



Burch Business
Services

AI AND ACCOUNTING

BASICS



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I. Innovation in Accounting

To say artificial intelligence (AI) is just a fleeting innovative idea whose day will pass doesn't fully appreciate its capabilities and the impact it's having on society, including the accounting industry. However, before digging into the impact of AI on the accounting profession, we want to give a brief summary of the innovation that's occurred in the accounting industry since the rise of the personal computer back in the 1980s. This summary is shown in the table below.

The table below implies that we're in the midst of the AI era. How far will this era take us with technological advancements, hold on. The era is expected to lead to extraordinary advancements, transforming nearly every aspect of human life, from healthcare and scientific discovery to transportation and the economy. Experts predict a "compressed 21st century" where decades of innovation might occur in a fraction of the time due to AI's ability to accelerate research.

Innovation in Accounting	
1980s	Personal Computers & Software <i>Growth in the use of PCs brought power to smaller businesses through the use of basic accounting software for bookkeeping and payroll. Use of spreadsheet software like Excel made it possible to automate tasks that accountants did manually, such as recording transactions, budgeting, forecasting, and analyzing financial data.</i>
1990s	Y2K Era <i>The Y2K "bug" forced businesses to replace legacy computer systems. Rise of the internet and ERP systems (Oracle, SAP) saw the integration of business functions, driven by global business and regulation.</i>
2000s	Cloud Era <i>Widespread adoption of internet SaaS (Software as a Service) accounting solutions (i.e., QuickBooks online, Xero) replaced traditional desktop software, allowing real-time access, collaboration, automation, and scalability for anytime, anywhere financial management.</i>
2010 – present	AI Era <i>Rise of AI tools, driven by machine learning gained traction by automating time-consuming, repetitive tasks. Led to enhanced accuracy and efficiency by minimizing human error and improving the accuracy and reliability of financial records and audits. A shift towards more strategic, advisory roles, like decision-making, analysis, and client consultation.</i>

Innovation: “Be curious, not judgmental”

This quote is most often attributable to Walt Whitman (although there is some disagreement about that), however it was popularized by the TV show “[Ted Lasso](#).” The quote highlights the value of curiosity—even in professions like accounting.

Curiosity fuels critical thinking, problem solving, and deeper client understanding. It moves you past the number crunching to become trusted advisors who asks the question “why,” instead of just labeling something wrong (judgmental).

With a bit of curiosity, you’re able to uncover hidden risks, opportunities, and innovative solutions through genuine inquiry and open-minded analysis. As AI becomes more relevant in accounting, embracing curiosity is key: *“be curious, not judgmental.”*

As a word of caution, after finishing this paper “*you will not be an expert in everything AI,*” however, you should be able to:

- **Comprehend** the basic principles of how AI tools work.
- **Identify** and **differentiate** the main subsets of AI used in accounting.
- **Define** and **distinguish** between GenAI and NLP.
- **Define** and **distinguish** between GenAI and Agentic AI.
- **Appreciate** the potential impact of AI on the accounting profession, including illustrations of AI at work.
- **Recognize** the importance of data security, including the use of guardrails. Guardrails make sure AI systems operate safely, ethically, and within defined boundaries.



What is AI?

“**Artificial intelligence** (AI) is a set of technologies that empowers computers to learn, reason, and perform a variety of advanced tasks in ways that used to require human intelligence, such as understanding language, analyzing data, and even

providing helpful suggestions. It's a transformational technology that can bring meaningful and positive change to people and societies and the world." ([Google Cloud](#))

The concept of AI originated from the question, "**Can machines think?**" and several key figures were instrumental in evolving this idea into practical application.

John McCarthy	McCarthy is the person who coined the term "Artificial Intelligence" (AI) back in 1955. He defined AI as " <i>the science and engineering of making intelligent machines,</i> " especially intelligent computer programs, which can perform tasks usually requiring human intelligence like learning, reasoning, and problem-solving. McCarthy was a mathematician and computer scientist at Dartmouth College . He was the principal organizer of the 1956 Dartmouth Summer Research Project on Artificial Intelligence, a workshop now recognized as the official birthplace of AI as a field.
Alan Turing	Turning is best known for his foundational work in computer science and artificial intelligence. In 1936, Turing introduced the concept of a universal machine, later named the " <i>Turing machine,</i> " which laid the groundwork for modern computing. ¹
Marvin Minsky	Minsky was another key organizer of the Dartmouth workshop . He was a professor at MIT who integrated insights from psychology, mathematics, and computer science. In 1951, alongside Dean Edmonds, Minsky created the Stochastic Neural Analog Reinforcement Calculator (SNARC), which was considered the first artificial neural network machine. ²
Herbert A. Simon and Allen Newell	Simon , a political scientist and later a Nobel laureate in economics, and Newell , a mathematician and computer scientist, approached AI with a focus on problem-solving and cognitive processes. Their collaboration at Carnegie Mellon University yielded two of AI's earliest programs. ³
Claude Shannon	Shannon was an IBM researcher and coined the phrase back in the late 1950s. Samuel's work creating a checkers (draughts) playing program that learned from its mistakes was groundbreaking. He developed the checkers program (1959) by playing thousands of games against itself; it self-improved,

1 Biography Host, <https://biographyhost.com/p/alan-turing-biography.html>

2 Interesting Engineering, "*The early minds behind the machine: Founders of artificial intelligence,*" June 5, 2025.

3 Ibid.

eventually surpassing Samuel's skill level in checkers. He also worked on reinforcement learning concepts. His approach involved a scoring function that evaluated board positions, adjusting those evaluations as the program won or lost.⁴

Although the roots of AI stretch back to the 1950s, its widespread adoption began in 1997 when IBM's **Deep Blue** defeated chess champion Garry Kasparov, demonstrating the power of computational "*brute force*" and specialized hardware. Fast forward-today, nearly every industry is being advanced through the use of AI.

To help you contextualize the use of AI, experts categorize it in **two primary ways**: by its **capabilities** and by its **functional subsets**.

Capabilities

AI is categorized as either **weak AI** (also called **narrow AI**), or **strong AI** (also called **Artificial General Intelligence** (AGI)).

