

Real IP Questions about Artificial Intelligence: Sorting the Real From the Fake

Martin Schwimmer
Melvin Garner

Conner Inn of Court
October 26, 2023

Understanding AI Technology

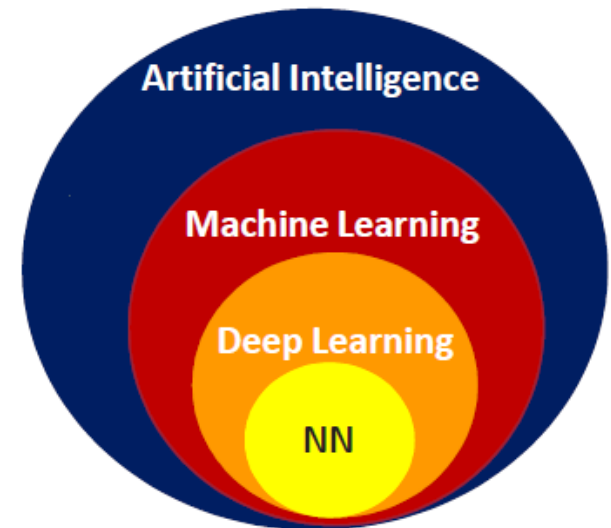
Applying AI to Patent Law



Melvin Garner
▪ PARTNER

What is Artificial Intelligence?

- Artificial Intelligence (AI) is computer technology that is designed to mimic and perform tasks like the human brain.
- The subsets of AI are:
 - Neural Networks (NN)
 - Deep Learning
 - Machine Learning
 - Large Language Models - Generative AI



What is Artificial Intelligence?

History

- **1943** Paper by **Warren McCulloch & Walter Pitts** stating that each neuron in the brain is a simple digital processor, and the brain is a form of computing machine.
- Neural Networks (NN) grew out of attempts to understand how the human brain works at the neural level and how people learn and remember.
- First mention of AI was during **Dartmouth Summer Research Project on AI** **1956**.



What is Artificial Intelligence?

History – Cont.

- **Perceptron** is the oldest neural network created by Frank Rosenblatt in 1958.
- **Geoffrey Hinton** paper on backpropagation 1986
- Early **Patent** filed 1988

United States Patent [19] [11] **Patent Number:** 4,979,124
Sachse et al. [45] **Date of Patent:** Dec. 18, 1990

[54] **ADAPTIVE, NEURAL-BASED SIGNAL PROCESSOR**

[75] **Inventors:** Wolfgang H. Sachse, Ithaca, N.Y.; D. Igor Grabec, Ljubljana, Yugoslavia

[73] **Assignee:** Cornell Research Foundation, Ithaca, N.Y.

[21] **Appl. No.:** 253,837

[22] **Filed:** Oct. 5, 1988

num Alloys”, *Journal of Acoustic Emission*, vol. 3, No. 3, (1984), pp. 118–129.

“An Introduction to Computing with Neural Nets”; Lippman *IEEE ASSP Magazine*; Apr. 1987; pp. 4–21.

“Neurocomputing: Picking the Human Brain”; R. Hecht-Nielsen; *IEEE Spectrum*; Mar. 1988; pp. 36–41.

Wolfgang Sachse, “Applications of Quantitative AE Methods: Dynamic Fracture, Materials and Transducer Characterization,” in J. D. Achenbach and Y. Raja-

[57] **ABSTRACT**

A method and system for analyzing emission signals emanating from a test medium for the purpose of determining characteristics of the test medium. The system and method utilize adaptive neural processing to prognosticate future results, as well as analyzing current test results.

What is Artificial Intelligence

What's a Neural Network?

- **A NN** is at least one layer of nodes where each node acts as an artificial neuron and can be represented by a single memory cell up to a regression processor. The purpose of the NN is to predict.
- The neural net **learns** from processing many **labeled examples** (i.e., data with "answers") that are supplied **during training** and **using this answer** key to learn what characteristics of the input are needed to construct the correct output.
- Once a **sufficient number of examples** have been processed, the neural network can begin to **process new, unseen inputs** and successfully return accurate results.
- The more examples and variety of inputs the program sees, the more accurate the results typically become because **the program learns** with experience.
- **Anthropomorphism?** Does your cat love you? CGI is not real.

What is Artificial Intelligence?

