GUNDERSON DETTMER

Patenting AI: What Does It Mean, Should We Do It, and What Does Success Look Like?

Wednesday, April 19, 2023

TIME: 11:00AM PST/2:00 PM EST

We represent ***what's next.***

Presenter

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Agenda

- Defining “AI Patents”
- AI Patent Trends in Context
- Types of AI Patents – Techniques, Applications, Generative?
- How to Think About AI Patent Protection
- Real-World Examples of Startup AI Patents

What is an “AI Patent” anyway?

TEXT-BASED CRITERIA

False positives: Many applications mention AI in the description as boilerplate.

False negatives: An AI invention might not use the term “artificial intelligence,” “machine learning,” or other terms that wouldn’t also bring in false positives

Searches limited to Title, Abstract and Claims, may miss patents that claim artificial intelligence using inventor-coined terms

CLASSIFICATION SYSTEMS

Different classification systems in different patent offices

Within the US, G06 (Computing, Calculating or Counting) is overinclusive

Subcategories are under-inclusive.

COMBINED APPROACH

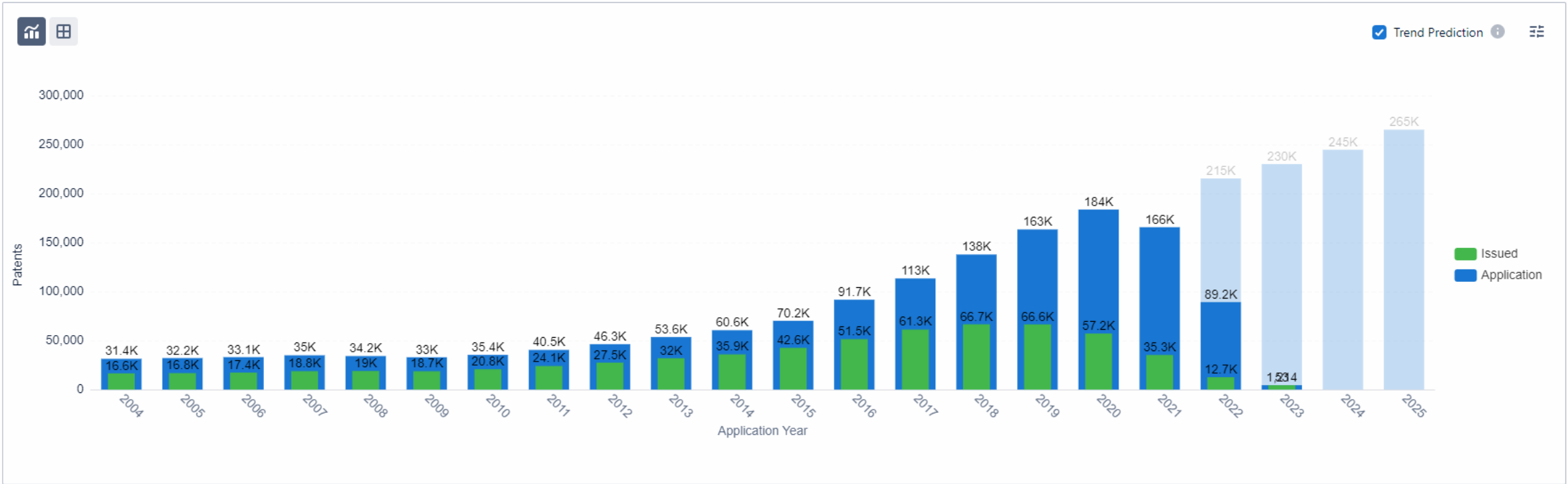
WIPO 2019 Report on Artificial Intelligence

USPTO Artificial Intelligence Patent Dataset

AI Patent Trends

AI Patent Trends

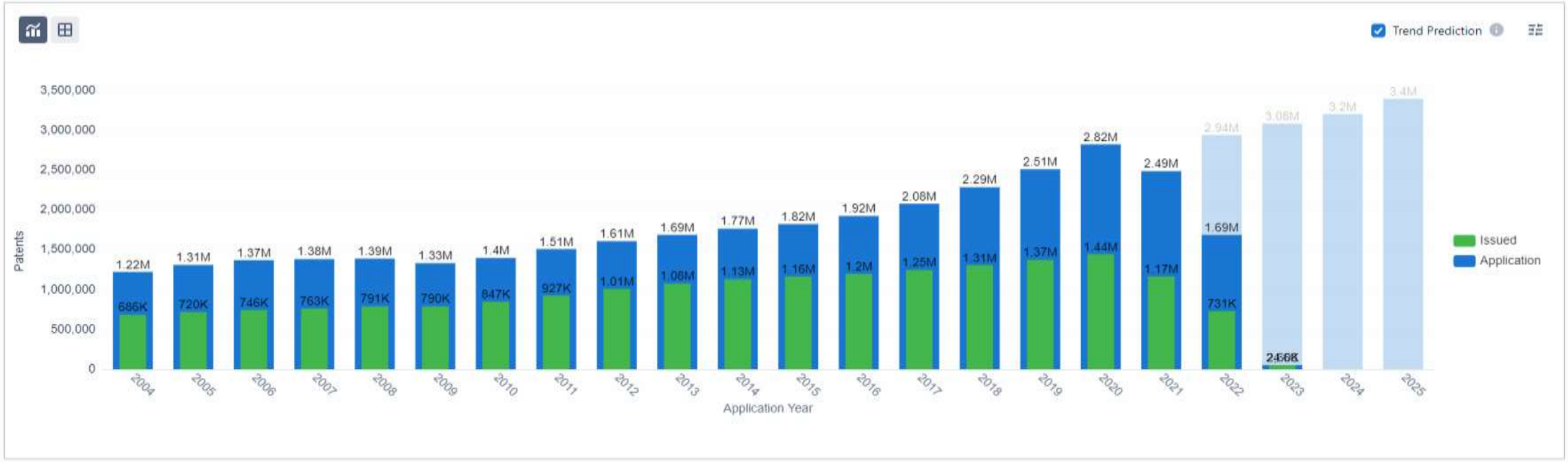
BY ANY MEASURE, "AI PATENT" FILINGS ARE GROWING DRAMATICALLY



Source: Gunderson Dettmer (PatSnap Analytics and WIPO Search Criteria)

AI Patent Trends

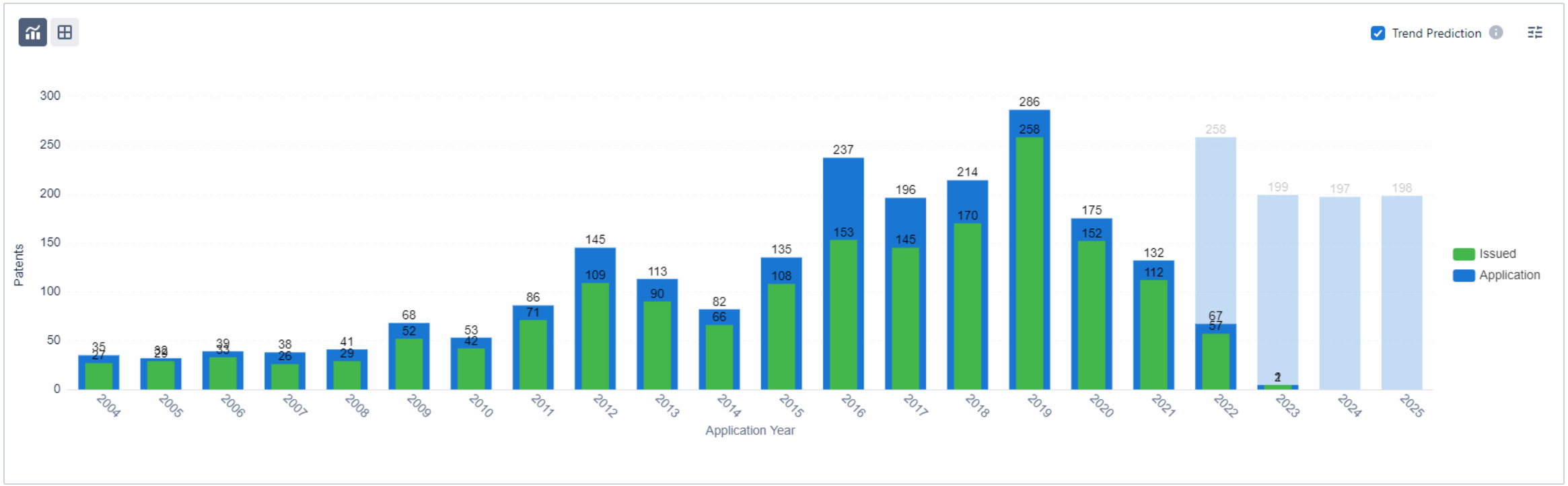
EVEN IN THE CONTEXT OF PATENT TRENDS GENERALLY