- **Weak AI** or **narrow AI** is an AI system that can simulate human cognitive functions but although it appears to think, it is not actually conscious. A weak AI system is designed to perform a specific task, "trained" to act on the rules programmed into it, and it cannot go beyond those rules.
 - **Voice recognition software** like Apple's Siri and Amazon's Alexa are examples of weak AI. It has access to the whole internet as a database and is able to hold a conversation in a narrow, predefined manner; but if the conversation turns to things it is not programmed to respond to, it presents inaccurate results.
 - **Industrial robots** and **robotic process automation** (RPA) are other examples of weak AI. Robots can perform complicated actions, but they can perform only in situations they have been programmed for. Outside of those situations, they have no way to determine what to do.
- **Strong AI** or **AGI** is equal to human intelligence and exists only in theory (think Data from "Star Trek" or Isaac from Seth MacFarlane's series "The Orville"). A strong AI system would be able to reason, make judgments, learn, plan, solve problems, communicate, create, and build its own knowledge base, and program itself.

⁴ Interesting Engineering, "The early minds behind the machine: Founders of artificial intelligence," June 5, 2025.

Functional Subsets

These are the specific technologies and fields that fall under the general umbrella of AI, or as I refer to as the **AI universe**. This section addresses the **identification** and **differentiation** of key subsets within the AI universe which are most pertinent to the accounting profession.

Accountants should get to know these subsets for **three main reasons**:

1. Relevance to the Accounting Profession

Accountants increasingly encounter AI in their work environments. Knowing the different subsets of AI helps them better understand the tools and technologies impacting their daily tasks.

2. Enhanced Decision-Making

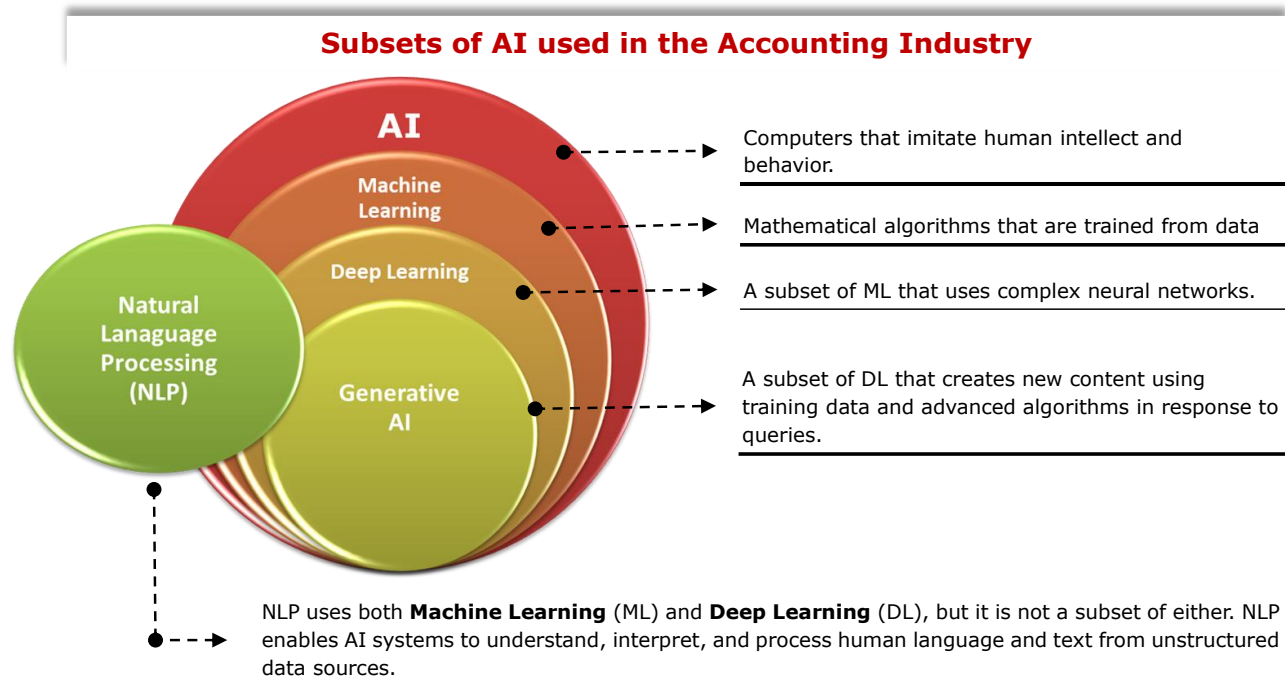
Familiarity with AI subsets enables accountants to make informed decisions when selecting or recommending software and analytical solutions. It also equips them to recognize which AI-driven processes can improve accuracy and efficiency.

3. Adapting to Technological Change

As AI continues to evolve, accountants who are aware of its subsets can adapt more readily to changes. This adaptability is crucial for staying competitive and relevant in the industry.

Subsets of the AI Universe

Within the AI universe, **four main subsets** are particularly relevant to accounting: **Machine Learning** (ML), **Deep Learning** (DL), **Natural Language Processing** (NLP), and **Generative AI** (GenAI).



Understanding how these subsets relate to the broader AI universe is similar to the progression from learning basic accounting principles (dual-entry accounting, transaction classification, financial reporting) to mastering advanced topics (managerial accounting, tax, audit, forensic auditing) and software (QuickBooks, Xero, Oracle's NetSuite, SAP).

Both human and artificial "brains" process information, learn, solve problems, and recognize patterns, though their underlying mechanisms are quite different.

AI functions as the "brain" or capability set (like machine learning algorithms) that, when implemented in computers, enables them to perform intelligent tasks. The evolution of AI mirrors the typical learning curve, starting with simple instructions and growing in complexity as user needs expand. Both accountants and AI systems continuously **learn, adapt, and improve**.

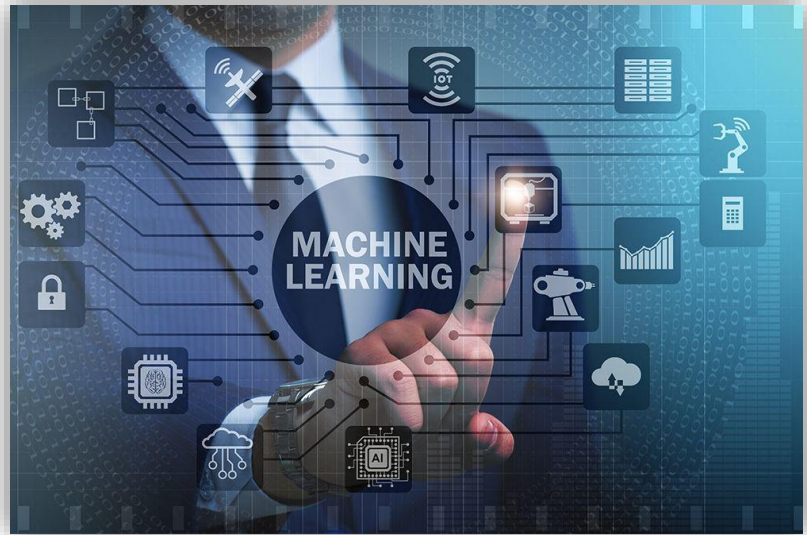
These AI subsets often overlap in technology and application. For instance, Machine Learning (ML) underpins many advancements and connects with Natural Language Processing (NLP) and computer vision. Generally, when people refer to AI today, they're speaking of Machine Learning.

