervised training techniques.

Background in Artificial Intelligence

- Unsupervised learning is used for training data that has not been classified or labeled. The training process partitions the set of training data into groups of related elements.
- For example, if the training data is a set of people and the music they like, unsupervised learning can group together people who have similar music preferences, and thereby make music recommendations. In this example, neither the people nor the music preferences need to be labeled.

Background in Artificial Intelligence

- For supervised learning, the training data is classified or labeled by people before it is input into the machine learning algorithm.
- Using the labeled training data, the machine learning system learns how to classify according to the labels.

Background in Artificial Intelligence

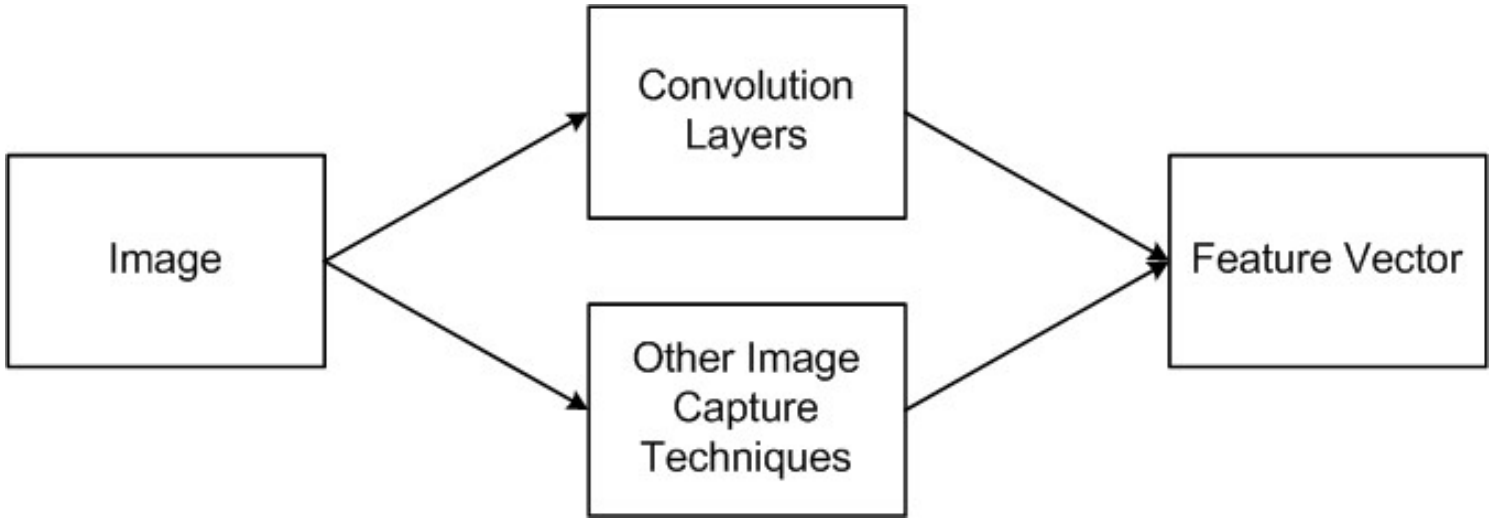
Example of Supervised Learning

features

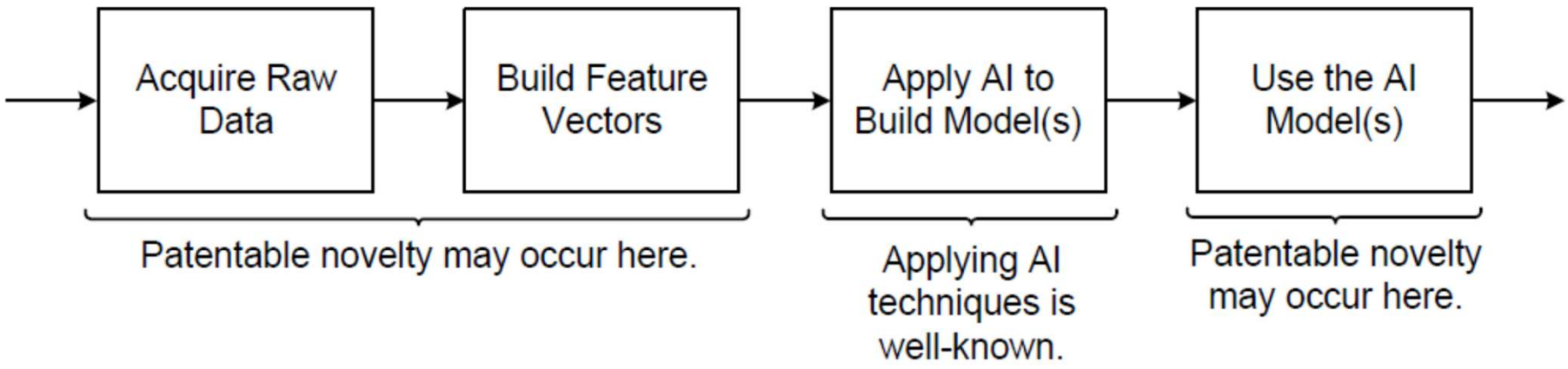
	Temp.	RBC Count	Headache	Gender			Has Disease X
Training Vector #1	[99.2	5.8	N	M	...	]	[N]
Training Vector #2	[100.3	5.8	N	F	...	]	[Y]
⋮	⋮	⋮	⋮	⋮	⋮		⋮

