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EU Guidelines for Patenting AI and Machine Learning Technologies: Comparison With U.S. Approach

Navigating EPO and USPTO Rules to Maximize Patent Protection

WEDNESDAY, FEBRUARY 5, 2020

1pm Eastern | 12pm Central | 11am Mountain | 10am Pacific

Today's faculty features:

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Finnegan, Henderson, Farabow, Garrett & Dunner, LLP

EU and US Guidelines for Patenting AI and Machine Learning Technologies: Navigating the EPO and USPTO to Maximize Patent Protection

February 5, 2020

Presented by
Susan Y. Tull and Aliza George Carrano

Overview

- Growth of patent protection for AI and ML in the U.S. and EU
- EU and PTO Guidelines
- Comparison of EU Guidelines with current U.S. patent law
- Maximizing patent protection in the U.S. and EU
- Data rights and privacy concerns with AI

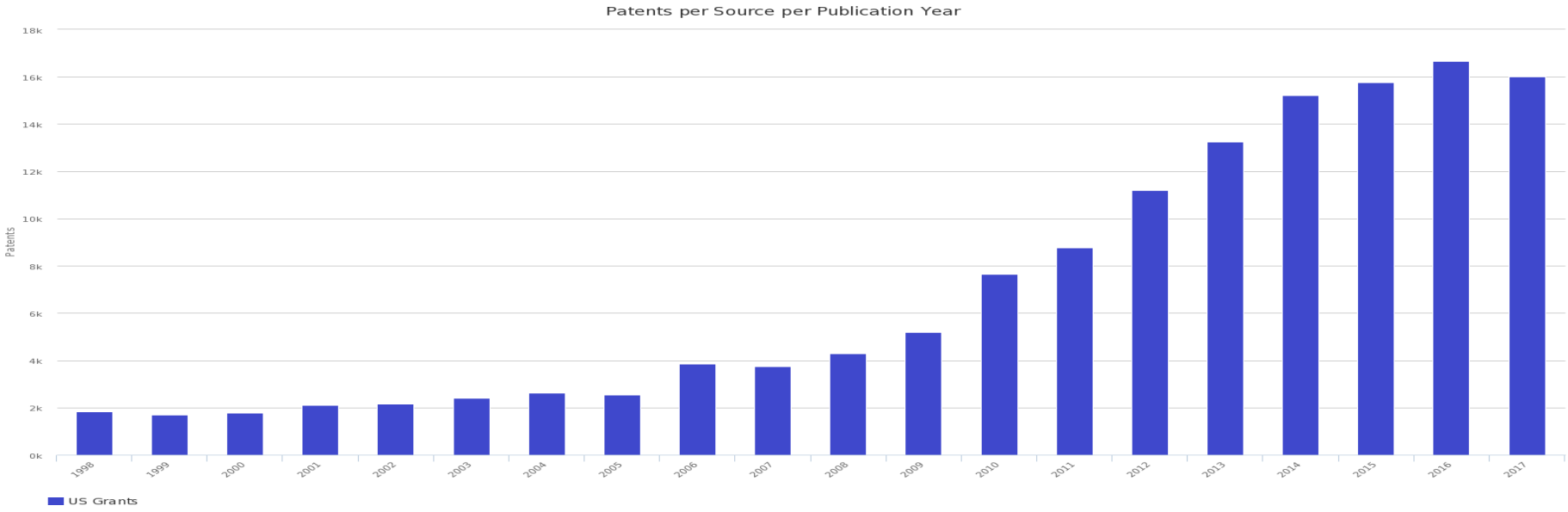
GROWTH OF PATENT PROTECTION FOR AI AND ML IN THE U.S. AND EU

AI Resurgence

- The accelerating growth of enabling technologies is driving AI development:
  - Powerful computing and wide availability of GPUs
  - Availability of practically infinite storage and a flood of data, i.e, “Big Data”
  - Development of smart algorithms
  - Advancements in sensor technology (e.g., image and voice)
- Increased need to identify patterns with large volumes of business data