Source: Gunderson Dettmer (PatSnap Analytics)

AI Patent Trends

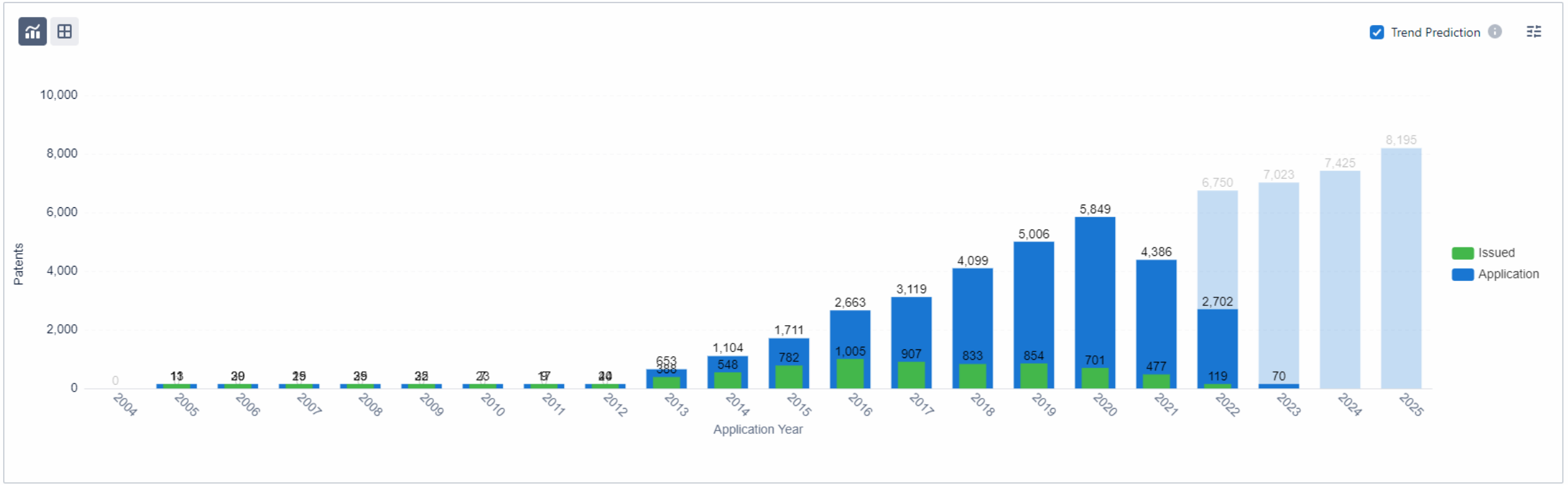
AND CERTAINLY IN COMPARISON TO MOUSETRAPS



Source: Gunderson Dettmer (PatSnap Analytics)

AI Patent Trends

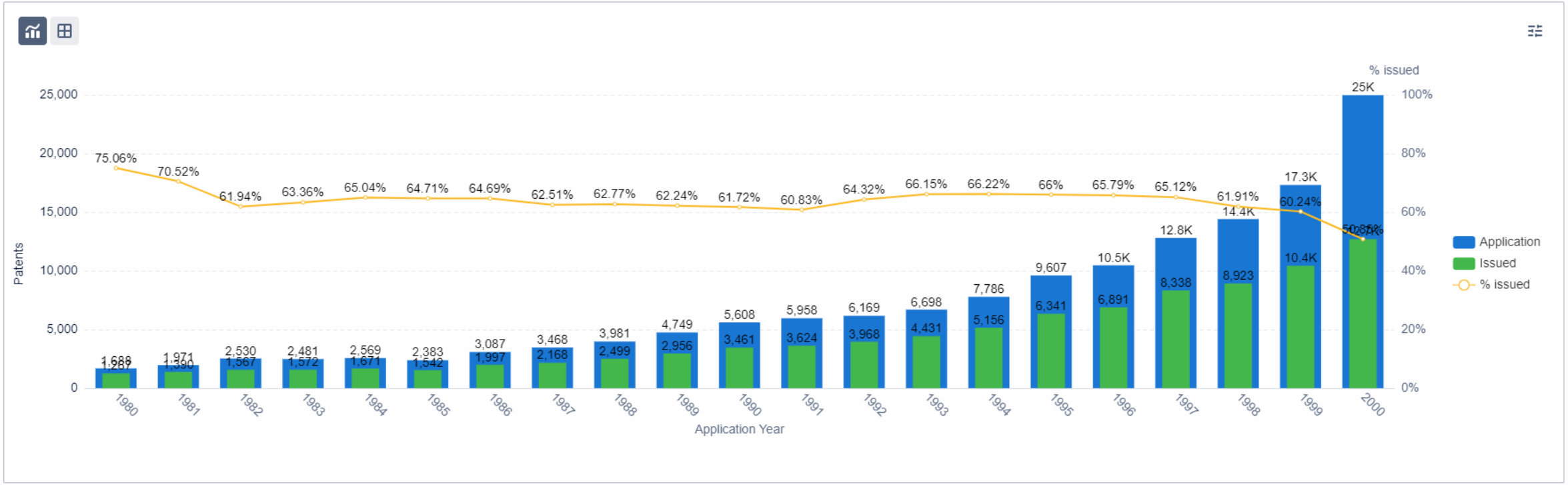
BUT NOT PARTICULARLY IN COMPARISON TO NEW TECHNOLOGIES LIKE CRISPR



Source: Gunderson Dettmer (PatSnap Analytics)

AI Patent Trends

OR COMPARED TO PATENTS FROM 1980-2000, NOW A BLIP IN RETROSPECT

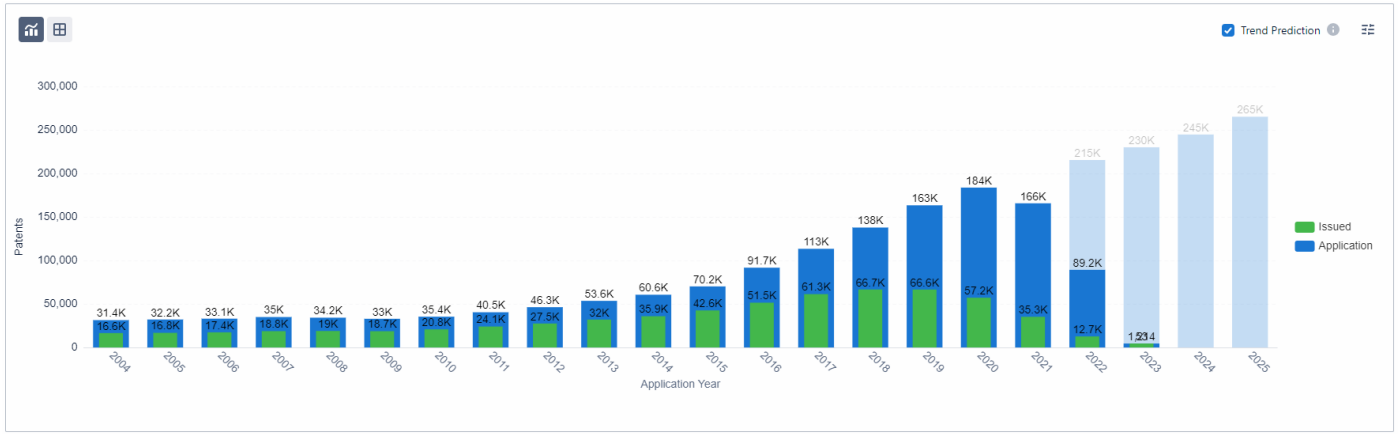


Source: Gunderson Dettmer (PatSnap Analytics and WIPO Search Criteria)