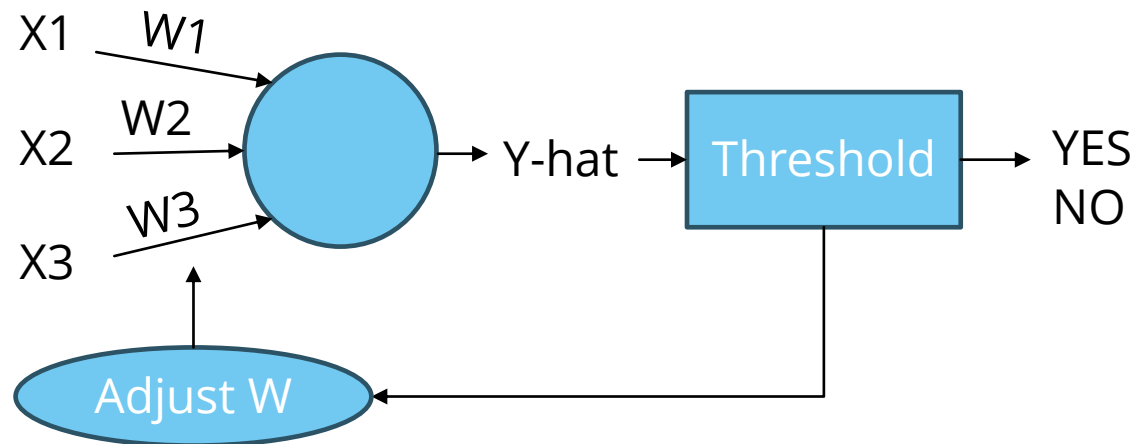
Surfing Problem

- Assume we want the NN to predict whether you should go surfing. The factors are (1) Are the waves good? X_1 (Yes:1, No:0), (2) Is the line empty? X_2 (Yes:1, No:0) and (3) Any recent shark attacks? X_3 (Yes:0, No:1).
- Assume the input is 1 (good waves), 0 (large crowds), 1 (No shark attacks)
- Apply some weights to determine the importance of each factor, e.g., $W_1 = 5$ because good waves are rare, $W_2 = 2$ because you don't mind crowds and $W_3 = 4$ since you fear sharks.
- The **predicted output** by this node or **\hat{y}** = $(1*5) + (0*2) + (1*4) - 3 = 6$. If 3 is the threshold, the prediction is yes, since 6 is greater than 3. However, if the answer is wrong, the weights can be changed to get the desired result. Try to get the minimum errors.
- Electronic circuits that perform this have been patented for years.

What is Artificial Intelligence?