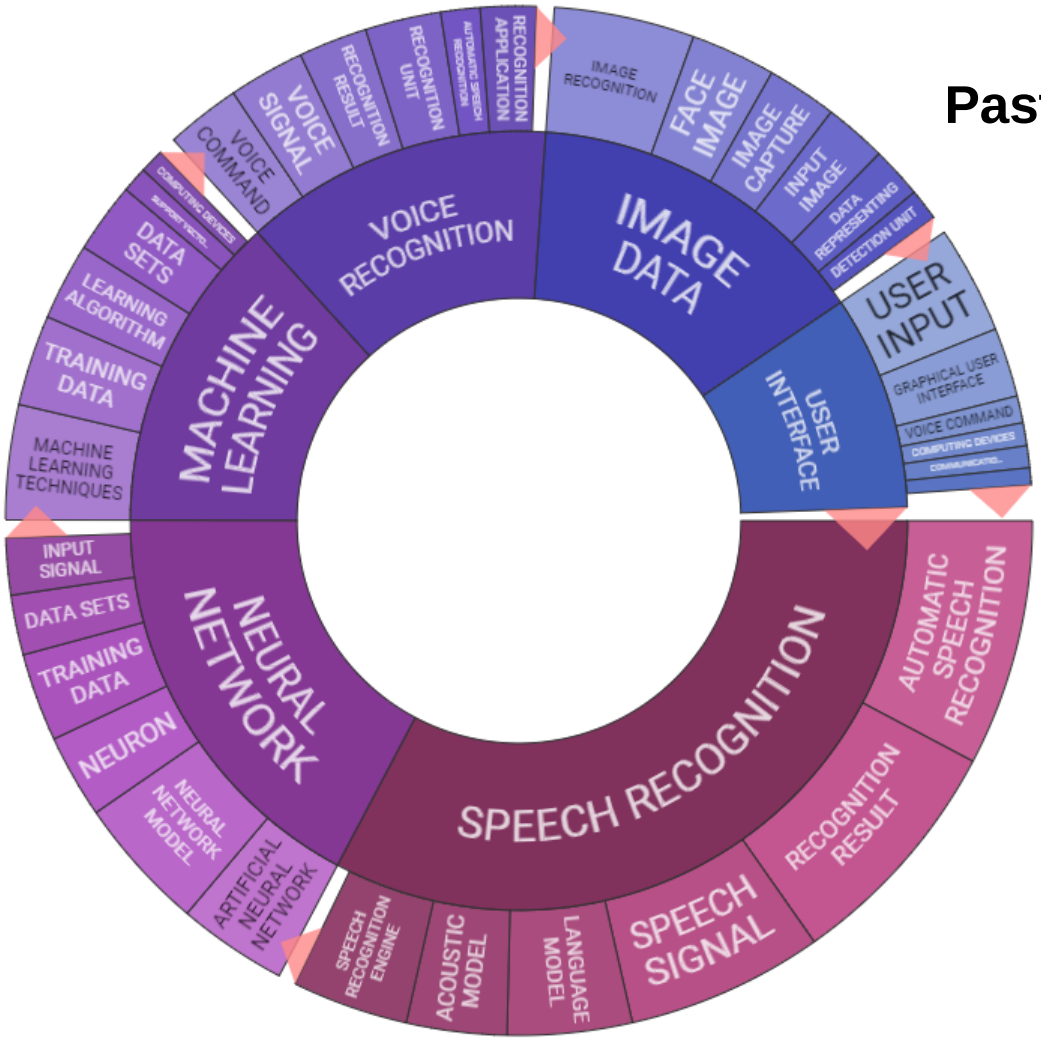
Growth of Patent Protection for AI in the U.S.

U.S. Patent Grants for AI (20 Years)



AI Patents - Keyword Clustering

U.S. Patents Grants for AI
Past 10 Yrs (Jan 2007 – Oct 2017)



EU PATENT PROSECUTION GUIDELINES

Patentability in the EU

- There are four basic requirements for patentability:
  i. there must be an “invention”, belonging to any field of technology;

  ii. the invention must be “susceptible of industrial application”;

  iii. the invention must be “new”;

  iv. the invention must involve an “inventive step”.

Art. 52(1)

What is an “invention”?