Background in Artificial Intelligence

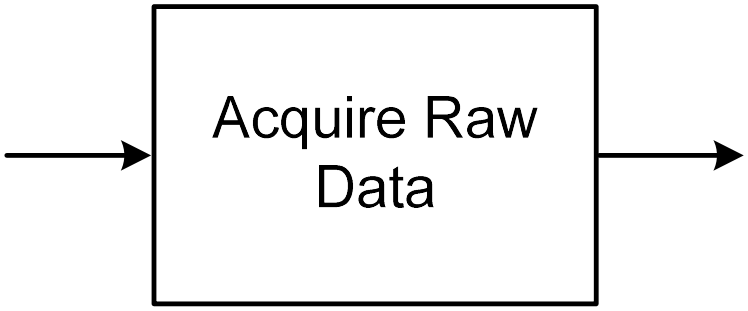
Supervised Learning with Images



Inventions That Use AI – Simplified Framework

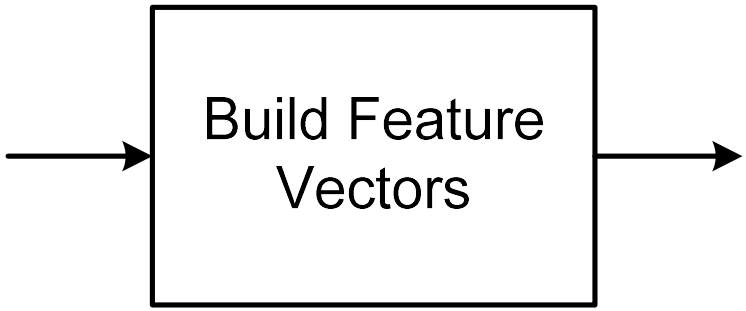


Inventions That Use AI – Simplified Framework



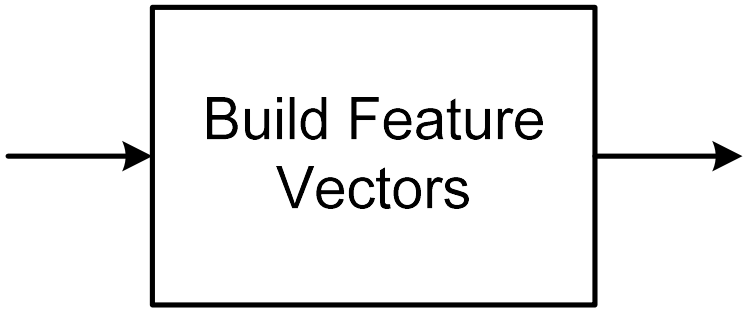
- Are any of the data elements new? New depends on context.
- Are any of new data elements non-obvious?

Inventions That Use AI – Simplified Framework



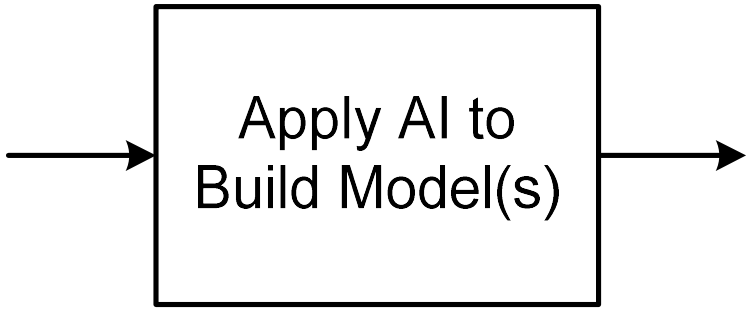
- Have the raw data elements been combined in new ways?
- Simple Boolean combinations of data elements can be handled by the AI engine, but there are many types of calculation that are beyond what current AI engines can do.

Inventions That Use AI – Simplified Framework



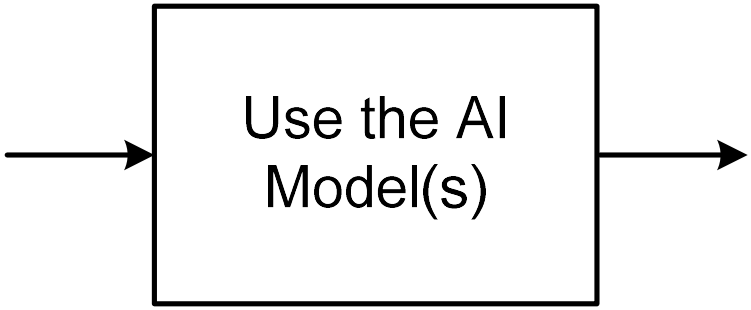
- Suppose the raw data values are r_1, r_2, r_3, …
- The simplest approach is to use these as the features: $f_1 = r_1$, $f_2 = r_2$, etc.
- But you can create more complex features, such as $(r_1 + r_2) / r_3$