AI Patent Trends

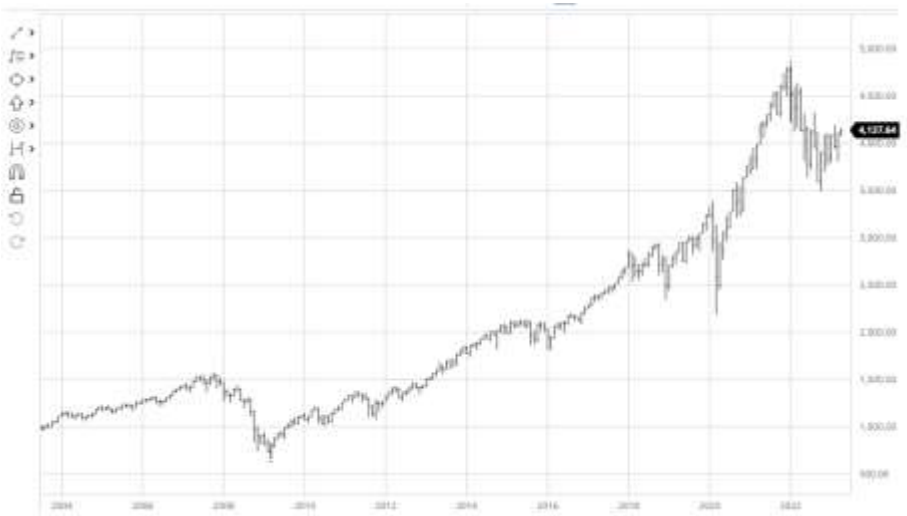
AND THERE ARE A LOT OF INDICATORS WITH THE SAME SHAPE OVER THE PAST 20 YEARS

AI PATENTS



Source: Gunderson Dettmer (PatSnap Analytics and WIPO Search Criteria)

S&P 500



Source: barchart.com

Trends Takeaway

AI PATENTS, HOWEVER DEFINED, ARE GROWING

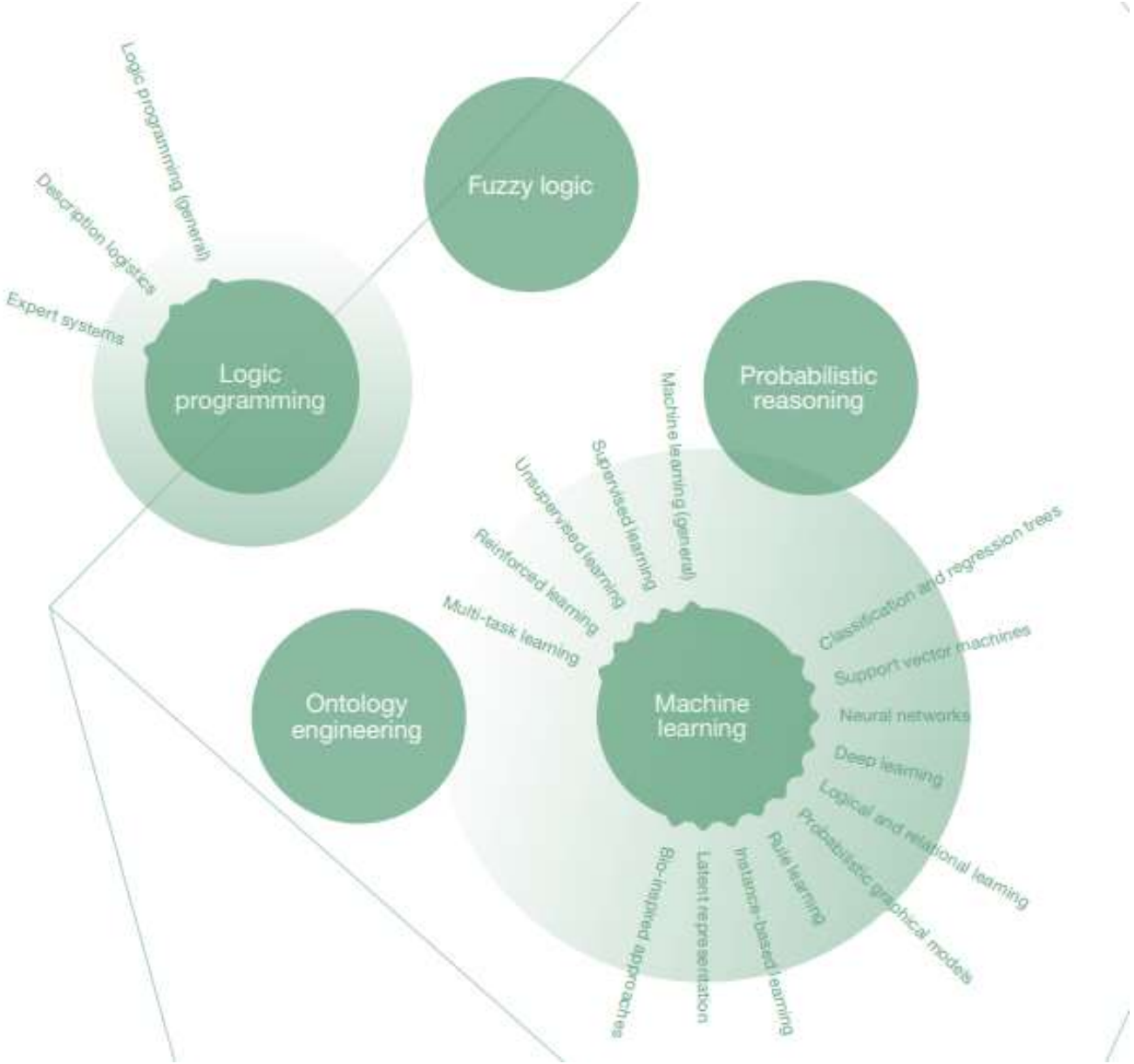
“SOFTWARE PATENTS ARE DEAD” WAS ALWAYS AN OVERSTATEMENT, NOW PLAINLY FALSE

AI PATENT GROWTH GREATER THAN PATENT GROWTH GENERALLY, BUT NOT AS DRAMATIC WHEN VIEWED IN CONTEXT

AI Techniques

- Machine learning

- Fuzzy logic
- Logic programming
- Ontology engineering
- Probabilistic reasoning
- Search methods