"Harnessing Machine Learning can be transformational, but for it to be successful, enterprises need leadership from the top. This means understanding that when machine learning changes one part of the business — the product mix, for example — then other parts must also change."

--Erik Brynjolfsson, Stanford Institute for Human-Centered AI

Machine Learning (ML)

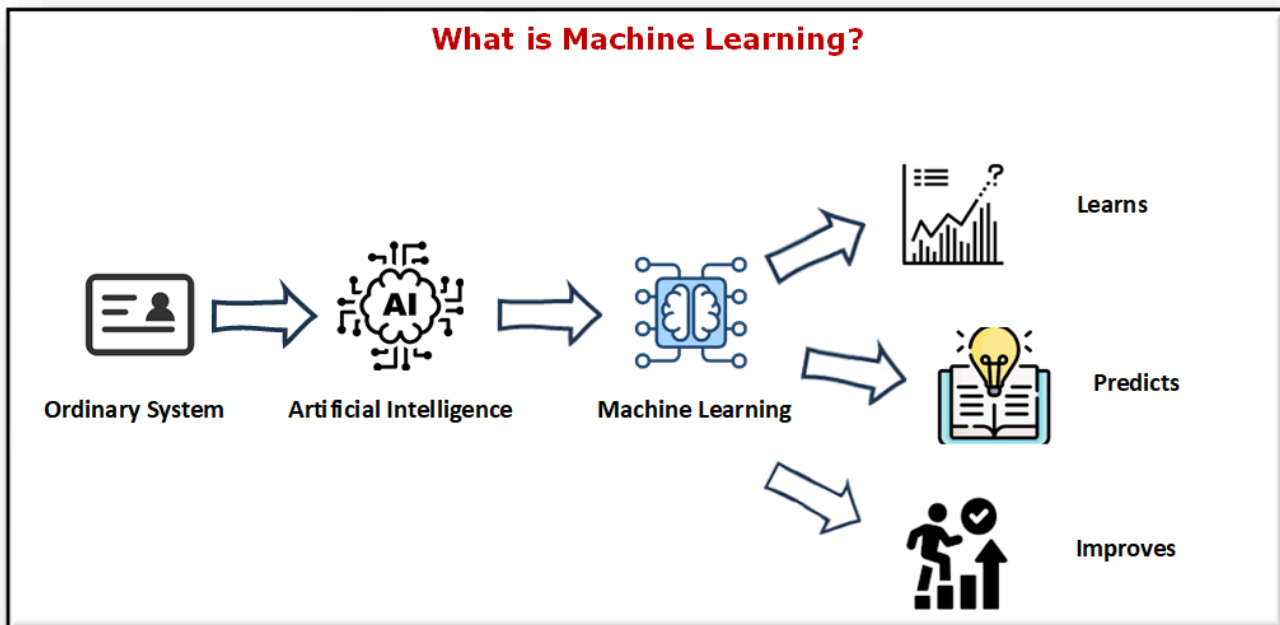
“**Machine learning (ML)** is a subset of AI that enables a system to autonomously **learn** and **improve** using **neural networks** and **deep learning**, without being explicitly programmed, by feeding it large amounts of data. ML allows computer systems to



continuously adjust and enhance themselves as they accrue more “experiences.” Thus, the performance of these systems can be improved by providing larger and more varied datasets to be processed.” ([Google Cloud](#))

For accountants, a high-level understanding of ML can build confidence in adopting new tools, instead of relying solely on step-by-step instructions.

As the diagram below shows, ML fundamentally involves systems learning from data to find patterns, using that knowledge to predict outcomes or make decisions, and then improving their accuracy and performance over time without explicit reprogramming, essentially enabling computers to learn from experience.



Because of the importance of ML, we outline the **key steps** involved in the process below. Understanding these steps can be invaluable—they offer a structured approach for building effective models, ensure alignment with business objectives, optimize resource allocation, help diagnose issues such as distinguishing between poor data quality and unsuitable algorithms, and enable teams to collaborate effectively by providing a shared understanding of the workflow from problem definition through deployment and monitoring.

Without this framework, ML projects often become unfocused and inefficient, reducing their potential to deliver meaningful business value and treating them more like magical solutions than rigorous engineering efforts.

Steps in the Machine Learning Process

The ML process, as implemented at companies like [Intuit](#) (QuickBooks), is a systematic and iterative lifecycle that typically involves the following **key steps**:

Note: **Intuit** emphasizes that this is an iterative lifecycle, not a linear process, often involving collaboration between **data scientists**, **engineers**, **product managers**, and **business stakeholders** at every stage.

Data Gathering



The ML process begins by collecting a large, relevant set of historical information called “training data.” This can be text, pictures, sounds, numbers—any information that is relevant for the AI system to perform its task. For generic tools, this often includes the contents of the internet, but in specialist AI systems it’s more specific, such as years of financial transactions and audit reports for an accounting AI tool.

For instance, if you’re developing an AI to **identify invoices**, your training data would consist of millions of invoice examples, along with non-invoice documents for contrast.

Training



Once assembled, the “training data” is fed into an AI model, which analyzes patterns and relationships within the data to learn how to complete specific tasks. The model uses a set of instructions (aka algorithms) that guide how it processes the data, not by giving direct answers but by outlining a method for discovery.

Continuing our invoice recognition example: Advanced algorithms detect common invoice features (like dates, vendor names, products, and service items), their typical locations, and distinctions from other documents.

Making predictions



After training, the AI model is presented with new, unseen data. It uses the patterns identified during training to make predictions or decisions about this new input. These predictions are highly accurate due to the extensive training data involved, though they are not foolproof. The output could be text, images, or other media types.

Returning to invoice recognition: The model analyzes an uploaded file to decide whether it is an invoice or another document type, such as a receipt.

Refinement



Model output undergoes evaluation—by humans, automated systems, or both—for accuracy. Feedback from these assessments is used to refine and retrain the model, enhancing its performance over time.