Surfing Problem

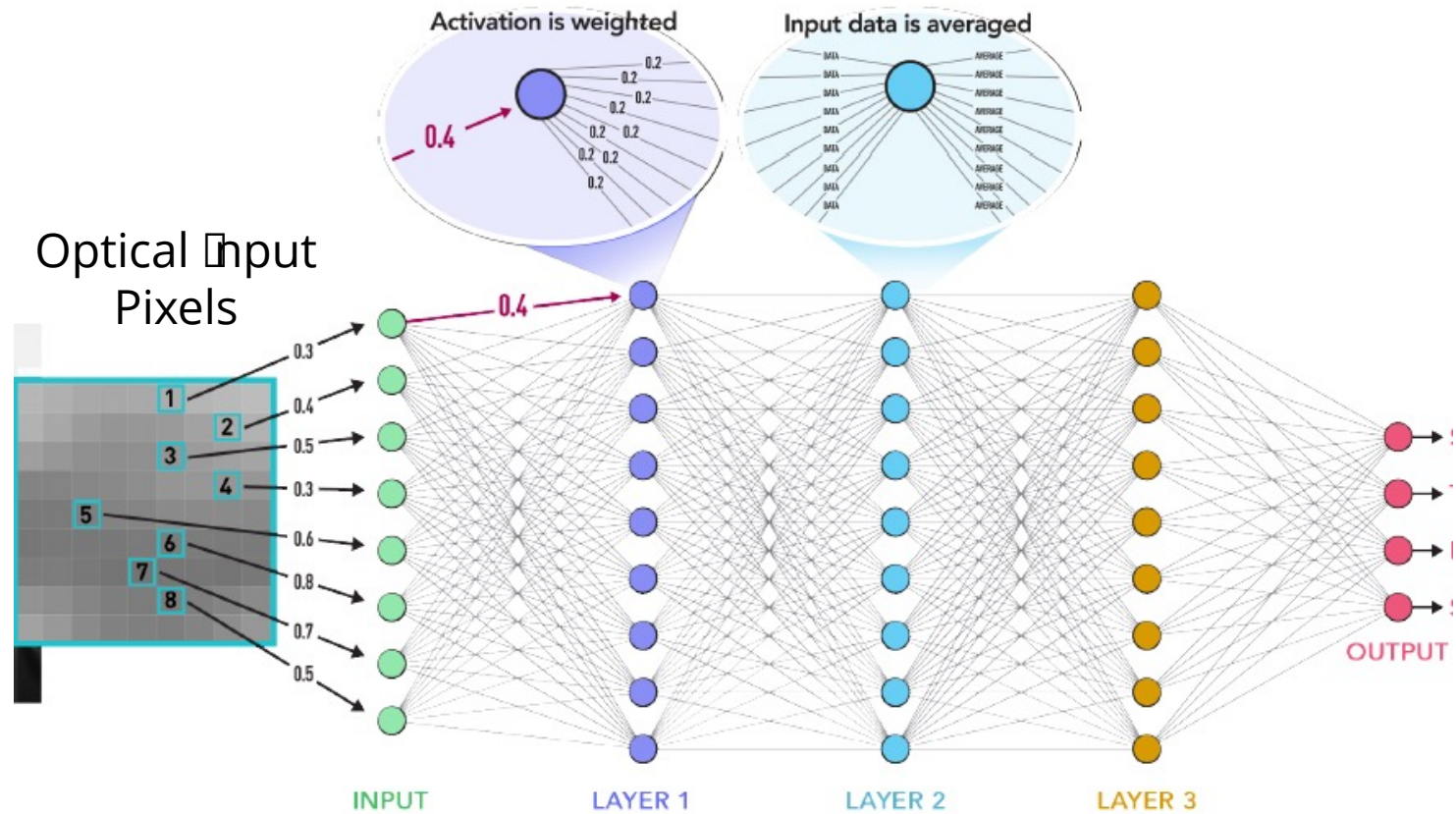
Single Node



What is Artificial Intelligence

Deep Learning

Three or more layers – each may perform a different function, e.g., **dense layer** (abstraction of input data) and **convolutional layer** (detects edges, textures, and patterns.)



What is Artificial Intelligence

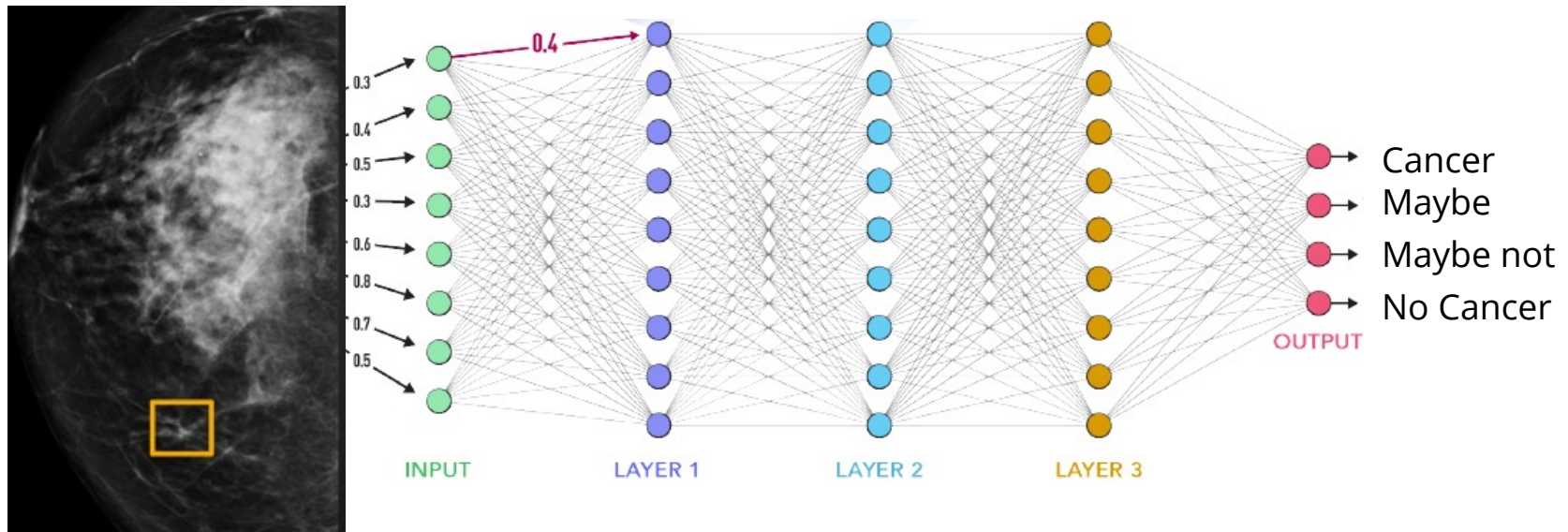
Deep Learning

- Each node has weight and threshold. Only if the node output (\hat{y}) is greater than the threshold does the data go to the next level. This results in the output of one becoming the input of the next node.
- As the network is trained, its weights and bias (thresholds) are adjusted to improve its results. The process in which the algorithm adjusts its weights works to reduce errors.
- With each training example, the parameters of the model adjust to gradually converge at the minimum