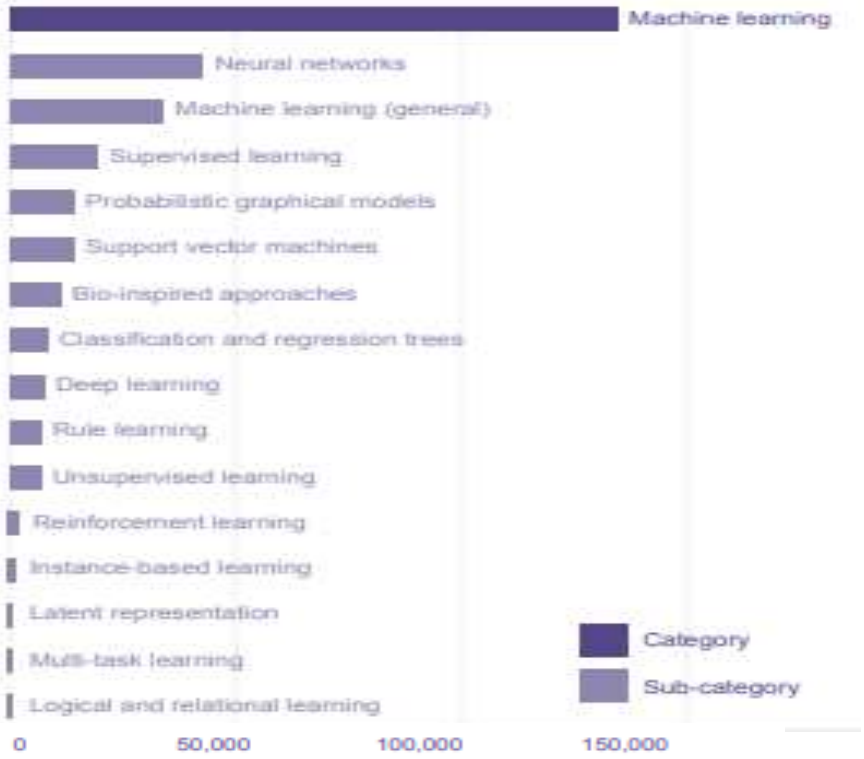


Source: WIPO 2019 Artificial Intelligence Report

AI Techniques Stats

MACHINE LEARNING IS BY FAR THE DOMINANT PATENTED AI TECHNIQUE

Machine Learning

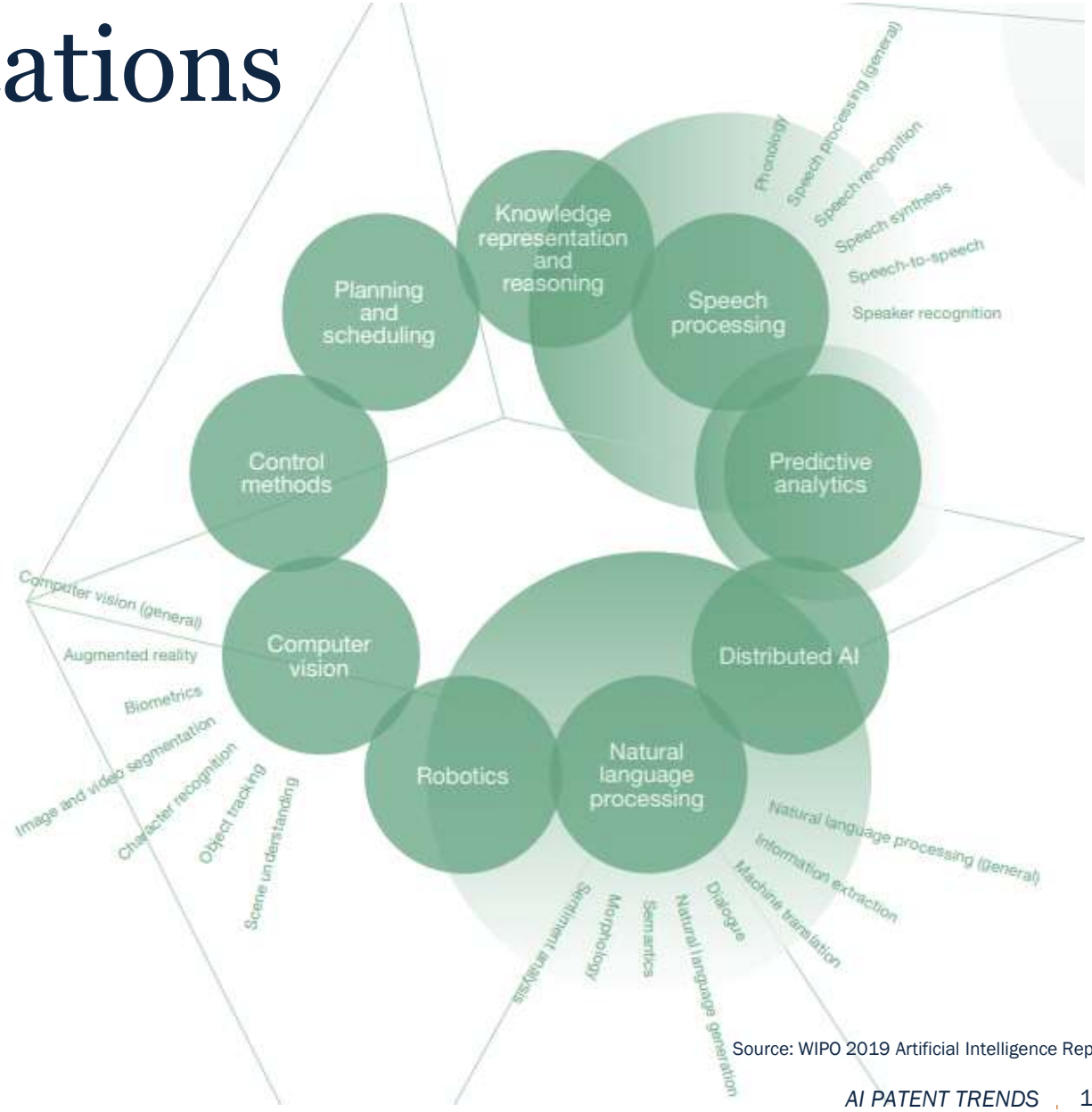


The Rest

Source: WIPO 2019 Artificial Intelligence Report

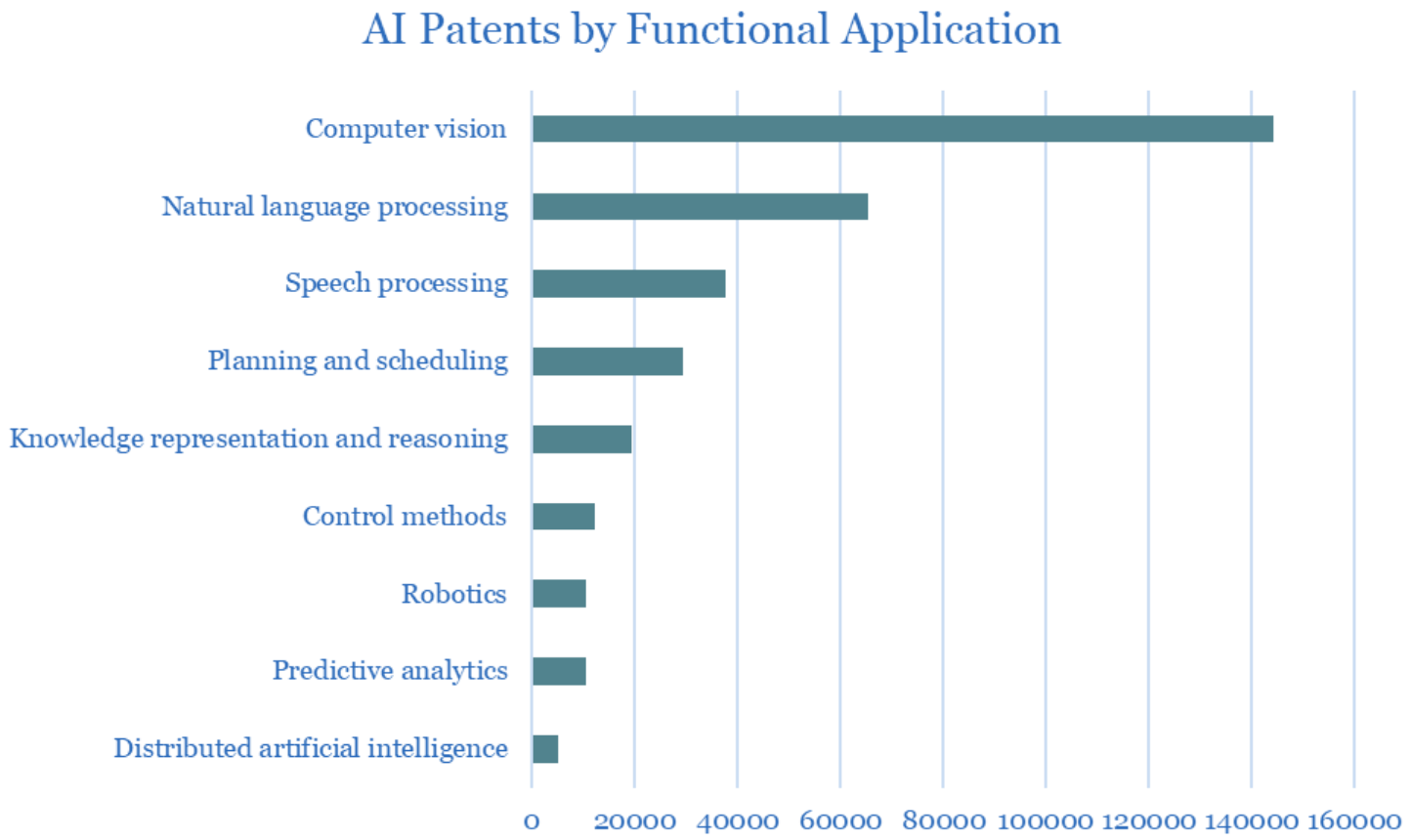
AI Functional Applications

- Computer vision
- Natural language processing
- Speech processing
- Planning and scheduling
- Knowledge representation and reasoning
- Control methods
- Robotics
- Predictive analytics
- Distributed artificial intelligence