- The EPC contains a non-exhaustive list of things that are not inventions (Art. 52(2)):
  - Discoveries
  - Scientific theories
  - Mathematical methods
  - Aesthetic creations
  - Schemes, rules and methods for performing mental acts, playing games or doing business
  - Programs for computers
  - Presentations of information

November 1, 2018 EPO Guidelines on AI

EPO updated Guidelines for Examination to provide specific guidance on AI

- Inserted under Guidelines addressing mathematical models
  - AI and machine learning are largely unpatentable and are *per se* “of an abstract mathematical nature”
  - EPO will look very closely at whether claimed subject matter has a technical character as a whole because expressions such as “neural network” and “reasoning machine” usually refer to abstract models

Section 3.3.1 of Part G

November 1, 2018 EPO Guidelines on AI

- The application of the field of technology of the AI will determine whether invention has a technical character
  - use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats = TECHNICAL CONTRIBUTION
  - Classifying abstract data records or even "telecommunication network data records" without any indication of a technical use being made of the resulting classification = NOT TECHNICAL PURPOSE

US PATENT PROSECUTION GUIDELINES

What Can Be Patented in the U.S.

- System Architecture (neural network; expert/knowledge system)
- Data Processing (problem solving; reasoning; planning; discovery)
- Learning/Training (machine/deep learning; back propagation; supervised/unsupervised)
- AI-Embodied Apparatus or Method (autonomous vehicles; smart home/IoT devices; security/fraud prevention; virtual personal assistants)

Patent Eligible Subject Matter in the U.S.

- To be eligible for a patent, the subject matter of the claim must be directed to a process, machine, manufacture, or composition of matter. *See* 35 U.S.C. §101.

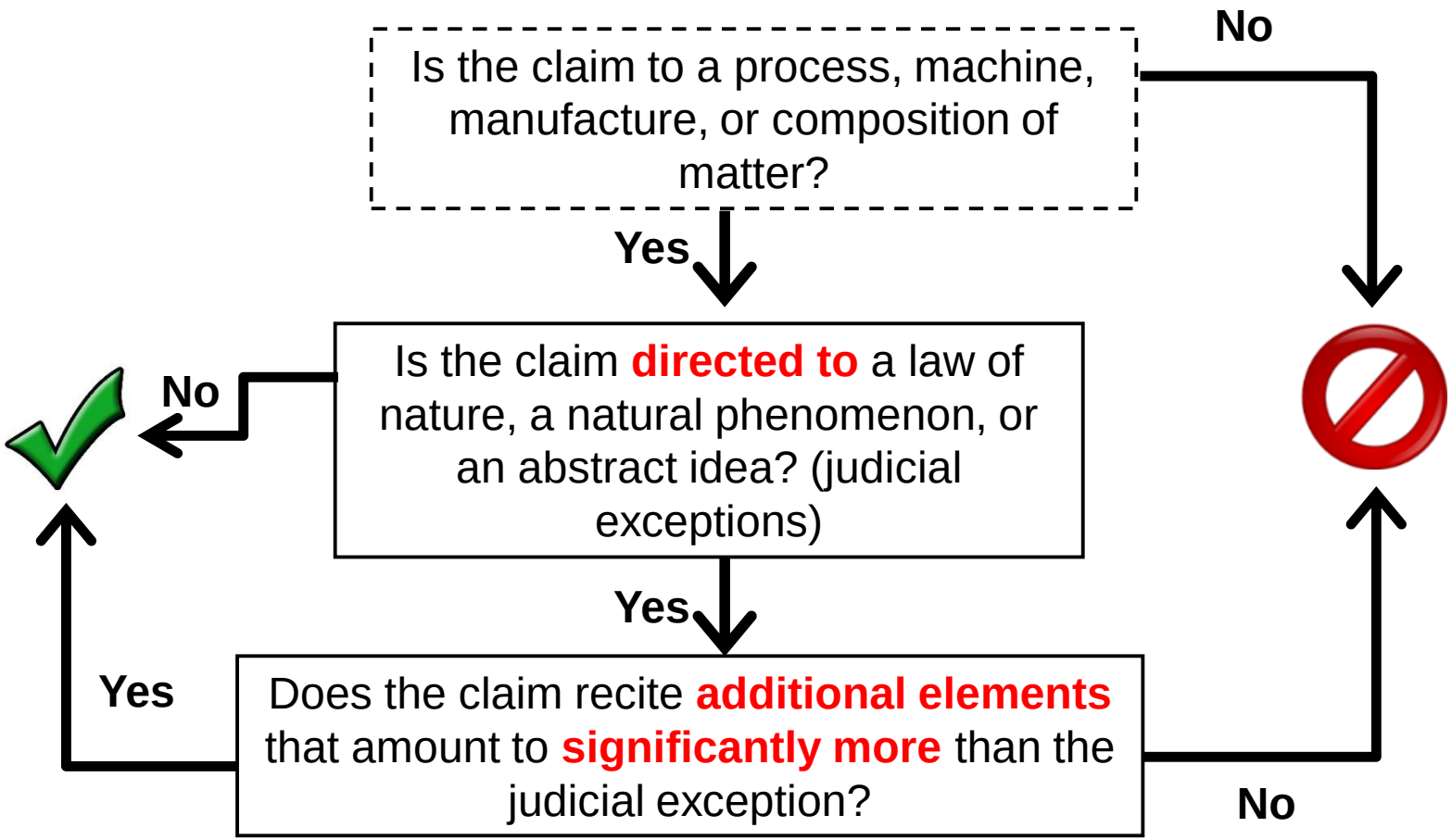
- **<u>Judicial Exceptions to Patent Eligibility</u>**
  - Abstract ideas (e.g., mathematical algorithms)
  - Laws of nature
  - Natural phenomena