What is Artificial Intelligence

Machine Vision/Machine Learning

- Mammogram Reader 2048x1801 - NY Times January 1, 2020 - 4K HDTV 3,840 x 2,160 =8.3 million pixels



Tested on images where the diagnosis was already known,
the AI system **performed better than radiologists**

What is Artificial Intelligence

Machine Vision/Machine Learning

- In addition to vision as in the prior example, machines can learn to hear and convert text to speech.
 - Dragon Dictator
 - Facial recognition
- If speech or sound is converted to a digital format the AI can process it and convert it back.

What is Artificial Intelligence

Large Language Models – Generative AI- ChatGPT

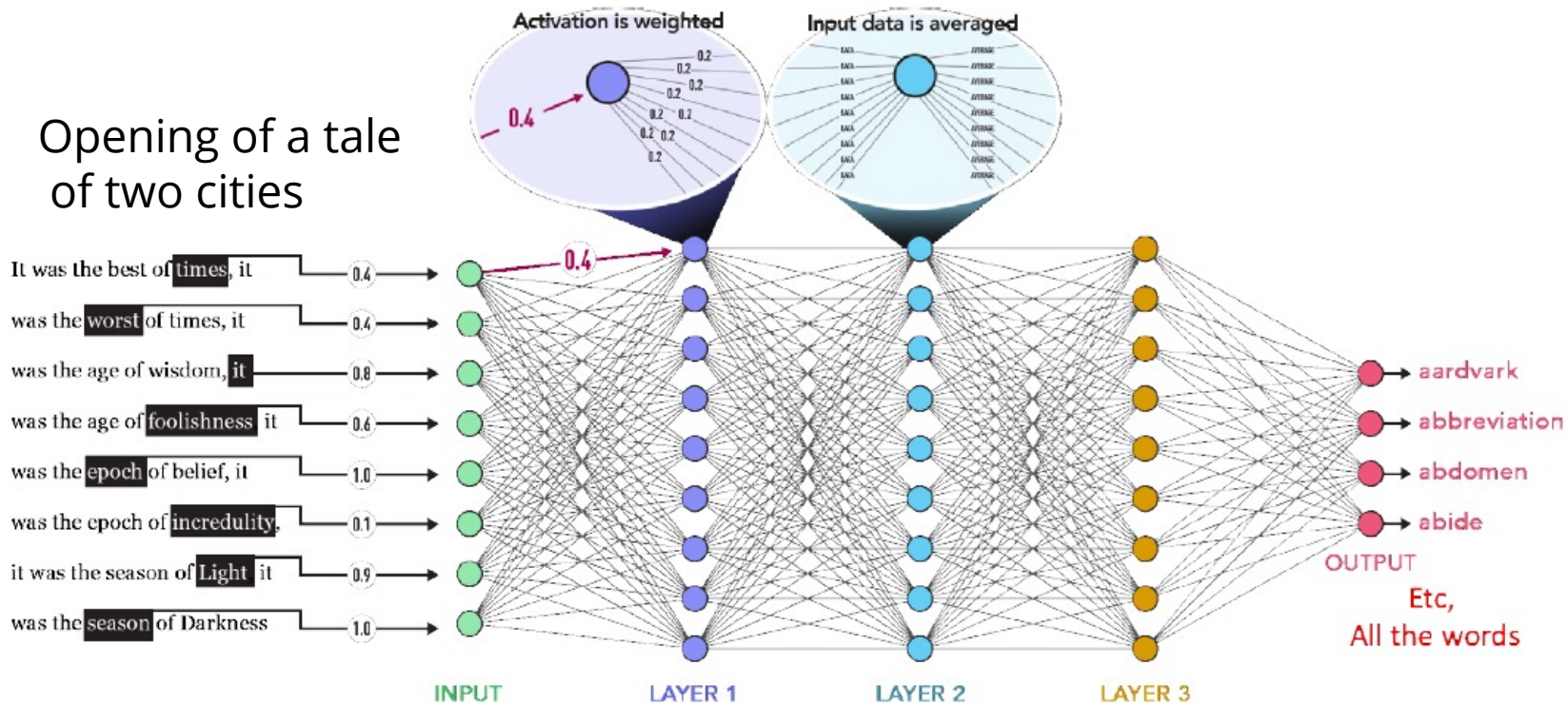
- **Large Language Models** are trained through “next token prediction”: They are given a large amount of text gathered from different sources, such as Wikipedia and news websites. The text is then broken down into “tokens,” which are basically parts of words (“words” is one token, “basically” is two tokens).
- **Generative AI-** Uses deep learning (and other techniques) to create content in response to prompts based on training data. The training data can be in the realm of Terabytes: 1 trillion bytes – 1,000,000,000,000 bytes or digital words.
 - Examples of Generative AI Siri/Alexa, Chatbots
- **ChatGPT** (Chat Generative Pre-trained Transformer) is a large language model generative AI powered by a special deep neural network architecture called a transformer network, which is especially good at learning from large sequences of data, including text, audio, images, and even protein structures. It was trained on originally trained on 0.570TB of text data from the internet last updated Sept. 2021.