Inventions That Use AI – Simplified Framework



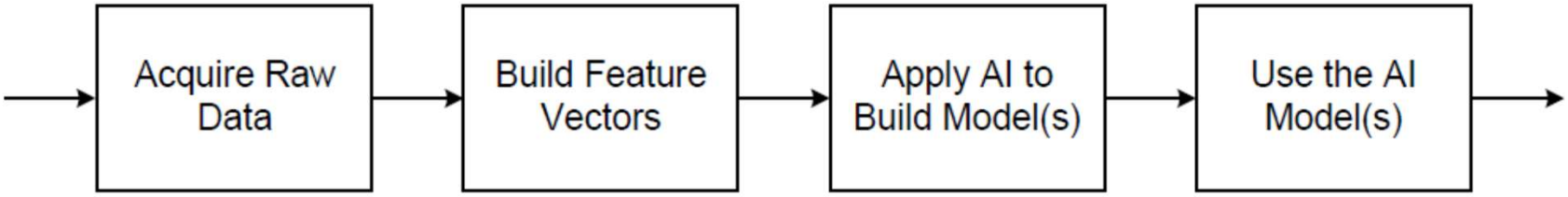
- Unless you have invented a new AI Algorithm (or a meaningful variation), this step does not affect patentability.

Inventions That Use AI – Simplified Framework



- After applying AI, do you use the output in a new way?
- For example, the AI output may be just one piece of data that is used as part of the determination of what action to take next.
- In some cases, the output of the AI is part of a novel User Interface.

Hypothetical Example #1 (Spam Filtering)



Use standard indicators of spam (e.g., domain of sender, existence and counts of certain keywords)

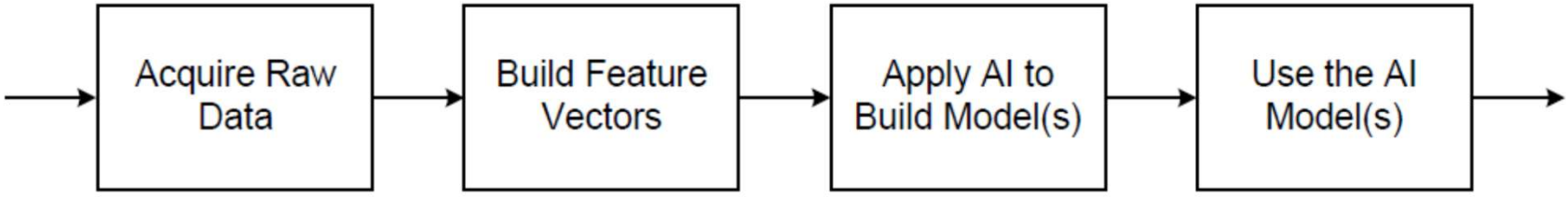
Use the data as collected

Apply standard AI

Designate new items as spam according to the model

Not Patentable.

Hypothetical Example #2 (Network Security)



Collect data at many nodes in the network, including source and destination of packets, as well as packet size, volume, and type

Probably not novel

Combine data from two or more nodes (e.g., data from nodes that have no direct link)

The unique combinations can create novelty

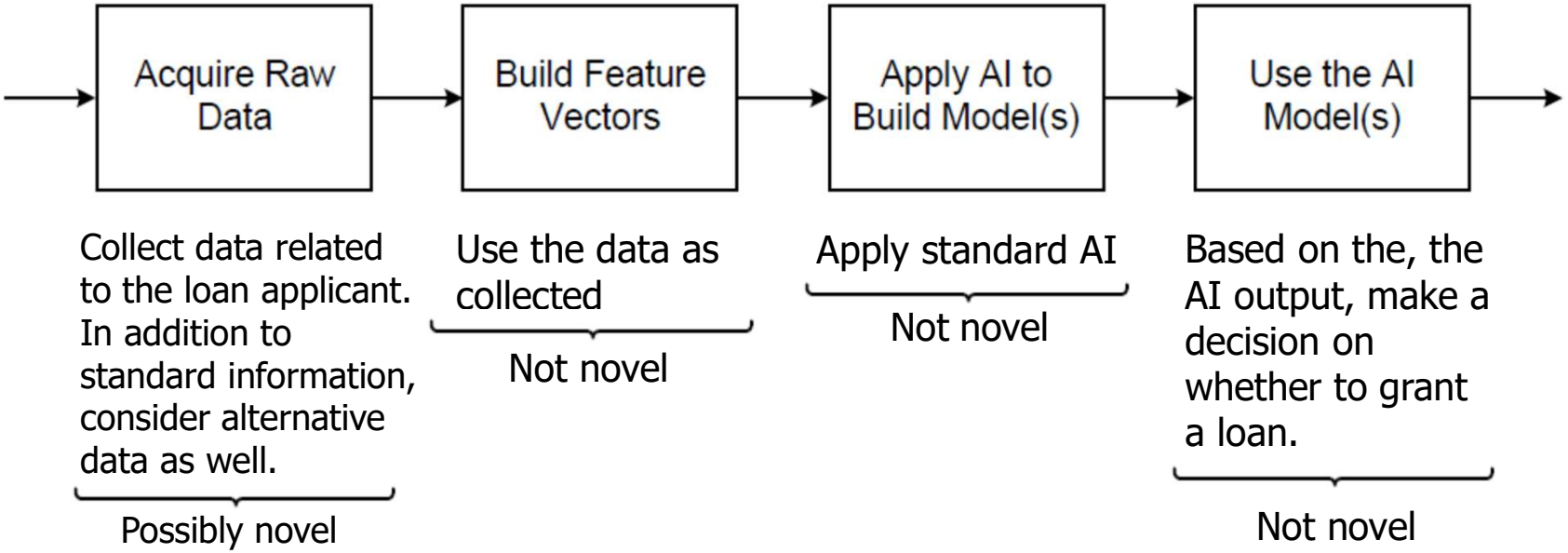
Apply standard AI

Not novel

Notify if intrusion suspected

Not novel

Hypothetical Example #3 (Loan Qualification)