Alice Corp. v. CLS Bank International, 34 S. Ct. 2347 (2014)

- A court must ***first*** "determine whether the claims at issue are ***directed to*** a ***patent-ineligible concept***." 134 S. Ct. at 2355.

- If so, the court must ***then "examine the elements of the claim to determine whether [they contain] an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application."*** *Id.* at 2357 (quoting *Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1298 (2012)).
  - This inventive concept must do more than simply recite "well-understood, routine, conventional activity." *Id* at 2359.

Alice/Mayo Test



January 7, 2019 USPTO Guidelines on § 101

Revised first step of examination procedure under *Alice*/*Mayo*:

- Provided groupings of subject matter that are abstract
  - **Mathematical concepts** - mathematical relationships, mathematical formulas or equations, mathematical calculations
  - **Certain methods of organizing human activity** – includes commercial or legal activity, marketing, managing personal relationships
  - **Mental processes** – concepts performed in the human mind (including an observation, evaluation, judgment, opinion)
- If claim does not recite subject matter that falls within one of these groupings, typically does not recite abstract idea

January 7, 2019 USPTO Guidelines

Revised first step of examination procedure under *Alice*/*Mayo*:

- Clarified that claim is not "directed to" a judicial exception if the judicial exception is ***integrated into a practical application*** of that exception
  - "A claim that integrates a judicial exception into a practical application will apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception"
  - Provides examples of what it means to integrate a judicial exception into a practical application

Examples Provided by USPTO

Example 39

A computer-implemented method of training a neural network for facial detection comprising:

collecting a set of digital facial images from a database;

applying one or more transformations to each digital facial image including mirroring, rotating, smoothing, or contrast reduction to create a modified set of digital facial images;

creating a first training set comprising the collected set of digital facial images, the modified set of digital facial images, and a set of digital non-facial images;

training the neural network in a first stage using the first training set;

creating a second training set for a second stage of training comprising the first training set and digital non-facial images that are incorrectly detected as facial images after the first stage of training; and

training the neural network in a second stage using the second training set.

Examples Provided by USPTO

Example 42

A method comprising:

a) storing information in a standardized format about a patient's condition in a plurality of network-based non-transitory storage devices having a collection of medical records stored thereon;

b) providing remote access to users over a network so any one of the users can update the information about the patient's condition in the collection of medical records in real time through a graphical user interface, wherein the one of the users provides the updated information in a non-standardized format dependent on the hardware and software platform used by the one of the users;

c) converting, by a content server, the non-standardized updated information into the standardized format,

d) storing the standardized updated information about the patient's condition in the collection of medical records in the standardized format;

e) automatically generating a message containing the updated information about the patient's condition by the content server whenever updated information has been stored; and

f) transmitting the message to all of the users over the computer network in real time, so that each user has immediate access to up-to-date patient information.

Example *Alice* § 101 Rejection

The courts have noted that "collecting information, analyzing it, and displaying certain results of the collection and analysis" is a method of organizing human activity, and is thus an abstract idea (Electric Power Group). The claim discloses comparable judicial exceptions such as collecting information

- Is AI's goal to replicate human activity?