Source: WIPO 2019 Artificial Intelligence Report

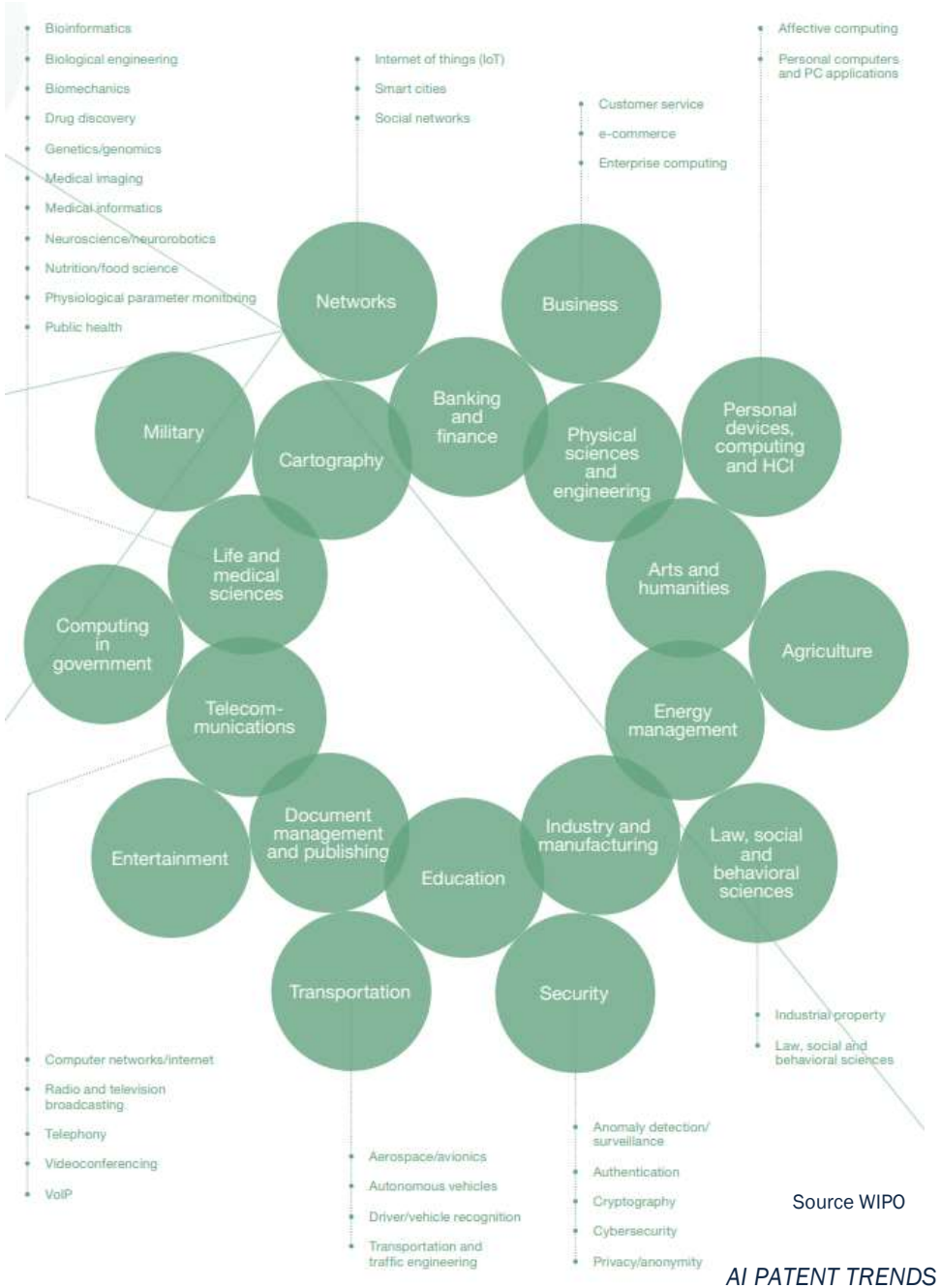
AI Functional Application Stats



Source Gunderson Dettmer, PATENTSCOPE (WIPO Search Criteria)

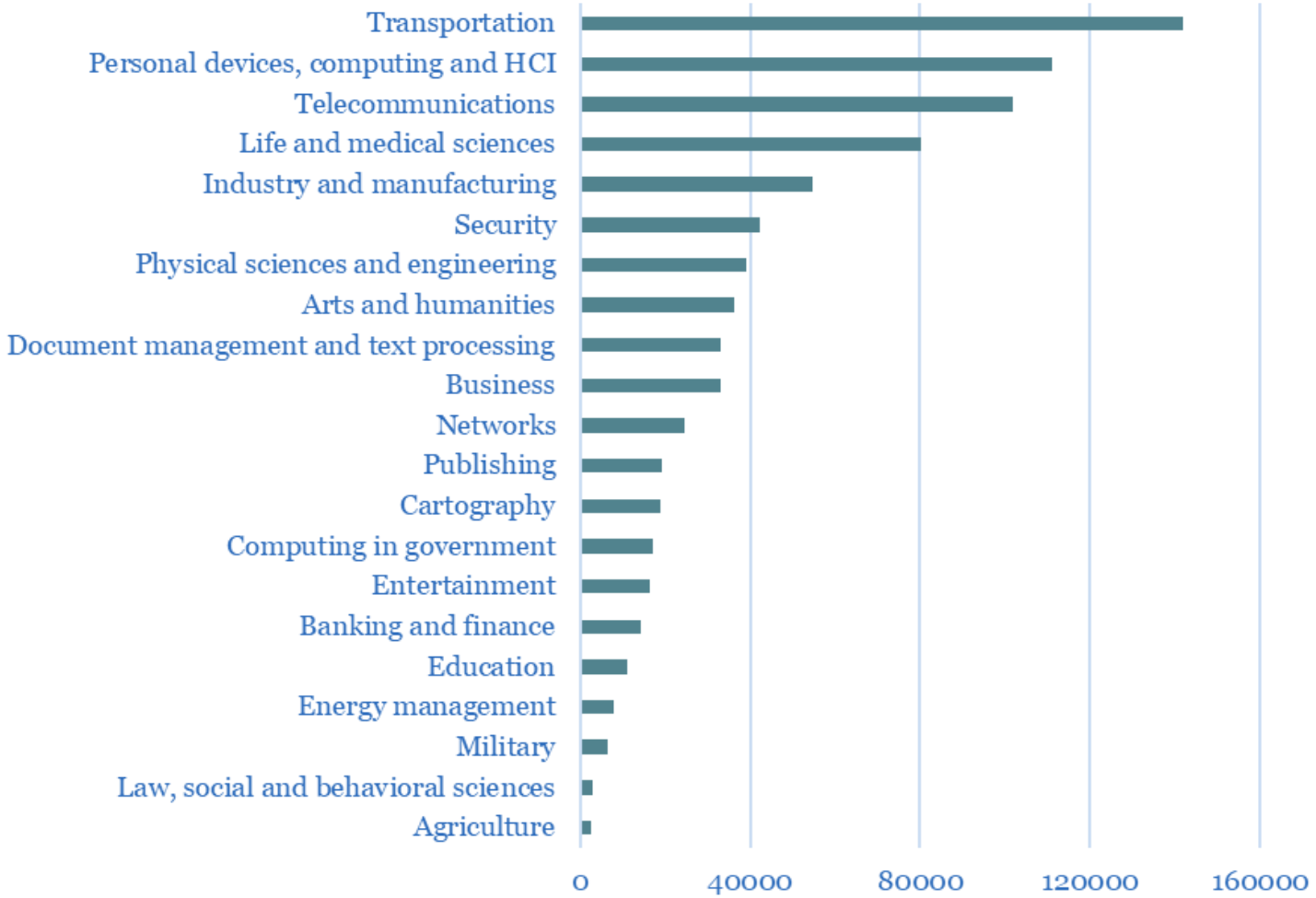
Industries Patenting AI

- Transportation
- Personal devices, computing and HCI
- Telecommunications
- Life and medical sciences
- Industry and manufacturing
- Security
- Physical sciences and engineering
- Arts and humanities
- Document management and text processing
- Business
- Networks
- Publishing
- Cartography
- Computing in government
- Entertainment
- Banking and finance
- Education
- Energy management
- Military
- Law, social and behavioral sciences
- Agriculture