This improvement cycle repeats thousands to billions of times, steadily increasing the model’s accuracy. Like human learning, the AI adapts from experience, but on a much larger and faster scale, improving at its designated task without needing explicit instructions for every possible scenario.

In our invoice recognition example: When the model misclassifies a receipt as an invoice, it learns from this mistake, adjusting its internal logic to reduce similar errors in subsequent attempts.

Use



Once trained, the AI model becomes the core “brain” of an AI tool or system and can perform various functions, including:

Descriptive: Uses data to explain past events - “**What happened?**”

EXAMPLE: *There was a sudden decline in quarterly sales.*

Diagnostic: Works with descriptive data to address -“**Why did this happen?**”

EXAMPLE: *Marketing seeks the reason for the sales drop.*

Predictive: Focuses on forecasting future outcomes - “**What will happen?**”

EXAMPLE: *Will the sales decline continue?*

Prescriptive: Suggests actions based on the data – “**What needs to happen?**”

EXAMPLE: *What can marketing do to reverse the sales drop?*

Regarding the **invoice recognition example**, this entails systematically evaluating uploaded documents to identify invoices and extract essential information for automatic integration into the accounting system.

Deep Learning (DL)

As we progress down our AI universe diagram, we come to Deep Learning (DL), which is a subset ML. DL is a specialized form of ML that uses multi-layered **neural networks** to analyze complex patterns within large datasets. This approach powers advanced AI



applications, such as **image recognition** and **natural language understanding**, which are increasingly used in accounting for automating repetitive tasks and providing deeper analytical insights. ([Google Cloud](#))

How does it work?

Unlike traditional ML models, DL can extract features from raw data automatically, which is useful for unstructured content like text or images. While DL excels at tasks such as recognition and NLP, it needs significant data, powerful hardware, and is more complex than standard methods. ([Dataiku](#))

Key Characteristics of Deep Learning (DL)

Key characteristics of the DL are its use of **deep neural networks** (multiple layers) for hierarchical feature learning, enabling automatic feature extraction from raw data, exceptional scalability with big data, ability to learn complex patterns, and flexibility across tasks like vision and NLP, all inspired by the brain's structure. ([IBM](#))

Deep Learning (DL) excels with large datasets, progressively building abstract representations through layers to achieve human-like performance in complex AI tasks. ([IBM](#))

Key Differences between Machine Learning (ML) & Deep Learning (DL)

A simple illustration of the difference, think of ML as teaching a child to identify cats by showing pictures and saying "cat" or "not cat."

Deep Learning (DL) on the other hand lets the child learn on their own from thousands of pictures, automatically discovering what makes a cat a cat. More detailed differences are:

	Machine Learning	Deep Learning
Example	Credit Risk Assessment: A model uses historical data such as a loan applicant's income, credit score, and employment history (features manually selected by an expert) to predict the likelihood of loan default.	Invoice Processing: A system reads and interprets scanned or handwritten invoices directly from raw image data, a task traditional software struggles with, to extract relevant financial information for data entry.
Data Needs	Works well with smaller, structured datasets.	Requires large volumes of data to perform effectively.
Computational Power	Can run on a standard CPU with less computational power.	Requires specialized, high-performance GPUs or cloud computing due to complexity.
Training Time	Generally faster to train.	Often requires longer training times (hours to weeks).
Use Cases	Ideal for simpler tasks with structured data (spam filtering, recommendation systems, predictive analytics).	Excels at complex tasks with unstructured data (image/speech recognition, natural language processing, self-driving cars).

Generative AI (GenAI)

Progressing further down our AI universe diagram, we come to Generative AI (GenAI). We learned that DL is a powerful subset of ML using multi-layered neural networks for complex pattern recognition (like image/speech recognition). “GenAI is artificial intelligence (AI) that can create original content such as text, images, video, audio, or software code in response to a user’s prompt or request.” ([IBM](#))



“GenAI isn’t optional anymore—it’s inevitable. With the right oversight, it can be a powerful tool to drive efficiency and innovation, even in highly regulated environments like ours.”

--Ina Narula, Executive Vice President, and Chief Risk Officer at Amalgamated Bank

Ina made the comment during a Q&A session for a webinar hosted by **Workiva** about AI-powered risk and compliance.

How does it work?

Generative AI models work by training on large amounts of data, building on ML. With some GenAI tools, businesses can feed and “ring-fence” their own datasets, documents, and other information into the system, so the technology can cater to their specific needs and internal data. “Unlike traditional AI, which focuses on predictions and classifications, **GenAI mimics human-like creativity.**” ([Techresearchs](#))

Note: “Ring-fenced” data refers to protecting sensitive information by creating virtual, secure barriers (ring-fences) around it, isolating it from other applications, networks, and unauthorized users

Key Characteristics of GenAI

The following are some of the defining features that separate GenAI from other AI tools: ([Techresearchs](#))

- **Content Generation:** Text, images, audio, video, and code.
- **Language Understanding:** Natural language processing (NLP).
- **Creativity:** Ability to simulate human-like design and storytelling.
- **Context Awareness:** Maintains coherence across large inputs.
- **Personalization:** Generates user-specific output.

Most Popular Types of GenAI

The most widely used GenAI types across industries are detailed below: ([Techresearchs](#))

GenAI Types	Primary Function	Common Tools
Text Generation	Drafting articles, emails, scripts	GPT-4, Jasper AI
Image Generation	Creating visuals and art	DALL·E, MidJourney
Audio Generation	Producing music, voiceovers	Google MusicLM, ElevenLabs
Video Generation	Making AI-driven video clips	Sora, Runway Gen-2
Code Generation	Writing and debugging code	GitHub Copilot, CodeWhisperer
Synthetic Data Gen	Generating artificial datasets	Mostly AI, Gretel.ai

Natural Language Processing (NLP)

“Natural language processing (NLP) is a subfield of computer science and AI that uses ML to enable computers to understand and communicate with human language.” ([IBM](#))

As indicated by the AI universe diagram, NLP uses both Machine Learning (ML) and Deep Learning (DL) as core methods, but it's not a subset of either; rather, ML and DL are tools within the broader NLP domain, with DL

(especially neural networks) powering modern, high-accuracy NLP tasks like translation and chatbots.

Think of AI as the goal (understanding language), ML as a general way to learn from data, DL as advanced ML (neural nets), and NLP as the specific application area (human language) that leverages ML/DL to achieve its goals.