Section 101 – Patent Eligibility

- This used to be a trivial hurdle
- Now, many inventions are being rejected for being allegedly directed to an "abstract idea"
- This type of rejection is particularly relevant to any invention that looks like a "business method" (e.g., Fintech)

Section 101 – Patent Eligibility Strategies

- A patent application itself should identify a technical problem, not a business problem.
- The patent application should provide substantial technical detail about how to solve the technical problem.
- As indicated in the simplified framework, you do not get any inventive credit for using a computer or using AI.

Section 101 – Patent Eligibility Strategies

- While working with a patent Examiner, focus on the technical problem and technical solution.
- If the patent Examiner fails to recognize the patent-eligible subject matter, use the appeal process.
- Work with a patent attorney who has experience with overcoming § 101 rejections. Unlike prior art rejections, rejections under § 101 are far more subjective. Technical expertise is not enough.

How About Protecting Your Data?

- A system that uses AI may not be patentable. It may be obvious what type of data to use, how to apply the AI, and how to use the output of the AI.
- As a practical matter, it may also be impossible to protect a system as a trade secret. If usage of the system allows users to see the inputs and outputs, the system is not very secret.

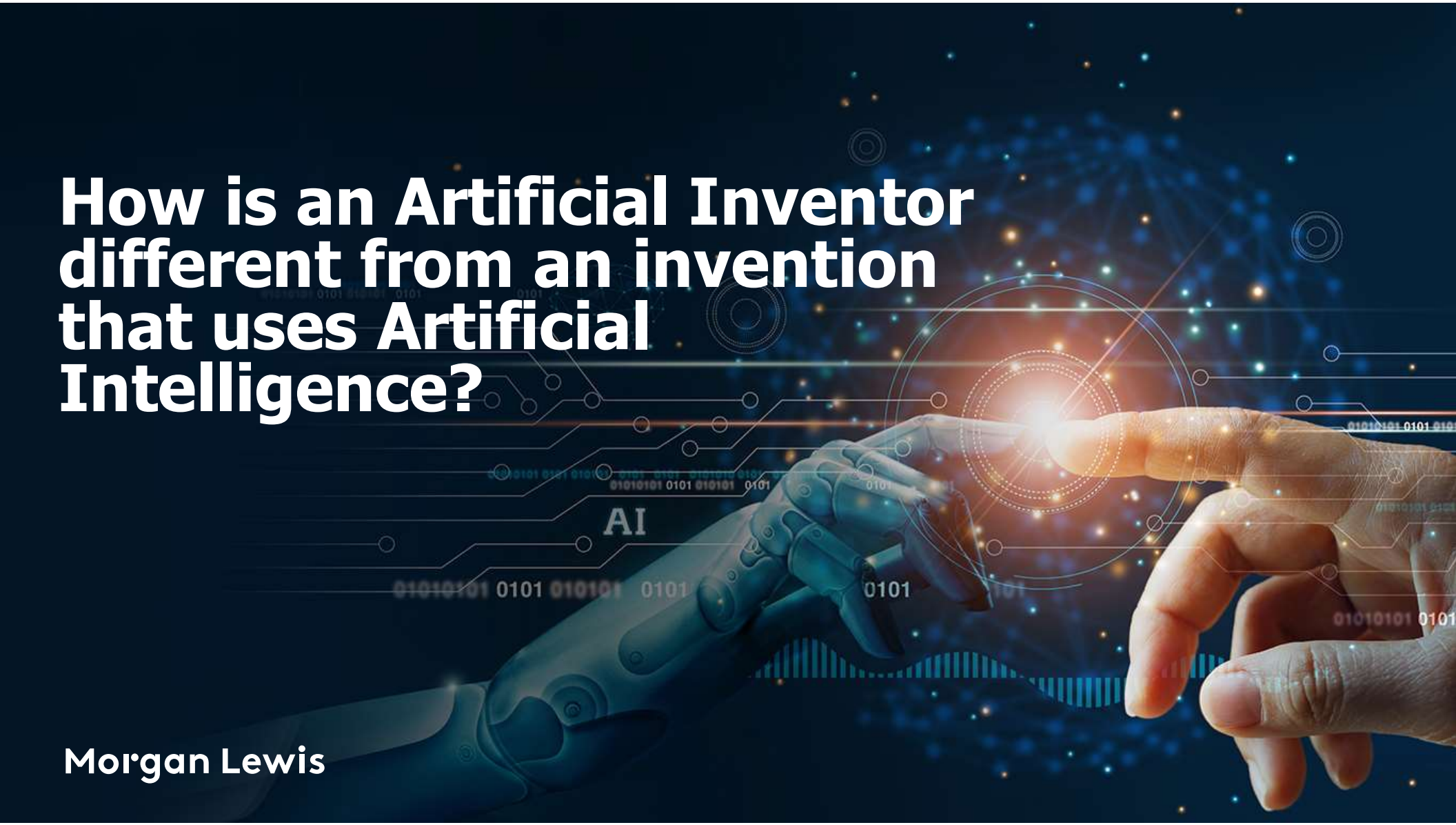
How About Protecting Data Instead of an Invention?