What is Artificial Intelligence

Large Language Models – Generative AI

TASK: Given A Window Of 2000 Words In A Document, Predict The Next Word

Opening of a tale
of two cities



Form of autocomplete

©SparkCognition, Inc. 2023

What is Artificial Intelligence

Large Language Models (LLM) – Generative AI- ChatGPT

- Google Search – Westlaw – Lexis use index searches.
- For LLM if you give it a proper prompt, it can generate an answer. It needs to be preprogrammed to have the shell of, e.g., a story, and it incorporates your prompts into the story. The better the prompt the better the story.
- Prompt: You're a lawyer giving a talk to a group of other lawyers. Explain a neural network using no more than 100 words.
- Ladies and gentlemen, a neural network is a computational model inspired by the human brain. It comprises interconnected nodes or "neurons" organized in layers. Information flows through these connections, with each neuron processing and passing it along. Neural networks are used in various fields, including law, to analyze vast datasets and make predictions. Through training, these networks can learn patterns, aiding legal research, contract analysis, or predicting case outcomes. They excel in tasks like natural language processing, enabling more efficient and accurate legal analysis. In essence, neural networks emulate the human brain's ability to learn and make decisions from data.

What is Artificial Intelligence

↳ ChatGPT Intelligent?

- **Turing Test** – (Alan Turing) if a computer could answer questions posed by a remote human interrogator in such a way that the interrogator could not distinguish the computer's answers from those of a human subject, then the computer could be said to be intelligent and to think.
- **Chinese Room Text** – (John Searle) Imagine someone who doesn't know Chinese is sitting alone in a room where there are several boxes containing cards with Chinese characters of varying complexity printed on them and a manual that matches strings of Chinese characters with strings that constitute appropriate responses. Chinese speakers insert messages in Chinese through a slot into the room. Using the manual, the person in the room acts as a kind of computer program, transforming one string of question symbols into another string of answer symbols and deposits them through another slot to a Chinese speaking person on the other side of the room. The person in the room would not understand Chinese. He would learn how to respond but would not understand what was being asked or what answer he gave.

What is Artificial Intelligence

Is ChatGPT Intelligent?

- **Geoffrey Hinton** – Godfather of AI PhD University of Edinburgh, Principal Scientist at Google. On “60 Minutes” October 8, 2023, he stated that AI is intelligent and has understanding. To predict the next word, you need to understand the previous one.
- His prompt to GPT4: The rooms in my house are painted blue or white or yellow. Yellow fades to white within a year. In two years time I want them all to be white. What should I do and why?
- The rooms painted in white: you don’t have to do anything to these rooms because they are already white. ... The rooms painted yellow: you do not have to repaint because according to your information yellow paint fades to white within a year. The rooms painted in blue: you need to repaint with white paint because the blue paint will not fade to white.
- If you paint the yellow rooms white, the faded yellow paint might mix with the white and give a different shade.
- **What do you think? Was the answer on the internet all along?**

AI & Patents

Can AI be an Inventor on a US Patent?