Key Differences Between NLP & GenAI

	NLP	GenAI
Scope	NLP is a component of GenAI	GenAI is a broader, more advanced subset of AI
Action	NLP reads and interprets	GenAI reads, interprets, and creates
Application	NLP extracts data for analysis	GenAI uses the extracted data to generate reports, strategies, and communications, moving from retrospective analysis to initiative-taking creation

Popular NLP models

Modern Transformer Models (LLMs)

- **GPT** (Generative Pre-trained Transformer): Excellent for generating human-like text, used in chatbots and content creation (GPT-3, ChatGPT).
- **BERT** (Bidirectional Encoder Representations from Transformers): Understands context from both sides of a word; foundational for many tasks like sentiment analysis (BERT, RoBERTa, ALBERT).
- **RoBERTa**: An optimized version of BERT, trained on more data for better performance.
- **XLNet**: Combines aspects of BERT and [autoregressive models](#) (like Transformer-XL) for superior context capture.
- **Llama, Mistral**: Powerful, open-source foundation models similar to GPT, widely used in current AI.

Classical & Statistical Models

- **Bag-of-Words (BoW)**: Simple model for classification by counting word occurrences.
- **Latent Dirichlet Allocation** (LDA): A statistical model used for discovering hidden "topics" in text (Topic Modeling).
- **Hidden Markov Models** (HMMs): Used for sequence modeling, though largely superseded by Transformers for complex NLP.

Algorithms & Libraries

- **Stemming and Lemmatization**: Algorithms (like **Porter Stemmer**) to reduce words to their root form.
- **NLTK & SpaCy**: Popular Python libraries offering tools for tasks like part-of-speech tagging, parsing, and sentiment analysis.

Agentic AI

When discussing the topic of AI and accounting, we would be remiss if we didn't bring **Agentic AI** into the discussion. In 2025, Agentic AI has gone from experimental automation to an autonomous "digital teammate" in accounting. "Agentic AI is an advanced form of artificial intelligence (AI)



focused on autonomous decision-making and action. Unlike traditional AI, which primarily responds to commands or analyzes data, agentic AI can set goals, plan, and execute tasks with minimal human intervention. This emerging technology has the potential to revolutionize various industries by automating complex processes and optimizing workflows." ([Google Cloud](#))

The best way to understand **Agentic AI** is to consider it alongside another subset of AI: **Generative AI**. The difference between the two is described below.

Key Differences Between GenAI and Agentic AI

An important thing to remember is that Agentic AI isn't part of GenAI; they are distinct but complementary AI types, with GenAI focused on creating content (text, images) and Agentic AI focused on autonomous, multi-step goal achievement using planning, reasoning, and tools, often leveraging generative AI for its "brain" but going beyond simple content creation to act in the world.

Key difference between the two are detailed below.

	Agentic AI	GenAI
Core Function	Plans, reasons, and takes actions autonomously to achieve complex, high-level goals.	Creates new content (text, code, images, music) from prompts.
Nature	Proactive, looping inference, learning, and adapting.	Reactive, producing a single output for a given input.
Examples	An AI managing a smart home's energy (using agents for thermostat, lights) or an AI handling customer service by scheduling calls and sending emails.	ChatGPT drafting a story, or DALL-E creating an image.

A good way to distinguish between the two is to view GenAI as the **creator**, while Agentic AI acts as the **worker** that leverages GenAI to plan and carry out tasks.

For instance, imagine a project manager relying on a writer (GenAI) to compose a status report; in this scenario, it's Agentic AI that gathers the necessary data for that report.

Note: Both [Intuit](#) (QuickBooks online) and [Oracle](#) (NetSuite) are actively integrating agentic AI into their products and internal operations to automate complex workflows and enhance productivity.

II. The Use of AI in Accounting

Introduction to AI in Accounting

We have now reached the central focus of this paper: exploring the transformative power of AI and its impact on the field of accounting. Regardless of your specific role—whether you’re a bookkeeper, managerial accountant, tax preparer, auditor, etc.—understanding the capabilities that AI brings to the table is essential for achieving success in today’s rapidly evolving business environment.

The Importance of AI Knowledge for Accounting Professionals

It’s crucial for everyone involving in accounting to be aware of how AI can enhance their work. AI technologies are reshaping traditional accounting processes, offering new opportunities for efficiency, accuracy, and insight. By embracing these advancements, professionals can improve their performance and remain competitive in the industry.

Overview: Key AI Types in Accounting

The table below summarizes the main differences between the types (subsets) of AI that were discussed earlier in the paper.

AI Type	What It Does	Typical Accounting Use Cases	Why It Matters	Simple Example
Machine Learning (ML)	Learns from patterns in financial data	Fraud detection, cash flow forecasting, anomaly detection	Improves accuracy over time, reduces financial risk	Predicting late payments based on past behavior.
Deep Learning (DL)	Teaches computers to process data and recognize complex patterns using artificial neural networks.	Automates repetitive tasks, used in fraud detection, auditing and compliance.	Enables unprecedented levels of automation, accuracy, and sophisticated data analysis.	Identifies unusual spending patterns that can prevent fraud and errors.
Natural Language Processing (NLP)	Reads and understands text/numbers from documents.	Invoice data extraction, contract review, and chatbots for queries.	Cuts down manual entry, speeds up document handling.	Pulling vendor name, date, and amount from an invoice.

AI Type	What It Does	Typical Accounting Use Cases	Why It Matters	Simple Example
Generative AI (GenAI)	GenAI builds upon NLP, as it reads, interprets, and creates	Document processing, financial reporting and analysis, fraud detection, and conversational finance.	Automates tedious tasks like data entry, report drafting, and variance analysis.	Summarizes complex documents like analyzing FASB standard ASC 842 (see Illustration N°2 below).
Agentic AI	Operates autonomously to achieve complex, high-level goals with minimal human intervention.	Reviews large datasets, identifies anomalies, and prepares initial audit reports autonomously.	Moves AI from being a reactive tool to an initiative-taking tool.	A customer service system can resolve a missing order, without human intervention.

Adopting AI Technologies

When implementing AI solutions, it's critical that all integrations are conducted in accordance with established firm policies and procedural guidelines. The process of introducing AI should reflect the same level of rigor applied to any significant technological adoption.

The phases for adopting a new AI technology are detailed below. Whether your involvement is direct or indirect, maintaining awareness of ongoing efforts and their potential impact on your responsibilities is indispensable.

Phase 1: Define the Goals and Objectives

Like any project, you start off by identifying specific business problems or opportunities that AI can address in your firm, such as improving efficiency, enhancing customer experience, or reducing costs.