- In some cases, the best protection is to keep the training data as a Trade Secret.
- Protecting your training data is particularly important when there is substantial work in the first box of the framework. It may take a lot of time and effort to collect and/or classify the raw data.
- The training data is used to build the AI models, so the training data itself is not publicly visible during subsequent usage.
- The training data can be supplemented over time, giving you the opportunity to retrain the machine learning model. You can reuse your secret data.

How About Protecting Data Instead of an Invention?

- In some cases, you can keep the model data as a Trade Secret. A trained machine learning model is just a bunch of parameters.
- Protecting the model data is possible regardless of patentability and regardless of whether it is feasible to protect the process as a trade secret.
- One downside risk is reverse engineering the data for the AI models using enough "black box" testing.

How is an Artificial Inventor different from an invention that uses Artificial Intelligence?



Morgan Lewis

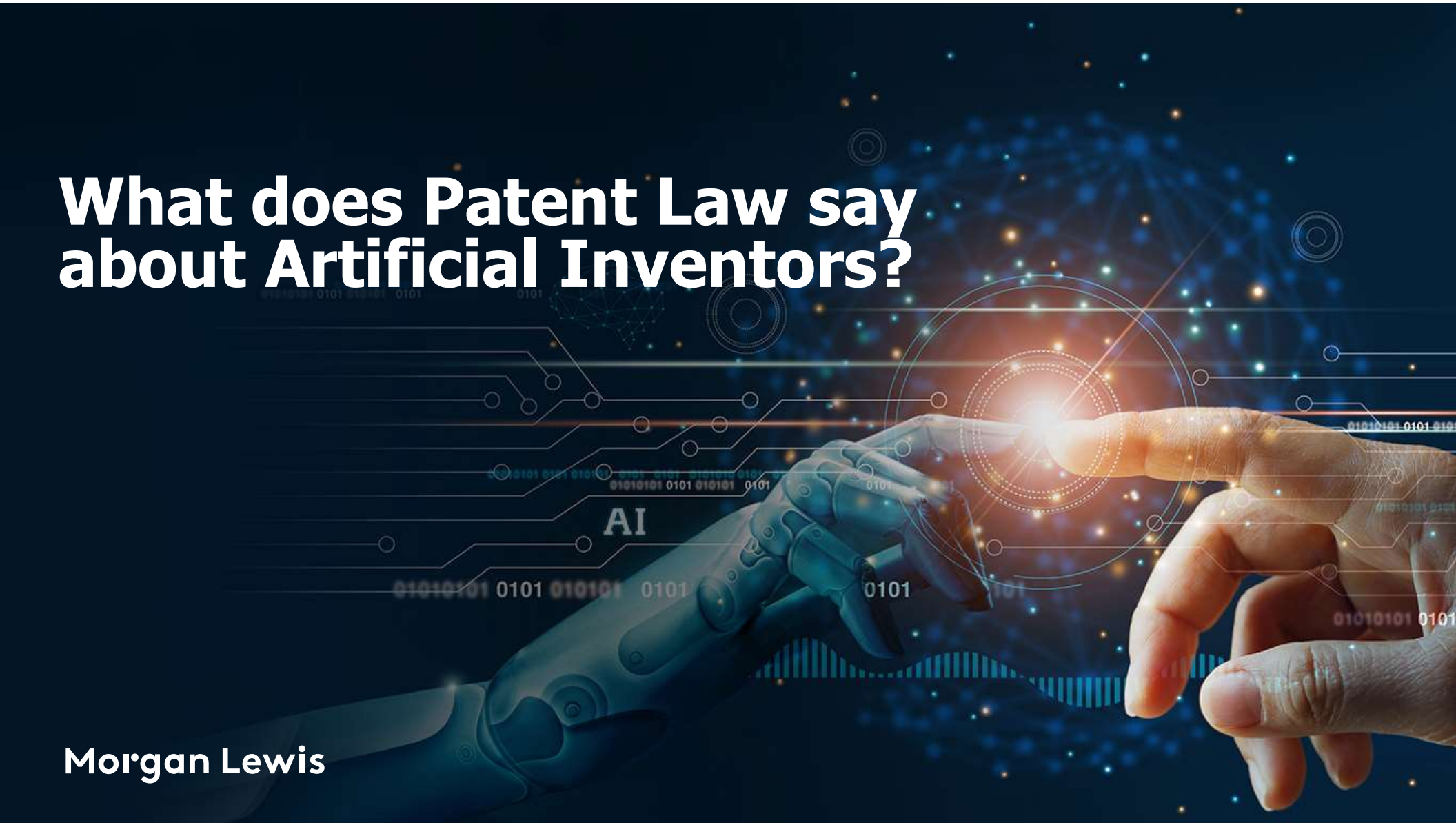
Artificial Inventors

- An AI Inventor (or "Artificial Inventor") is a complex system that autonomously creates a new process, device, system, or composition of matter.
- An Artificial Inventor is generally designed to handle a specific category of inventions, and usually has a set of input parameters that are user-specified.
- An Artificial Inventor generally works iteratively, with each iteration evolving from the previous iterations and testing the current version.