Source WIPO

Industry Stats

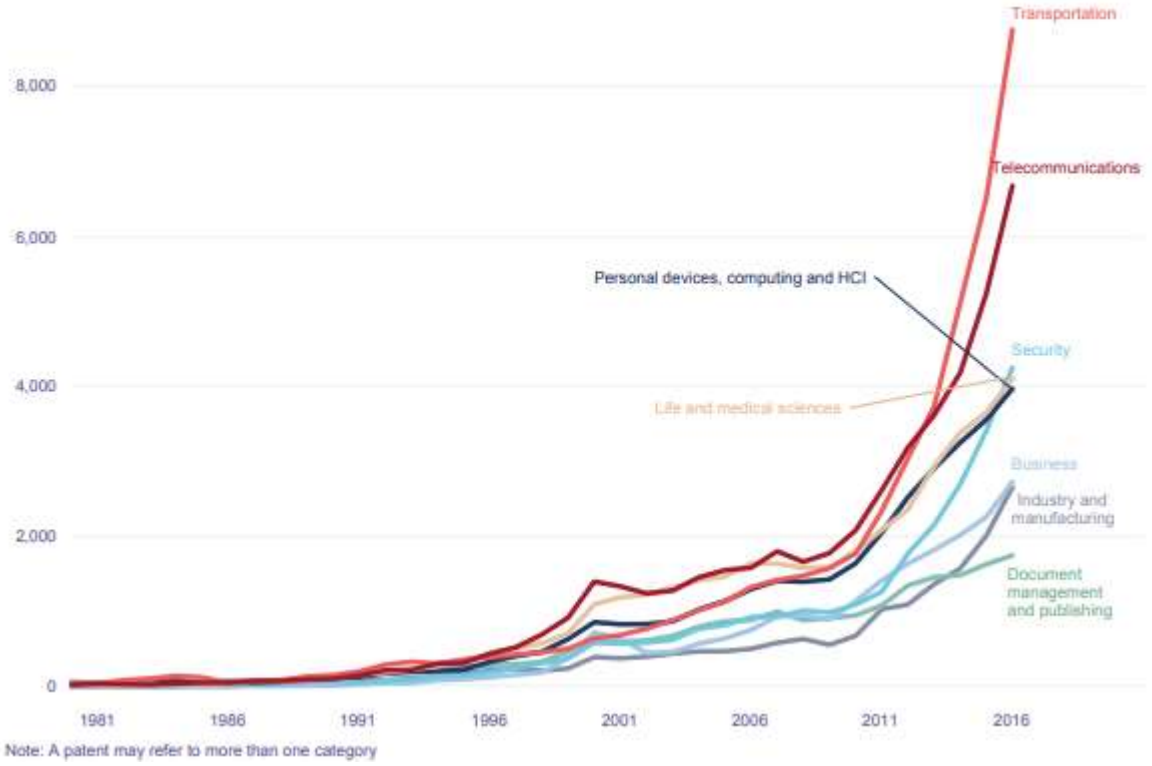


Source Gunderson Dettmer, PATENTSCOPE (WIPO Search Criteria)

AI Industries

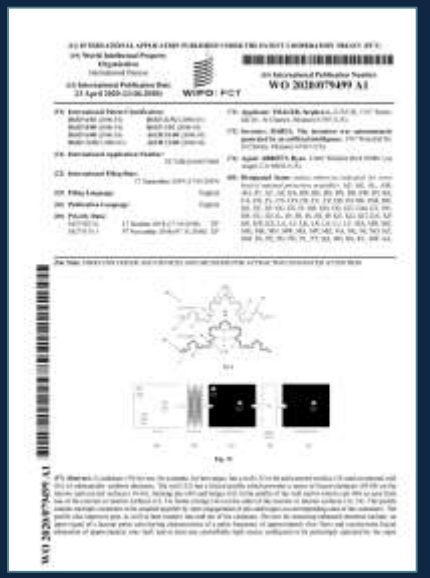
AI PATENT INDUSTRIES

- Transportation
- Personal devices, computing and HCI
- Telecommunications
- Life and medical sciences
- Industry and manufacturing
- Security
- Physical sciences and engineering
- Arts and humanities
- Document management and text processing
- Business
- Networks
- Publishing
- Cartography
- Computing in government
- Entertainment
- Banking and finance
- Education
- Energy management
- Military
- Law, social and behavioral sciences
- Agriculture



Source WIPO

A Note on Generative AI



PATENTING GENERATIVE AI OR GENERATIVE AI PATENTING?

- Generative AI is a functional application of Machine Learning
  - Recently-coined term, but also only recently significant technology
  - 0.00008 percent of “AI Patents” (just a few hundred) contain the phase “generative AI”
- Patents having nothing to do with AI may cover inventions discovered through (or by?) AI
  - Can potentially apply to AI-related patents, but need not
  - Dr. Thayer has fought to have his AI, DABUS, recognized as an inventor for e.g. a patent for a food container – not an “AI Patent” yet an “AI Patent” in another sense
- Controversy
  - Courts have ruled that Inventor must be a human
  - Lots of policy discussion and concern about destroying incentive
  - Practically: List human as inventor; in patent law so far, AI *is* like a photographer’s camera

How to Think About AI Patent Protection

Patent Process Basics

TYPICAL COSTS OVER FIRST THREE YEARS

Month		Low	Mid	High
0	Pre-filing Search	$ 1,000	$ 2,000	$ 3,000
1	Drafting and Filing	$10,000	$16,000	$24,000
4-12* or 16-26	U.S. Prosecution	$ 5,000	$11,000	$25,000
30	Foreign Filings**	$ 5,000	$25,000	$48,000
	Total	$ 21,000	$54,000	$100,000

Anecdotal Personal Experience

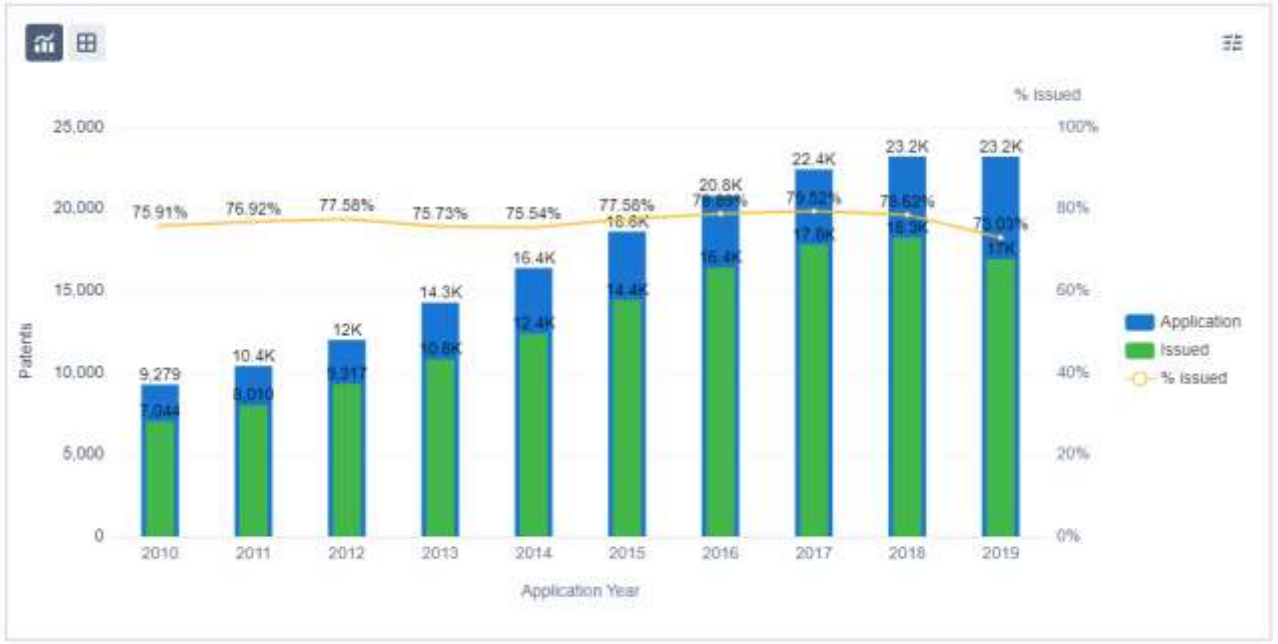
* Prosecution can be expedited for an additional $480 - $4,200, depending on your company size
** Foreign Filing costs depend on the number of countries you choose and the number of words in your application that must be translated. Add $5-$20k for each country during months 30-60.