Thaler v. Vidal, 43 F. 4th 1207 (Fed. Cir. 2022)

- DABUS is a particular type of **connectionist artificial intelligence**, i.e., an artificial neural network. Thaler, the operator of DABUS sought patent protection for two of DABUS' putative inventions by asserting that DABUS was the sole inventor.
- The court did not consider the truth of these allegations or whether DABUS was capable of invention. Rather the Court found that the text of the Patent Act makes it clear that “inventors must be natural persons: that is, human beings.”
- The Patent Act defines “inventors” as “individuals.” 35 U.S.C. §§100(f), 100(g), 115. The Supreme Court has explained that when used “[a]s a noun, ‘individual’ ordinarily means a human being, a person.” *Mohamad v. Palestinian Auth.*, 566 U.S. 449, 454 (2012). Dictionaries confirm this.
- The Court noted that it was “not confronted ... with the question of whether inventions made by human beings with the assistance of AI are eligible for patent protection.”
- **Professor Dennis Crouch** of University of Missouri School of Law suggested in a speech on October 22, 2023, that the AI's contribution would be **considered insignificant**, citing *HIP, Inc. v. Hormel Foods*, 66 F.4th 1346 (Fed. Cir. 2023)

Can an AI Invention Satisfy §101?

Recentive Analytics v. Fox Corp., 2023 WL 6122495 (D. Del. 2023)

- Recentive has three patents that are directed to **methods for generating network maps (e.g., television schedules)**. The methods improves on the prior art by allowing dynamic updating of the network map based on changing conditions and **optimizing the scheduling process using machine learning (ML) techniques**. An ML model is defined as at least one of **a neural network ML model** and a support vector ML model.
- The ML model **is trained** on historical data corresponding to one or more previous series of live events, wherein iterative training improves the accuracy of the ML model.
- US Supreme Court has held that exceptions to patentability include **"laws of nature, natural phenomena, and abstract ideas."**

Can an AI Invention Satisfy §101?

Recentive Analytics v. Fox Corp., 2023 WL 6122495 (D. Del. 2023)

- Recentive cites the PTO's Subject Matter Eligibility Example 39 "Method for Training a Neural Network for Facial Detection" as evidence that the patents-in-suit claim patent-eligible subject matter. District Court is not bound by PTO analysis but does greatly respect it.
- The Court finds that Example 39 relates to a neural network training patent and describes a set of novel methods to improve prior art neural networks. The patents-in-suit only relate to the application of machine learning techniques to a manual process.
- Held: "[T]he Network Map Patents and the Machine Learning Training Patents are directed to the abstract ideas of producing network maps and event schedules, respectively, using known generic mathematical techniques."

Can an AI Invention Satisfy §101?

Power Analytics Corporation v. Operation Technology, Inc., C.A. No. 16-1955, 2017 WL 5468179 (C.D. Cal. July 13, 2017)

- The case involved patents directed to “gathering information, e.g., real-time and predicted data values, and analyzing and updating a model with that information, e.g., comparing the gathered data and evaluating the prediction deviations to update the model” using a “machine learning engine” described in functional terms.
- **Held:** Claims are unpatentable since the patent “does not specify how the engine is configured. None of the claims recites a particular structure for how to compare the real-time and predicted values, how to pick the threshold values or how to update the virtual model.” *Id.* at *4;

Can an AI Invention Satisfy §101?

Health Discovery Corp. v. Intel Corp., 577 F. Supp. 3d 570 (W.D. Tex. 2021)

- Patents that “relate to innovative technology for using learning machines to identify relevant patterns in datasets, and more specifically, to a selection of features within the datasets that best enable classification of the data (e.g., Recursive Feature Elimination).” The data related to genomic sequencing and the machine learning related to neural networks to identify patterns in the data.
- Held: Claims to an enhancement of an abstract mathematical calculations is abstract. It is unlike those in CardioNet focusing on an improvement in a technology. 955 F.3d at 1371