Artificial Inventors – Example #1

- I want an alloy material constructed from a specific set of elements, and I can specify various properties I want, such as tensile strength in a certain dimension, a maximum density, maximum cost, or torsional capacity around a certain axis. I may also specify shape characteristics.
- Today there already exist systems that can do this and provide the details of the material it invented. In addition to the specific component elements, the system specifies a lattice structure for how the elements are joined together, and a manufacturing plan.

What does Patent Law say about Artificial Inventors?



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Artificial Inventors in the United States

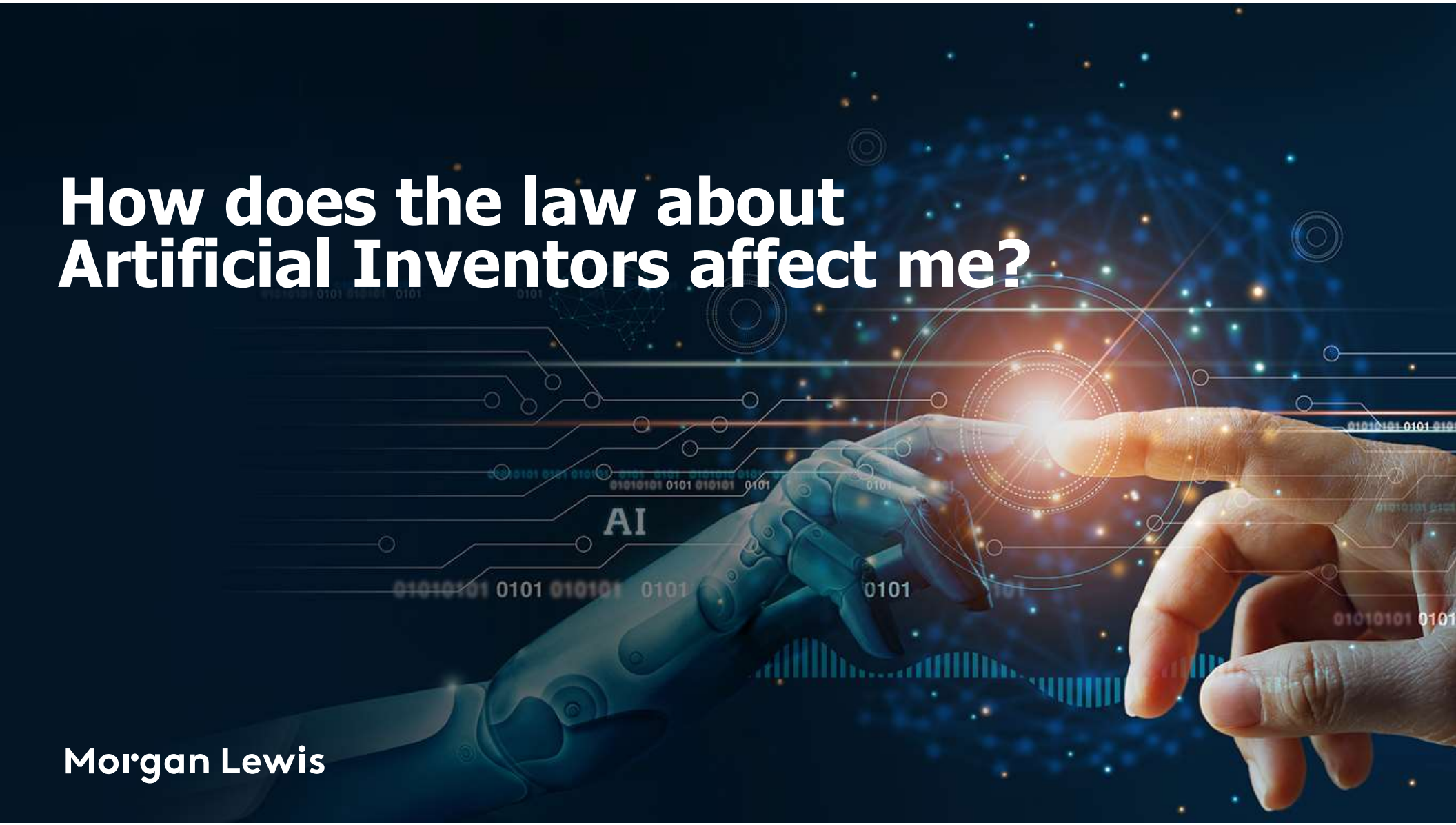
1. Inventors must be people:
   - 35 U.S.C. § 100: (f)The term "inventor" means the **individual** or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.
   - 35 U.S.C. § 101: **Whoever** invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Legal Issues with Artificial Inventors

- There are many more examples that illustrate why Artificial Inventors is a non-trivial issue.

- I have suggested an adaption of patent laws in my earlier articles. A human surrogate signs assignment and declaration documents on behalf of an AI inventor, helping clarify a chain of title of the invention from the initial creation to the applicant (the human surrogate may or may not be the applicant). Like current declarations in the United States, the human surrogate is subject to criminal penalties for perjury. (This also encourages the development of AI systems that are transparent and auditable.)