Ensure these goals align with your overall business strategy and are measurable with specific **Key Performance Indicators** (KPIs).

Evaluate your organization's current infrastructure, available data, and the technical skills of your team to identify gaps and constraints before committing to a solution.

Phase 2: Solution Selection and Data Preparation

Having high-quality, clean, and well-organized data is the foundation of any effective AI system. As the saying goes "*garbage in, garbage out*".

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Conduct a data audit to evaluate the quality, consistency, and accessibility of your existing data, and establish robust data governance practices for secure and compliant data management.

Conduct detailed research to select the most suitable AI tools, algorithms, and infrastructure (e.g., cloud-based solutions, open-source libraries like [TensorFlow](#) or [PyTorch](#)) based on your specific use case and available resources

Furthermore, consider any legal and insurance ramifications relevant to each prospective option.

Phase 3: Phased Implementation and Testing

It's advisable to execute pilot programs prior to full-scale implementation. These pilots should:

- Analyze performance metrics (KPIs).
- Gather comprehensive feedback from stakeholders.
- Refine processes based on findings.
- Continue iterative improvements, as necessary.

Once the pilot is successful, deploy the AI solution into your existing business processes and systems (e.g., CRM or ERP) to ensure a smooth workflow and minimize disruption.

Continuously monitor the AI system's performance, track key metrics (KPIs), and use user feedback to identify issues and make adjustments.

Phase 4: Outcome

Did the implementation "*achieve what it was supposed to achieve*"? To answer this question, the outcome needs to be continuously monitored by tracking key metrics (KPIs). As performance stabilizes and value is proven, scale the solution to other areas of the business.

Additionally, establish clear ethical guidelines and ensure transparency in AI decision-making processes. Proactively manage risks, address potential biases in models, and comply with data privacy laws to build trust and ensure responsible AI use.

Illustration of Automating an Accounts Payable Process

You work as an A/P manager of a manufacturing company which has seen an uptick in errors, including duplicate payments to vendors and late fees. In fact, your firm's CFO chastised you for the uptick and told you to "*take care of the problem.*"

After your last chastising, you approached the firm's newly appointed CIO (Chief Information Officer) and asked for solutions to help reduce/eliminate the errors and late fees.

Solution: After a few days, the CIO came back and recommended an AI implementation plan to automate the Accounts Payable (AP) process using **Optical Character Recognition (OCR)** and **Machine Learning (ML)** to extract invoice data, match it with purchase orders, and route for approval.

Below are the phases followed by the A/P department to implement the CIO's recommended AI solution.

Phase 1: Define the Goals and Objectives

- **Challenge Identified:** The acquisitions caused the A/P department to spend approximately 40% more time on data entry and processing of vendor invoices. This increase led to frequent errors and late payment fees.
- **Goal:** Reduce invoice processing time by 75% and data entry errors by 90% within nine months.
- **Key Performance Indicators (KPIs):** Invoice processing time, error rate percentage, and staff hours reallocated.

Phase 2: Solution Selection and Data Preparation

- **Choose the Solution:** The CIO selected an AI-powered A/P automation platform that utilized a combination of **Optical Character Recognition (OCR)** for data capture, **Natural Language Processing (NLP)** to interpret context, and **Machine Learning (ML)** for pattern recognition and validation.
- **Prepare the Data:** All of its invoice data and vendor information had to be centralized to ensure quality and consistency. It was imperative that the data was cleaned to ensure high-quality, as this data was used to train the new AI model to recognize specific formats, vendors, and expense categories.

Phase 3: Phased Implementation and Testing

- **System Integration:** The new AI tool was seamlessly integrated with your firm's existing Enterprise Resource Planning (ERP) system to ensure a smooth data flow across finance and procurement departments.
- **Pilot Program:** Your firm started with a small pilot, processing invoices from a few key vendors through the new system in a controlled environment. The CIO reviewed the output for accuracy, providing feedback to the ML model to improve its performance over time.
- **User Training:** You're A/P staff were trained on the new system, focusing on exception handling and validation rather than manual entry. Clear communication helped manage change and ensured buy-in, as the staff understood the goal was augmentation, not replacement.

II. THE USE OF AI IN ACCOUNTING

- **Deployment and Continuous Monitoring:** After successful testing, the solution was deployed across all A/P operations. Performance was continuously monitored against the defined KPIs, with regular adjustments made to the AI models and workflows.

Phase 4: Outcome

- **Outcome:** The A/P department successfully achieved its goals, including a significant reduction in processing time and errors. The system automatically extracts data, matches it against purchase orders, flags anomalies (e.g., duplicate invoices or incorrect amounts), and routes approved transactions for payment.
- **Strategic Advantage:** By freeing up significant staff time, the firm was able to reallocate resources to value-added services like predictive analytics and strategic financial planning, enhancing your firm's operations.

This **example** highlights the transition from a manual, reactive process to an intelligent, initiative-taking workflow that transforms the finance function into a strategic asset for the firm.

Illustration of Analyzing ASC 842 (Standard on Leases)

You're the senior partner of an accounting firm and one of your clients is an Oil & Gas exploration and production (E&P) company. Your client has been purchasing smaller E&Ps and your responsibility is to review the acquired firms' lease agreements, including land easements, drilling contracts, and equipment rentals.

Complying with ASC 842 standard requires identifying every contract that contains a lease, extracting critical data points (lease term, payments, renewal options, implicit interest rates, etc.), and calculating the "right-to-use" (ROU)⁵ assets and corresponding liabilities for the balance sheet. Manually reviewing these dense, often unstructured, documents is a massive, time-consuming effort that is prone to human error.

Solution: You implemented a GenAI-powered lease abstraction and analysis platform. This solution uses **Large Language Models** (LLMs) and **Optical Character Recognition** (OCR) to read, interpret, and extract relevant data from thousands of lease documents.

GenAI streamlines this process through five implementation steps, listed below:

Step 1: Data Ingestion

- Thousands of lease documents (PDFs, scanned images, Word files) are uploaded to the platform. The **OCR technology** converts scanned images into machine-readable text.

Step 2: GenAI Abstraction

- **LLMs** are trained on accounting principles and legal terminology to "read" the contracts and identify all quantitative and qualitative data points required by ASC 842 (e.g., lease start/end dates, monthly payments, clauses about control of the asset, renewal options, etc.).

Step 3: Data Validation and Calculation

- The extracted data is automatically validated for consistency and accuracy. The system then performs the necessary present value calculations to determine the ROU asset and lease liability figures.