Patent Conclusions

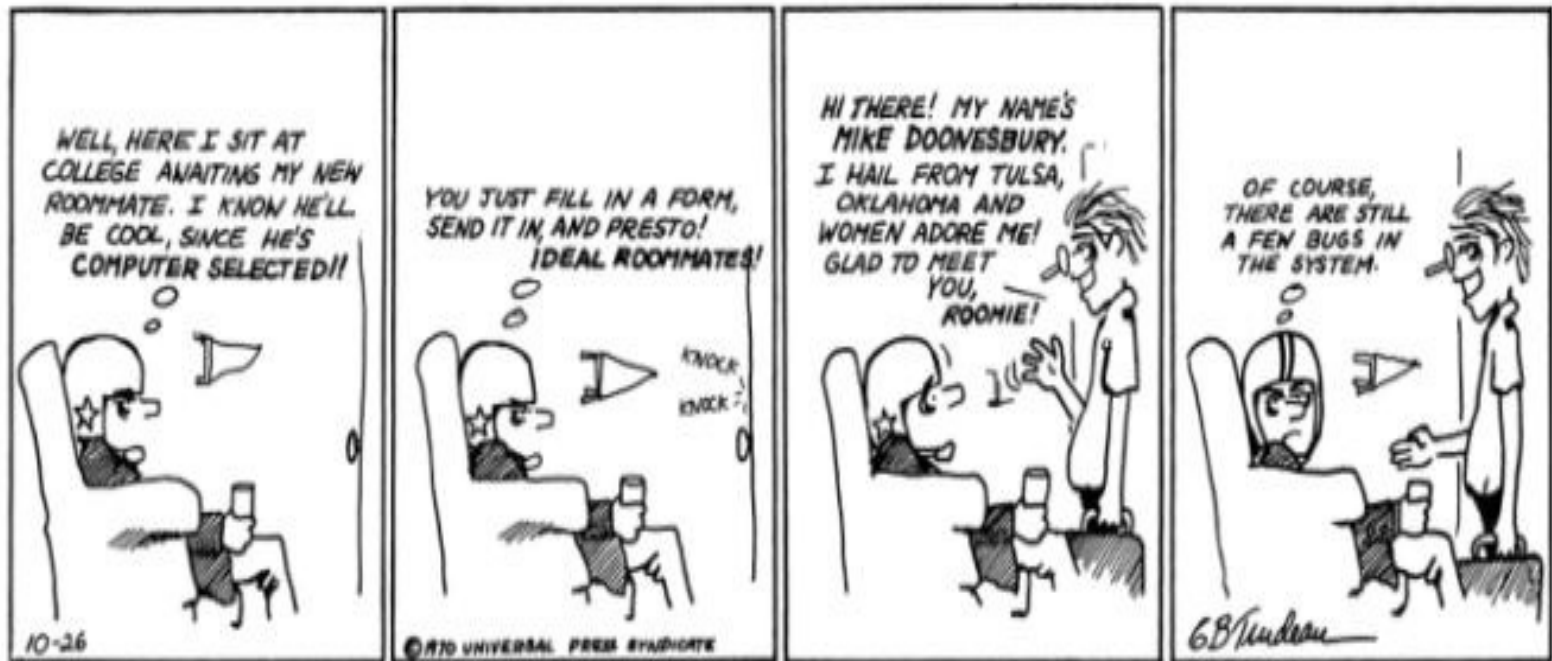
- AI cannot be an inventor or joint inventor
- AI inventions are under the same §101 restrictions as other computer implemented inventions
- AI inventions will be judged under §§102, 103 & 112 in the same way as any other computer implemented inventions
- Stand a better chance trying to patent how the AI machine is constructed as opposed to what it does. For example, a novel memory arrangement, way to speed up calculations, structure of the node layers, etc.

Handling A[®] Copyright & Trademark Issues



**Martin B.
Schwimmer**
■ PARTNER

Still a few bugs in the system



"Still a few bugs in the system," *Doonesbury*, 26 October 1970

Definitions

Large Language Model

Foundation Model

Generative AI

Text-to-image model

Recent Cases

- Authors Guild et al v. OpenAI, Inc.

[Authors Guild et al v. OpenAI Inc. et al 1:23-cv-08292-SHS | Lex Machina](#)

- Chabon et al v. OpenAI, Inc.

[Chabon et al v. OpenAI, Inc. et al 3:23-cv-04625-AMO | Lex Machina](#)

- Chabon et al v. Meta Platforms, Inc

[Chabon et al v. Meta Platforms Inc. 3:23-cv-04663-VC | Lex Machina](#)

- Huckabee et al v. Meta Platforms, Inc. et al

[Huckabee et al v. Meta Platforms, Inc. et al 1:23-cv-09152-LGS | Lex Machina](#)

- L. et al v. Alphabet Inc.

[L. et al v. Alphabet Inc. et al 3:23-cv-03440-LB | Lex Machina](#)

More Cases

- Silverman et al v. OpenAI, Inc.

[Silverman et al v. OpenAI, Inc. et al 4:23-cv-03416-KAW | Lex Machina](#)

- Kadrey et al v. Meta Platforms, Inc

[Kadrey et al v. Meta Platforms, Inc. 3:23-cv-03417-SK | Lex Machina](#)

- [Tremblay et al v. OpenAI, Inc.](#)

[Tremblay et al v. OPENAI, INC. et al 3:23-cv-03223-AMO | Lex Machina](#)

- Description: “OpenAI's ChatGPT software product allegedly used copyrighted books in its training dataset without the authors' consent.”