How does the law about Artificial Inventors affect me?



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Hypothetical Litigation in 5 – 10 years

- A pharmaceutical company uses an AI system for new drug discovery. The AI system spends months to sort through hundreds of millions of possible drugs and identifies a dozen that meet the specified parameters. In accordance with all government regulations, the company follows the standard protocol for testing the 12 possible drugs (e.g., in vitro, then animals, then human). Assume that some of the dozen are discarded at various stages, and two are tested in humans. One of them is fantastic, and the company files for patents throughout the world.

Hypothetical Litigation in 5 – 10 years

- A few years after the patents issue, the company discovers a competitor has copied their fabulous new drug and sues for $500M.
- The defendant argues that the patents are invalid because the only actual "inventor" was the AI system, and AI inventors are not allowed.

Hypothetical Litigation in 5 – 10 years

- The defendant's arguments:
  - The actual invention was created by the months of work by the AI system.
  - The remainder of the testing was just standard work that ordinary technicians performed. None of the identified human inventors actually contributed to finding the drug.
  - Adhering to government regulations was not inventive.

Hypothetical Litigation in 5 – 10 years

- Some possible arguments for the plaintiff:
  - Human research scientists eliminated half of the potential drugs based on their microscopic analysis of the potential drugs.
  - Human research scientists had to develop a special line of mutant mice in order to test key aspects of how the drugs operated.
  - After selecting the best drug out of the 12 candidates, research scientists discovered a way to alter the structure slightly so that it was better in some way (e.g., more effective or better tolerated).

Protection of inventions created by Artificial Inventors

1. If patent protection is needed, make sure that the inventive process has at least one meaningful human inventor (like the plaintiff in the hypothetical). Using AI systems to invent is going to become increasingly necessary in order to be competitive, so design development processes up front to include some people.

2. If an Artificial Inventor creates a tangible product, it is generally necessary to protect that product with a patent. However, if an AI system generates software, consider Trade Secret protection. This can be particularly effective if the software is running in the cloud, where it is much more difficult to reverse engineer.

Coronavirus COVID-19 Resources

We have formed a multidisciplinary **Coronavirus/COVID-19 Task Force** to help guide clients through the broad scope of legal issues brought on by this public health challenge.

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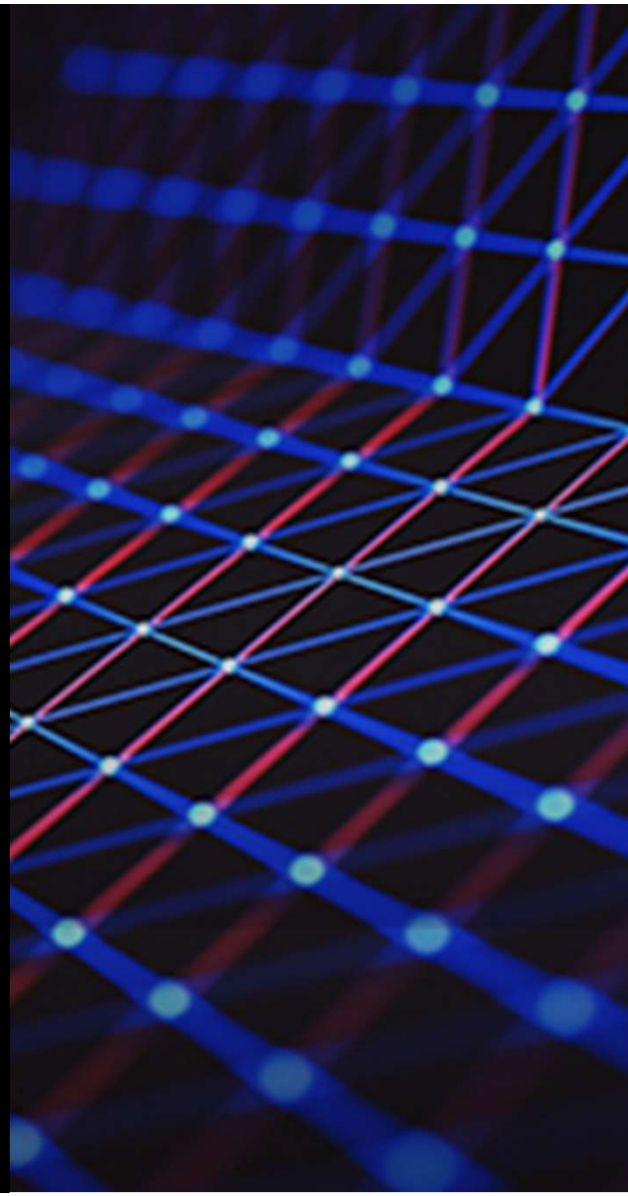
To help keep you on top of developments as they unfold, we also have launched a resource page on our website at **www.morganlewis.com/topics/coronavirus-covid-19**

If you would like to receive a daily digest of all new updates to the page, please visit the resource page to **subscribe** using the purple "Stay Up to Date" button.