Takeaways For Overcoming Section 101 Challenges

- A non-conventional arrangement of generic, conventional pieces is patent eligible
- Use of a mathematical equation in a claimed method or system does not make the claim abstract
  - But as in *Diehr* and *Thales*, claim must include other non-generic elements
- Consider the claim elements individually and “as a whole” when arguing non-conventionality
- Argue that claimed method or system improves prior art technology or improves the functionality of the generic computer

USPTO Examination Statistics In View of *Alice*

- 36,000+ published apps rejected based on *Alice*, with 5,000+ apps becoming abandoned[1]

Tech Center	101 Rejections Before Alice (2014)	% of 101 Rejections After Alice (July 2016)
1600 Biotech & Chemistry	11%	10%
2100 Computer Engineering	14%	11%
2400 Networks & Video	9%	14%
2600 Communications	7%	8%
2800 IC, Electrical, Optical	2%	3%
3600 Business Methods	12%	25% (but in e-commerce is 85+%)

[1]Source: Bilski Blog (http://www.bilskiblog.com/blog/2016/06/two-years-after-alice-a-survey-of-the-impact-of-a-minor-case-part-2.html)

MAXIMIZING PATENT PROTECTION IN THE U.S. AND EU

Coordinating Patent Drafting

- Collaboration between U.S. and EP attorneys **during drafting** can avoid problems during prosecution
- Best to collaborate before U.S. first filing to ensure EP application is entitled to priority date

Avoiding Patent Eligibility Problems

Joint drafting techniques

- Direct applications away from problematic technology centers/classes
- Avoid business-method related terminology
- Emphasize technical advantages

Drafting techniques for the USPTO

- Evaluate the USPTO guidelines and court decisions for framing the application

Drafting techniques for the EPO

- Mention technical problem solved and technical effects
- Make sure classification of invention avoids pure machine learning or AI

U.S. Application Drafting Strategies

- Recite specific elements and/or ordered combination; focus on technological solution or aspects
  - Avoid terminology that reads on mental thoughts

OK	Better
"determining a crash occurrence"	*"analyzing sensor data to determine if received sensor value exceeds a deceleration threshold "*

U.S. Application Drafting Strategies

Claims

- Recite more than conventional computer processing steps or functions
- Claim application or use of data, not just generation
- Include implementation details in claims
- Consider means-plus-function claiming if novelty is in the algorithm
- Consider drafting claims as a computer-readable medium
- Consider using different types of claims, e.g., CRM claims, method claims, functional claims

U.S. Application Drafting Strategies

Specification

- Focus specification on technical aspects of invention
- Identify problems in the art and explain the invention's specific improvements over the prior art
- Avoid characterizing any claim elements as conventional, routine, or commercially available
- Avoid using overly abstract language to describe invention
- If the individual steps are "well known," then emphasize that the combination of these steps (i.e., the claimed process) is far from routine and conventional

AI Challenges Based on Subject Matter

At the USPTO

- Section 101 rejections more common
- Greater scrutiny on functional claiming
- Higher standard for obviousness

At the EPO

- More objections that claims are “non-technical”
- Higher standard for inventive step
- Fewer office actions before oral proceedings

Now more than ever, what works at one patent office can work at the other

Other Issues to Consider Before U.S. Filing

Include multiple dependencies in the dependent claims (with a Preliminary Amendment)?

MPF elements

Remove the term “invention” from the application

File U.S. and EP applications around the same time?

Other Issues to Address Before EP Filing

Define all terms that may be considered unclear

Provide different levels of generalisation

- e.g. *biasing member → spring → helical spring*

Consider adding means-plus-function language

Mention technical problem and technical advantages

Add multiple claim dependencies

Include claims in all relevant categories

- e.g. apparatus, method, computer-readable medium

CAN AI BE LISTED AS THE INVENTOR?

EU: AI Cannot Be Named as Inventor

- Applications filed in US, UK, and EU naming AI system “Dabus” as inventor
- EU rejected the two applications because they “do not meet the requirement of the EPC that an inventor designated in the application has to be a human being, not a machine.”
- Still pending in UK and US

US: Can AI Be Named as Inventor?

- **US Basic requirements**
  - "Because conception is the touchstone of inventorship, **each joint inventor must generally contribute to the conception of the invention**." *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assoc., Inc*., 776 F.3d 837 (Fed. Cir. 2015).
  - Conception "is 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.'" *Dawson v. Dawson*, 710 F.3d 1347 (Fed. Cir. 2013).