- [Andersen et al v. Stability AI Ltd](#)

Link: [Andersen et al v. Stability AI Ltd. et al 3:23-cv-00201-WHO | Lex Machina](#)

Andersen et al. v. Stability et al. January 2023 (N.D. California): Artists sued in a class action AI entity for acquiring billions of images for training of its AI systems to then create works.



[Getty Images \(US\), Inc. v. Stability AI](#)

Link: [Getty Images \(US\), Inc. v. Stability AI, Inc. 1:23-cv-00135-GBW | Lex Machina](#)

Author's Guild v OpenAI et. al.

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

AUTHORS GUILD, DAVID BALDACCI,
MARY BLY, MICHAEL CONNELLY, SYLVIA
DAY, JONATHAN FRANZEN, JOHN
GRISHAM, ELIN HILDERBRAND,
CHRISTINA BAKER KLINE, MAYA
SHANBHAG LANG, VICTOR LAVALLE,
GEORGE R.R. MARTIN, JODI PICOULT,
DOUGLAS PRESTON, ROXANA ROBINSON,
GEORGE SAUNDERS, SCOTT TUROW, and
RACHEL VAIL, individually and on behalf of
others similarly situated,

Plaintiffs,

v.

OPENAI INC., OPENAI LP, OPENAI LLC,
OPENAI GP LLC, OPENAI OPCO LLC,
OPENAI GLOBAL LLC, OAI CORPORATION
LLC, OPENAI HOLDINGS LLC, OPENAI
STARTUP FUND I LP, OPENAI STARTUP
FUND GP I LLC, and OPENAI STARTUP
FUND MANAGEMENT LLC,

Defendants.

No. 1:23-cv-8292

CLASS ACTION COMPLAINT

JURY TRIAL DEMANDED

Authors Guild v Open AI Allegations

-Open AI used large, publicly available datasets, include “Common Crawl”, and other datasets “Books1” and “Books2” and other datasets such as LibGen and Z-Library, which are “large pirate book repositories – paragraphs 80 –

There is no other way OpenAI could have trained a LLM like GPT-4. to accomplish this

AI is replacing “content writing jobs” – copywriting, journalism, online content

“Garbage e-books” published under a “real” authors name

Authors Guild Specific Allegations

- ChatGPT accurately generated summaries of copyrighted books

When prompted, ChatGPT generated an infringing, unauthorized, and detailed outline of the next purported installment of copyrighted works, using characters from existing books

ChatGPT could not have performed these acts had it not ingested and trained on copyrighted works

Infringed by reproducing copyrighted works in copies for the purpose of training LLMs and CHATGPT

The copying was willful because Def. knew the datasets on which it trained the LLMs contained copyrighted works.

“Memorization”

The computer science literature suggests that memorization is more likely when: models are trained on many duplicates of the same work; images are associated with unique text descriptions; and the ratio of the size of the model to the training data is relatively large.

Self Help (Recommended)

Copyright Safety for Generative AI

Forthcoming in the Houston Law Review

Houston Law Review, Vol. 61, No. 2, 2023

50 Pages • Posted: 4 May 2023 • Last revised: 13 Aug 2023

[Matthew Sag](#)

Emory University School of Law

Date Written: August 10, 2023

Self Help (Not Recommended)

ARTIFICIAL INTELLIGENCE

This new data poisoning tool lets artists fight back against generative AI

The tool, called Nightshade, messes up training data in ways that could cause serious damage to image-generating AI models.

By Melissa Heikkilä

October 23, 2023

Sunday morning in Sumer, 3500 B.C.





The Liar's Dividend

NEWS IN BRIEF

AI Researcher Warns Deepfake Videos Of Him Cheating On Wife Will Become More Common

Published March 22, 2021



BellingCat Beginner's Guide to Verification

ORIGINALITY: Use Google or Google Reverse Image Search to determine if this is repurposed

WHO: What is the source of the content? What is the reputation of the source?

WHERE: Geolocation analysis

WHEN: Chronolocation

WHY:

Verification Tools – Aior Not dot com

Google Reverse Image Search

Yandex Image Search

Aiornot.com

Sensity AI

Fictitious.AI

Originality.AI

Verification by the Media

NY Times Visula investigations

Washington Post Visual Forensics

Materials are available at:



Thank you