Chances of Success

ASSUMING "SUCCESS" MEANS THE ISSUING OF A PATENT, OF WHATEVER SCOPE

- Actually pretty good—somewhere around 75% for a initial U.S. filing

% of First U.S. Applications Issued 2010-2019



Source: Gunderson Dettmer (PatSnap Analytics)

A Note About "Success"

TO BE WORTH SOMETHING, A PATENT'S CLAIM MUST NOT BE SUSCEPTIBLE TO "DESIGN AROUND"

- Cynic's script for patent prosecution:
  1. Company hires patent attorney
  2. Company describes invention to patent attorney
  3. Patent attorney drafts broad claims + narrower claims as backup
  4. Patent Office rejects broadest claim
  5. Patent attorney reverts to next broadest, slightly narrower claim
  6. Steps 4 and 5 repeat, sometimes multiple times
  7. Patent issues with claims that cover narrow embodiments of invention
  8. Company suspects infringement
  9. Company learns that patent isn't as broad as it thought

The Patent Bargain

THE PATENT BARGAIN: YOU GIVE, YOU *MIGHT* GET

- Patent applications are published and teach the world how to make your invention
- Great if your application is successful: you get the benefit of the bargain
- Not great if you don’t get a patent or get a narrow patent: You gave but you don’t get

Potential Downsides

DIFFICULTY DETECTING INFRINGEMENT OF AI PATENTS

- Functional Application patents may be easier to enforce if based on open source
- AI Technique patents may be more difficult due to custom code
- Many services are cloud-based, meaning no access to executable

YOUR PATENT APPLICATION MAY TIP OFF OTHER PATENTEES THAT YOU'RE INFRINGING THEIR PATENT

- Monitoring patent publications is one way companies track competitive activity in their space
- While your patent application is not proof that you are actually doing what's in your patent, it can cause a patentee to take a closer look at your products and services

Potential Upsides

A broad claim, written in a way that makes detection straightforward, can offer a substantial competitive advantage

A good patent will give you an advantage, even (and maybe especially) if you never litigate

- Barrier to entry for competitors
- Increase future “white space”
- Licensing revenue
- Make you a more attractive investment / acquisition target
- Marketing claim

Fundraising Considerations

PATENT PROTECTION FROM AN INVESTOR'S STANDPOINT IS A "NICE TO HAVE" BUT CAN BE NICE TO HAVE

- Compared with, e.g. Pharma, where good patent protection is "table stakes," investors generally focus on factors other than patent protection in the tech space
- If you have a good patent and wish to use it to justify a higher-than-otherwise valuation, investor-side tech deal teams are often not equipped to evaluate patent strength (compare life sciences deal teams)

Startup Patent Statistics

"Strong correlations between the presence of patents and the ability to raise rounds at higher valuations and achieve larger exit values on average"

Between 2011 and 2020, deal sizes for patent startups were 40% to 60% larger than those for nonpatent startups in a given year.

51.5% larger	73.2% larger	71.2% larger %	46.0% larger	154.9% higher
SEED STAGE	EARLY STAGE	LATE STAGE	VENTURE GROWTH	MEDIAN VALUATION FOR M&A EXIT

Source: Pitchbook Patent Research

Real-World Examples of AI Patents and Scope

Real-World Examples: Claiming AI Techniques

FEEDZAI

- Late-stage private company in the fraud detection space founded 2011 in Portugal.
- 1B – 10B post-money valuation
- 23 patent applications beginning in 2016 + one filed pre-formation in 2010
- 2020 patent application issued 2023 directed to method for training and executing a decision-making ML model that provides a natural language explanation for its decision result.

Claim 1:

1. A method, comprising:

receiving a labeling function associated with **generating one or more semantic concepts**;

receiving a **reference dataset manually annotated with the one or more semantic concepts**;

using the received labeling function to automatically annotate an existing dataset with the one or more semantic concepts to **generate an annotated noisy dataset**, wherein the annotated noisy dataset includes annotations with less precision than annotations included in the reference dataset and at least one of the annotations in the annotated noisy dataset is generated without using human-supplied labels;

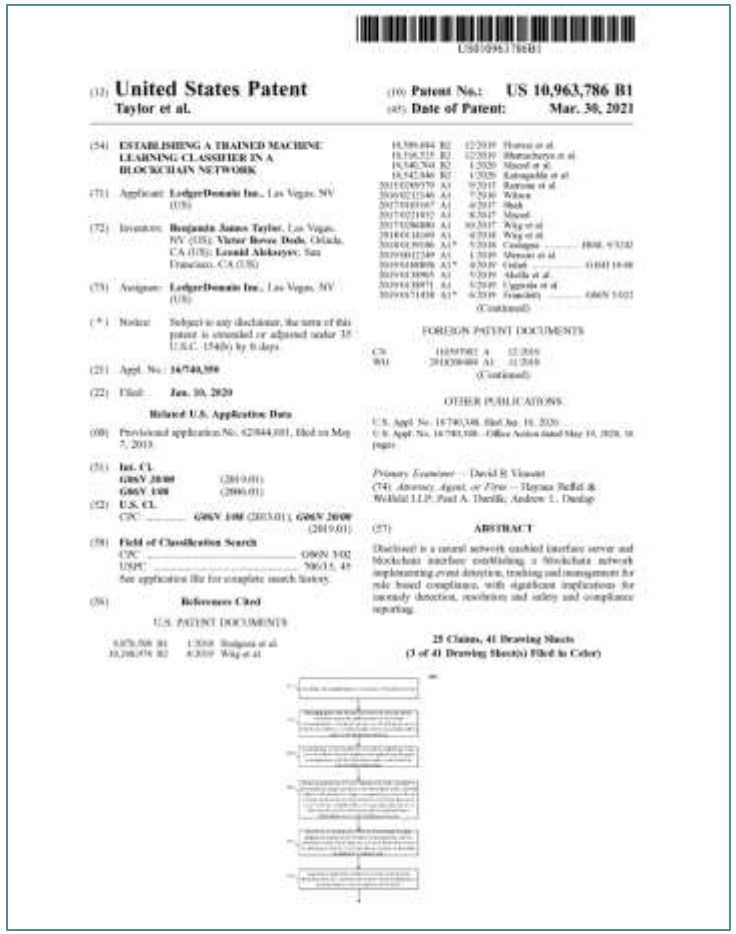
preparing a training dataset including by combining at least a portion of the reference dataset with at least a portion of the annotated noisy dataset;

providing the training dataset to a multi-task machine learning model at least prior to deployment of the multi-task machine learning model; and

using the training dataset **to train a multi-task machine learning model**, wherein the multi-task machine learning model is configured to:

automatically **perform a decision task that outputs a decision result**; and

automatically **perform an explanation task** that outputs at least one of the one or more semantic concepts, wherein the at least one of the one or more semantic concepts is a natural language explanation, understandable by a user, **describing a reason for the decision result**.



US010963786B1

(12) **United States Patent**
Taylor et al.

(10) **Patent No.: US 10,963,786 B1**
(45) **Date of Patent: Mar. 30, 2021**

(54) **ESTABLISHING A TRAINED MACHINE LEARNING CLASSIFIER IN A BLOCKCHAIN NETWORK**

(71) Applicant: **LedgerDomain Inc.**, Las Vegas, NV (US)

(72) Inventors: **Benjamin James Taylor**, Las Vegas, NV (US); **Victor Boyce Dods**, Orlando, CA (US); **Leonid Aleksiyev**, San Francisco, CA (US)

(73) Assignee: **LedgerDomain Inc.**, Las Vegas, NV (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/740,350**

(22) Filed: **Jan. 10, 2020**

Related U.S. Application Data

(60) Provisional application No. 62/844,681, filed on May 7, 2019.

(51) **Int. Cl.**
G06N 20/00 (2019.01)
G06N 3/08 (2006.01)

(52) **U.S. Cl.**
CPC **G06N 3/08** (2013.01); **G06N 20/00** (2019.01)

(58) **Field of Classification Search**
CPC G06N 3/02
USPC 706/15, 45
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

FOREIGN PATENT DOCUMENTS

OTHER PUBLICATIONS

Primary Examiner — David R. Vincent
(74) *Attorney, Agent, or Firm* — Haynes Beffel & Wolfeld LLP; Paul A. Durdik; Andrew L. Dunlap

(57) **ABSTRACT**

25 Claims, 41 Drawing Sheets
(3 of 41 Drawing Sheet(s) Filed in Color)

Real-World Examples: Claiming AI Functional Application

DEEPMEDIA.AI

- Pre-seed stage company in deep fake space founded 2020 in California.
- Reported 200k in funding after pre-seed round
- Two patent families
- 2022 patent application issued 2023 directed to method generating a synthetic media with translated speech.