Biography

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Ron N. Dreben advises clients on intellectual property and technology issues in business transactions. Ron provides advice in connection with mergers, acquisitions, and licensing arrangements, as well as trademark, copyright, trade secret, and related IP law. A certified information privacy professional (CIPP), Ron helps companies assess privacy and information security issues. Recently, he has written on nonfungible tokens (NFTs), copyright, and diligence, and spoken on artificial intelligence and copyright, including authorship of AI developments, machine learning database issues, and challenges presented by deep fakes.

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Drawing on 12 years of experience in software development and database architecture, David V. Sanker, Ph.D., works with clients to build strong patent portfolios in a variety of areas, including artificial intelligence (AI), machine learning, natural language processing, data visualization software, large-scale database architecture and storage infrastructure, data analytics software, and touchscreen technology. As AI tools have become widely available, inventions that use AI have become an increasing portion of his work, including inventions in industrial automation and life sciences.

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Serving as the leader of the firm's semiconductor practice and as a member of the firm's fintech and technology industry teams, Andrew J. Gray IV concentrates his practice on intellectual property litigation and prosecution and on strategic IP counseling. Andrew advises both established companies and startups on AI, machine learning, Blockchain, cryptocurrency, computer, and Internet law issues, financing and transactional matters that involve technology firms, and the sale and licensing of technology. He represents clients in patent, trademark, copyright, and trade secret cases before state and federal trial and appellate courts throughout the United States, before the US Patent and Trademark Office's Patent Trial and Appeal Board, and before the US International Trade Commission.

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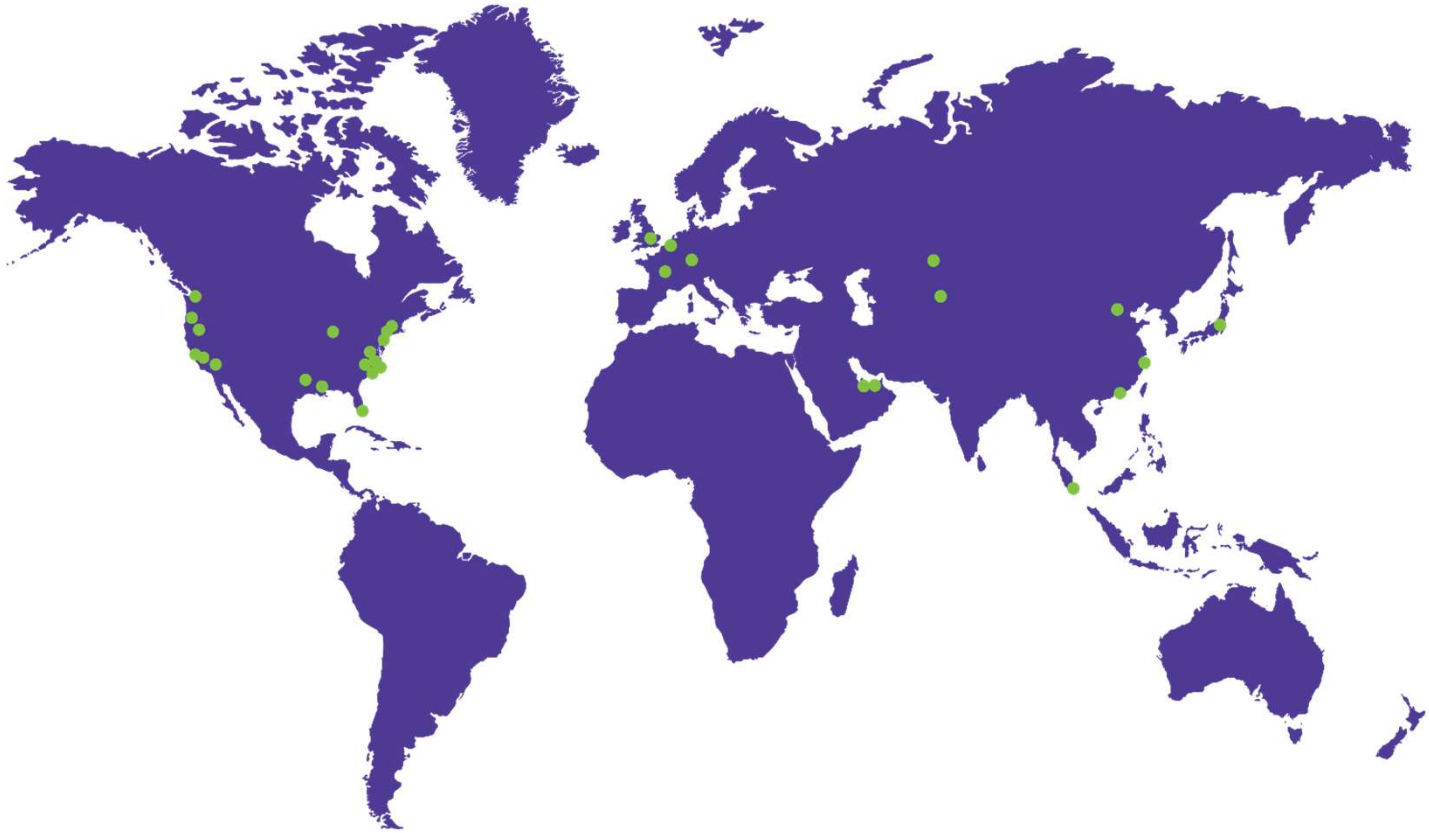

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THANK YOU