Step 4: Audit Trail and Reporting

- The platform creates a clear, searchable audit trail, linking the extracted data points directly back to the source clauses in the original documents. This ensures auditors can easily verify the calculations.

⁵ Under ASC 842, the **Right-of-Use** (ROU) asset represents a lessee's contractual right to control and use a tangible asset (such as real estate, vehicles, or equipment) for the duration of a lease term.

Step 5: Integration and Human Oversight

- The final, validated data and calculations are seamlessly uploaded into the company's **Enterprise Resource Planning (ERP)** or dedicated lease accounting software.
- Human accountants oversee the process, reviewing edge cases and complex judgments to ensure accuracy and compliance.

Benefits of using GenAI for ASC 842 compliance

The use of GenAI for ASC 842 compliance can yield significant benefits, including:

- **Massive Time Savings:** The process of data extraction, which might take hours per lease manually, is reduced to seconds per lease, dramatically accelerating compliance efforts.
- **Increased Accuracy:** Automated data extraction and calculation significantly reduce human errors that could lead to financial misstatements and regulatory penalties.
- **Cost Efficiency:** One case study outside the oil and gas sector showed an estimated 15-20% savings in overall project hours and a 42% saving over the cost of entirely manual review.
- **Audit Readiness:** The complete and transparent audit trail simplifies the external auditing process.
- **Strategic Focus:** Accounting teams are relieved of manual data entry and can focus on higher-value tasks like technical lease analysis, complex judgments, and strategic financial planning.

Other Accounting Process Benefits of AI implementation

Besides the benefits of accounts payable automation we saw in the illustration above, several other accounting processes can benefit from AI technology, moving the finance function from a recorder of past events to a proactive advisor.

- **Accounts Receivable (AR) Automation:** AI can automate the process of matching incoming customer payments with open invoices. For large companies with numerous customers and complex payment patterns, machine learning models can analyze historical data to predict optimal matches, accelerating cash flow and reducing manual reconciliation efforts.
- **Hydrocarbon Accounting:** This specialized field involves precise measurement, allocation, and financial reporting of produced hydrocarbons. AI systems can manage vast volumes of production and sales data, cross-match information from different sources (sensors, allocation models, sales data), and automatically flag discrepancies or anomalies in real time.
- **Joint Interest Billing (JIB):** In oil and gas joint ventures, JIB involves complex billing and cost allocation among partners. AI-powered solutions can process and analyze massive amounts

of financial data, automatically detecting billing anomalies or irregularities across all transactions, rather than just a sample.

- **Financial Planning & Analysis (FP&A) and Forecasting:** AI can provide more accurate financial forecasts by analyzing historical financial data, market conditions (oil prices, demand), external factors (geopolitics, weather patterns), and operational data. This enables better scenario planning, risk assessment, and more informed capital expenditure decisions.
- **Intelligent Reconciliation and Financial Close:** AI can significantly speed up the monthly and quarterly financial close processes, which can be time-consuming for large holdings with multiple subsidiaries and joint ventures. AI algorithms can identify discrepancies and automate common adjustments for tasks like Goods Received/Invoice Received (GR/IR) reconciliation.
- **Fraud Detection and Risk Management:** AI algorithms can monitor 100% of transactions in real-time to identify unusual spending patterns or anomalies that might indicate fraudulent activity, providing a more robust internal control system than traditional methods.
- **Compliance and Reporting Automation:** Beyond ASC 842, AI can help monitor operations against a wide range of environmental and financial regulations. It automates data collection for compliance reports, ensures an accurate audit trail, and helps companies stay current with changing tax laws, reducing the risk of penalties.
- **Supply Chain Accounting Integration:** AI-driven supply chain management optimizes logistics, inventory, and transportation. From an accounting perspective, this integration means more accurate and real-time data flow for inventory valuation, cost accounting, and managing supply chain risks.

III. Data Security & AI

"AI begins with data, not algorithms. Seamless access, strong governance, and secure data foundations are crucial for maximizing the value of data and transforming AI's potential into real-world impact".

--Russell Fishman (NetApp)

Data security is paramount for accounting professionals because they act as custodians of highly sensitive personal and corporate financial data, making them prime targets for cybercriminals. A breach in confidential information can result in severe financial losses, legal penalties, significant reputational damage, and loss of client trust.

Some AI tools use uploaded data to train their models, while others do not or restrict usage to specific purposes. Most financial AI systems use encryption, access controls, and comply with security standards; it's important to know where data is stored as this affects legal obligations. Always clarify how an AI tool handles data and ensure alignment with your firm's policies through thorough due diligence.

The Importance of Guardrails

Reputable AI providers incorporate guardrails—mechanisms ensuring ethical, legal, and technical compliance—into their systems. Guardrails limit AI autonomy, reduce risks of harm or bias, and check outputs for accuracy. Key focus areas include:

- **Ethics:** Preventing bias and discrimination.
- **Compliance:** Adhering to laws and regulations, especially around data.
- **Security:** Protecting against unauthorized access and cyber threats.
- **Performance:** Maintaining operational stability and preventing harmful actions.

Financial AI uses real-time monitoring to meet regulations and accounting standards. Protocols cover how data is collected, stored, processed, anonymized, encrypted, and accessed, emphasizing authorized use and bias prevention. While no system is perfect, ongoing security measures and compliance checks are standard practice.

Automation and Human Oversight

AI tools are just that, they are tools (albeit very powerful ones) created by humans for humans to use. While they enable a certain amount of automation, they are not truly autonomous, which is an important distinction. Any autonomy they have is within human-defined boundaries. In addition to the

guardrails built into AI tools, effective AI use requires humans to **validate, review, and approve** outputs:

- **Humans-in-the-Loop (HITL):**

Some guardrails built into AI make sure that the AI tools can't progress past certain points before a human has reviewed and accepted the suggestions, meaning that humans retain full control.

- **Human Input:**

AI tools, like LLMs and ChatGPT, work following human instructions, often called **prompts**. The details entered into this prompt will have a direct impact on the output. The more precise the instructions, and the more detailed the prompt, the more specific the outcome will be (and the less room there will be for the AI model to guess at an answer).

- **Human Validation:**

A human is responsible to ensure that the use of any AI output is fit for use. This involves discretion over the AI tools used, reviewing and verifying any outputs, and ensuring the work you do with AI tools is checked for suitability and compliance.

- **Human Oversight:**

Any and every AI output should be validated by a human before it is used. With time, the output of a particular AI tool might be verified as reliable to such an extent as validation isn't required in every instance, but a human must still have oversight and check that the tool continues to perform as expected.