US: Can AI Be Named as Inventor?

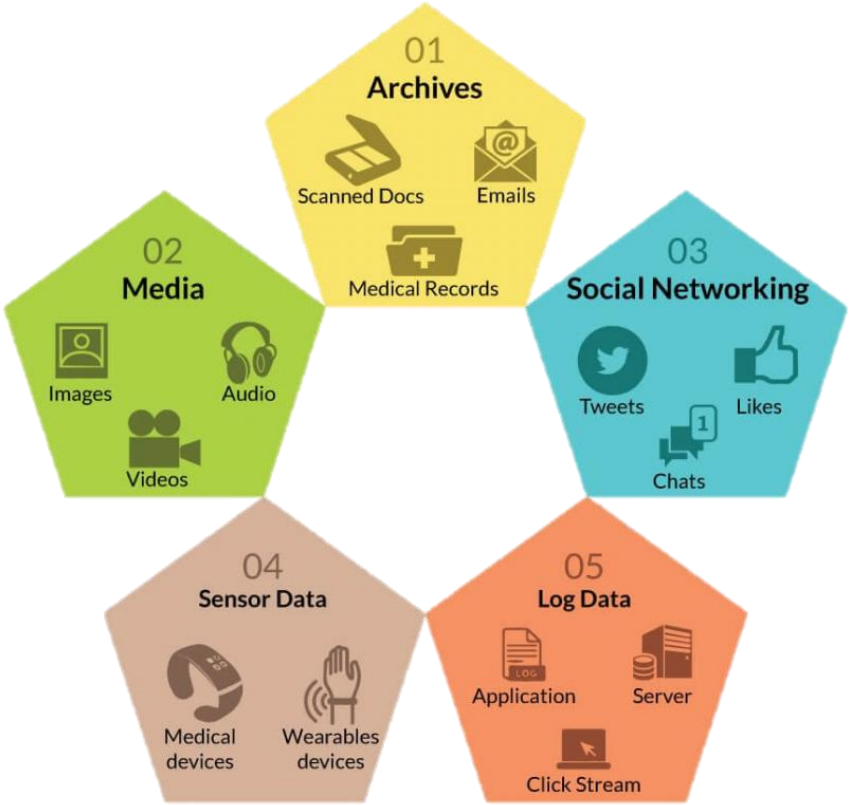
- USPTO called for comments relating to patenting AI in October 2019
- No decision yet on Dabus application
- US Copyright Office regulations state that an author or creator must be a human being in order to receive copyright protection. The office will not register works created by a machine.

Who Owns?

- **General principles**
  - Ownership initially vests in each **inventor**, absent an agreement to the contrary
  - "Each co-owner's ownership rights carry with them the **right to license others**, a right that also does not require the consent of any other co-owner." *Schering Corp. v. Roussel-UCLAF SA*, 104 F.3d 341 (Fed. Cir. 1997).
  - "Ordinarily, one co-owner has the **right to impede the co-owner's ability to sue infringers** by refusing to voluntarily join in such a suit." *STC.UNM v. Intel Corp*., 754 F.3d 940 (Fed. Cir. 2014).

DATA RIGHTS AND PRIVACY CONCERNS WITH AI

AI and Big Data



Data Privacy and AI

- Privacy of the individual v. Use of AI
- Is it possible to use AI and protect people's data at the same time?
- AI challenges associated with data protection
  - Fairness and discrimination
  - Purpose limitation
  - Data minimization
  - Transparency and the right to information

Speaker Information

Susan Tull is a partner in our DC office

Susan has been involved in all phases and forums of litigation. Her patent litigation, appeals, and post-grant proceedings practices focus on technologies related to consumer products, software, AI, medical devices, automotive, and other mechanical and electrical systems. Susan focuses her practice on patent litigation and client counseling in the mechanical, computer science, electrical, and medical device fields. Susan has researched and written extensively on patenting artificial intelligence and software as a medical device.

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Aliza is a registered patent attorney, focusing her practice on complex patent litigation before the U.S. district courts and the U.S. International Trade Commission (ITC). She works on litigation matters in a variety of technologies, primarily in the electrical, software, optical technology, wireless technology, business methods, and mechanical fields. She has researched and written extensively on intellectual property issues concerning artificial intelligence.

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