Claim 1:

1. A method for generating a synthetic media with translated speech corresponding to an input media file, comprising:

digitally **acquiring** the input media file, wherein the input media file includes **input audio in a first input language**;

acquiring a first output language, wherein the first output language is different from the first input language;

segmenting the input audio into a plurality of vocal segments, wherein each vocal segment in the plurality of vocal segments includes a speaker identification to identify the speaker of each vocal segment;

for each vocal segment in the plurality of vocal segments:

identifying pacing information for each word or phoneme in each vocal segment;

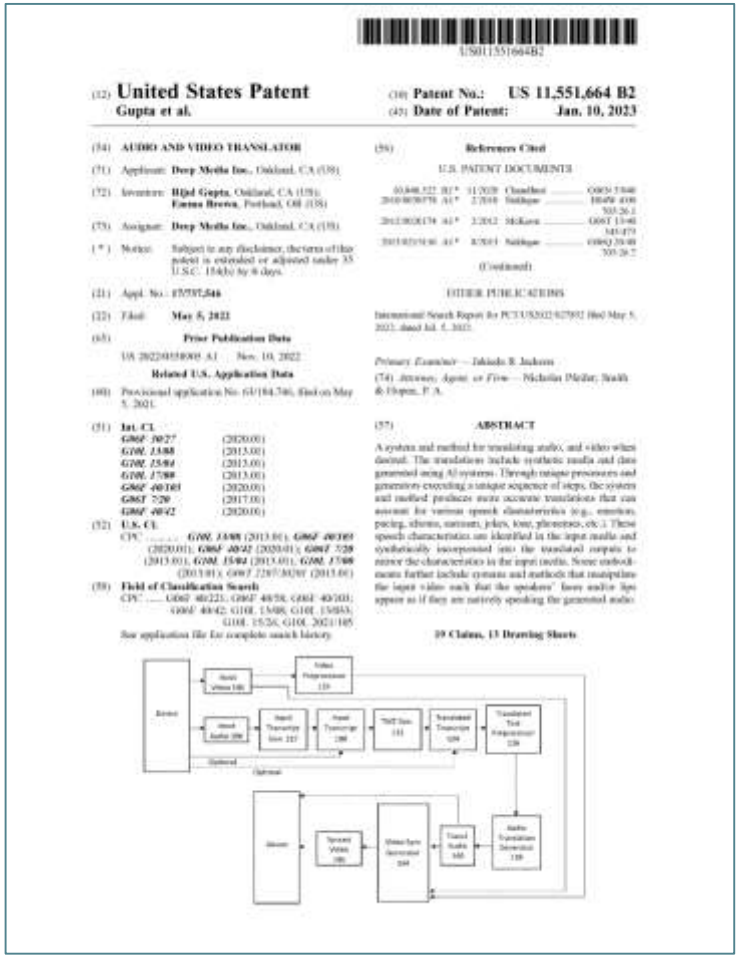
acquiring an input transcription, wherein the input transcription includes **text corresponding to the words spoken** in each vocal segment;

acquiring input meta information, the meta information including **emotion data and tone data**, wherein emotion data corresponds to one or more detectable emotions from a list of predetermined emotions;

inputting the input meta information and input transcription into a transcription and meta translation generator, wherein the transcription and meta translation generator is **a generative adversarial network generator**;

translating the input transcription and input meta information into the first output language based at least on the timing information and the emotion data via the transcription and meta translation generator, such that the translated transcription and meta information include similar emotion and pacing in comparison to the input transcription and input meta information; and

generating the synthetic digital media file having translated audio.



US011551664B2

(12) **United States Patent**
Gupta et al.

(10) **Patent No.: US 11,551,664 B2**
(45) **Date of Patent: Jan. 10, 2023**

(54) **AUDIO AND VIDEO TRANSLATOR**

(71) Applicant: **Deep Media Inc.**, Oakland, CA (US)

(72) Inventors: **Bijul Gupta**, Oakland, CA (US); **Emma Brown**, Portland, OR (US)

(73) Assignee: **Deep Media Inc.**, Oakland, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 17/737,546

(22) Filed: **May 5, 2022**

(65) **Prior Publication Data**

US 2022/0358908 A1 Nov. 10, 2022

Related U.S. Application Data

(60) Provisional application No. 63/184,746, filed on May 5, 2021.

(51) **Int. Cl.**
G06F 40/58 (2020.01)
G10L 13/08 (2013.01)
G10L 15/04 (2013.01)
G10L 17/00 (2013.01)
G06F 40/103 (2020.01)
G06T 7/20 (2017.01)
G06F 40/42 (2020.01)

(52) **U.S. Cl.**
CPC **G10L 13/08** (2013.01); **G06F 40/103** (2020.01); **G06F 40/42** (2020.01); **G06T 7/20** (2013.01); **G10L 15/04** (2013.01); **G10L 17/00** (2013.01); G06T 7207/30201 (2013.01)

(58) **Field of Classification Search**
CPC G06F 40/221; G06F 40/58; G06F 40/103; G06F 40/42; G10L 13/08; G10L 15/04; G10L 15/26; G10L 2021/105
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

(Continued)

OTHER PUBLICATIONS

International Search Report for PCT/US2022/027932 filed May 5, 2022, dated Jul. 7, 2022.

Primary Examiner — Jakieda R. Jackson
(74) *Attorney, Agent, or Firm* — Nicholas J. Pauley; Smith & Hopen, P. A.

(57) **ABSTRACT**

A system and method for translating audio, and video when desired. The translations include synthetic media and data generated using AI systems. Through unique processors and generators executing a unique sequence of steps, the system and method produces more accurate translations that can account for various speech characteristics (e.g., emotion, pacing, idioms, sarcasm, jokes, tone, phonemes, etc.). These speech characteristics are identified in the input media and synthetically incorporated into the translated outputs to mirror the characteristics in the input media. Some embodiments further include systems and methods that manipulate the input video such that the speakers' lower and/or lips appear as if they are natively speaking the generated audio.

19 Claims, 13 Drawing Sheets

Real-World Examples: Claiming Functional Application

DENTAL MONITORING SAS

- Founded with Seed Round 2014, PE round 2016, Series A 2017
- Fifty-one patent families, beginning with a 2013 pre-formation filing
- 2017 patent application issued 2020 directed to method of analyzing a dental arch using deep learning

Claim 1:

1. A method for acquiring an image of a dental arch of a patient, said method comprisingthe following steps:

a′) activation of an image acquisition apparatus so as to **acquire an image, called "analysis image"**, of said arch;

b′) analysis of the **analysis image by means of a deep learning device** trained by means of a learning base;

c′) **determination**, for the analysis image, as a function of the results of the analysis in the preceding step, of a **value for an image attribute**;

d′) **comparison** of said image attribute value **with a setpoint**;

e′) **sending of an information message as a function of said comparison**, the information message being **related to the quality of the image** acquired or to the position of the acquisition apparatus in relation to said arch or to the setting of the acquisition apparatus or to the opening of the mouth or to the wearing of a dental appliance, or to a combination thereof,

to check whether the analysis image respects the setpoint and, if it does not respect the setpoint, to **guide the operator in order for him or her to acquire a new analysis image**.

Real-World Examples: Countering Alleged Theft by a Major Player

DENTAL MONITORING SAS

- Sued Align Technology (maker of Invisalign), a $26B medical device company in Nov. 2022
- Notes in its complaint that:
  - "Dental Monitoring has invested close to $150,000,000 developing its transformative, award-winning, AI-powered remote dental monitoring technologies—a massive investment for a company of Dental Monitoring's size. These industry-leading technologies reflect the contributions of hundreds of Dental Monitoring employees over the past half-decade. Dental Monitoring has protected its investment by developing a significant, home-grown, world-wide patent portfolio."
- Complaint alleges that Dental Monitoring met repeatedly with Align to discuss "potential future business arrangements" and after learning about the details of the technology, subsequently went dark and introduced its own competing technology

Takeaways

Takeaways

- AI Patents Growing, but as expected
- Machine Learning, Computer Vision, and Transportation top technique, functional, and industry
- Inventions made with or by Generative AI must be named to a human; so far not a practical issue
- Overall good chance of receiving patent but narrow patent can be worse than no patent
- Even good, broad AI patents can have enforcement challenges
- Good patents are barriers to others' entry, licensing revenue sources, can encourage acquisition, and *may* help drive valuation in fundraising
- More context needed, and not AI specific, but Pitchbook reports significantly higher funding at all stages for companies seeking or with patents
- Not every technology bound for success is patentable—it's not a referendum on the business! Get good objective advice as to the *real* chances of getting a good, enforceable patent.
  - If they're low, focus your time and resources on growing your business.
  - But if they're good, make sure you have a good reason for *not* filing!

Thank you!

Any Questions?

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insights@gunder.com