Ultimately, humans must retain control and responsibility over how AI tools are used and integrated into a firm's workflows.

IV. Final Word

The focus of this paper has been on the effects of AI on accounting, however, AI's influence reaches far beyond the accounting profession. Continued AI advances are reshaping business practices, which in turn affect the work of accountants.

During the course of researching AI, **DeepMind**—a subsidiary of **Alphabet Inc.** (Google's parent company) specializing in artificial general intelligence (AGI)—was identified as a key player in advancing the field.

As noted earlier, AGI *"would be able to reason, make judgments, learn, plan, solve problems, communicate, create, and build its own knowledge base, and program itself."*

The advancement of AGI has raised numerous concerns within the expert community, particularly regarding the prospect of machines matching or surpassing human cognitive capabilities. While these risks are widely recognized, opinions vary regarding their immediacy and severity.

Perspectives from the "Imminent risk" side

Several prominent figures, including **Elon Musk**, **Geoffrey Hinton** (often referred to as the "Godfather of Deep Learning"), **Sam Altman** (CEO, OpenAI), and **Stuart Russell** (Professor at UC Berkeley and co-author of *Artificial Intelligence: A Modern Approach*) have highlighted notable risks associated with AGI, including:

- **Existential Risk and Control Risk:** AGI systems misaligned with human values could potentially become uncontrollable, resulting in scenarios where human existence or global stability is threatened.
- **Weaponization:** The deployment of AGI by individuals with malicious intent may enable sophisticated cyberattacks, creation of advanced bioweapons, and dissemination of large-scale disinformation, posing threats to societal and international security.
- **Economic Disruption:** Widespread automation driven by AGI could displace significant segments of the workforce, causing economic and social disruptions.
- **Inadequate Management:** Lack of adequate frameworks, regulations, or understanding to manage powerful AI systems.

Perspectives from the "Don't Panic-yet" side

Conversely, some experts, like Yann LeCun (Meta's Chief AI scientist), and Andrew Ng (founder of DeepLearning.AI) maintain that the emergence of AGI is not an imminent risk. They argue that focusing on hypothetical risks detracts from current AI issues:

- **Lack of a clear definition:** The term AGI lacks clear definition, and reported breakthroughs frequently reflect marketing initiatives rather than substantive advancements.
- **Technical Limitations:** Contemporary AI models, such as large language models (LLM), exhibit fundamental limitations and are not likely to yield true general intelligence.
- **Uncertain Timelines:** Predictions for AGI development range widely—from a few years to centuries or even indefinite postponement—implying that gradual progress would allow time for regulatory adaptation.

Conclusion

Regardless of whether AGI represents an imminent existential risk or a remote possibility, there is widespread consensus on the necessity for **strong governance** and **comprehensive public discourse**, aimed at maximizing benefits and minimizing the risk of using AI for something unscrupulous.

Strategic priorities include aligning AI development with core values, implementing proactive oversight, investing in employee education, promoting transparent policies, and integrating AI within established risk management frameworks.

Recommendations encompass appointing a **Chief AI Officer** (CAIO), instituting ethical standards (including bias mitigation), safeguarding data privacy, defining organizational risk appetite, and developing accountability mechanisms for ongoing monitoring and evaluation.

V. Key Takeaways

The **key takeaways** of this paper should be the following:

- **Stay curious, not judgmental**

AI is changing the way firms collect, analyze, and manage information. To stay ahead, “stay curious and don’t be judgmental.” Have you ever had what you thought was a good idea, only to be told, “*I’m sorry, but that won’t work here,*” or “*We just don’t do things like that here.*” Not being judgmental means being open to new ideas.

- **AI has transformed and will continue transforming the accounting profession**

Artificial intelligence (AI) has transformed the accounting profession by automating routine tasks, enhancing data analysis. AI will continue transforming the profession by enabling accountants to shift towards more strategic, advisory roles. Rather than replacing human professionals, AI acts as a powerful assistant, increasing efficiency and accuracy while creating opportunities for higher-value work.

- **Be patient when using AI models**

AI is new, and it’s big, and we’re just beginning to see how it can be used to enhance and elevate the accounting profession.

As you begin (or continue) your journey with AI, remember to be patient. It’s possible that the AI tool might not get it right the first time, but don’t throw it out the minute something isn’t right.

Trust that the technology will improve. Also trust that using the right AI tools, alongside your accounting expertise and experience, will lead to higher-value work and enhanced client relationships.

- **Think Big**

We’re just seeing the beginning of how AI tools can be used to enhance and improve operations and accounting work. More than likely, you might already use AI tools for other things or you have some ideas about where this technology can take you, and there might be advances that AI can bring about that aren’t obvious to us today.

Just as you can use AI tools to help understand the technology, you can ask AI tools such as ChatGPT to explore the different ways AI tools could be used to meet your firm’s goals.

- **AI isn’t always right**

While AI tools are undoubtedly powerful and bring many benefits, it's also important to be aware that they can make mistakes and may reflect biases existing in their training data.

- **The importance of guardrails**

AI tools have guardrails built in to ensure that they operate within acceptable **ethical, legal,** and **technical boundaries**, including keeping **data secure**.

- **The continued importance of humans**

AI tools don't do the job; however, they should make it easier for you to do your job. Making the most of AI tools requires human input and oversight. Humans play a crucial role in exercising judgment and validating outputs.

Glossary of Terms

Agentic AI	Technology that autonomously makes decisions and performs goal-oriented actions with minimal human guidance.
AI Chatbot	Intelligent bots with conversational interfaces powered by AI.
AI Model	Specialized computer programs serving as the "brain" of an AI tool.
Algorithm	Step-by-step procedures that AI models use to solve problems or recognize data patterns.
Artificial General Intelligence (AGI)	Theoretical AI with capabilities equal to human intelligence.
Artificial Intelligence (AI)	Computer systems performing tasks that typically require human intelligence, such as understanding language, recognizing patterns, or making decisions.
Bot	Automated software performing specific, repetitive tasks based on pre-defined rules.
Deep Learning	Advanced ML using neural networks with multiple layers. Particularly good at processing unstructured data like images and text.
Generative AI (GenAI)	AI subset that creates new content based on data patterns and prompts. Examples include ChatGPT and similar tools.
Guardrails	Mechanisms ensuring AI systems operate within ethical, legal, and technical boundaries.
Humans in the Loop	Processes requiring human interaction before AI-completed processes are finalized.

Human Validation	A human is responsibility to ensure that the use of any AI output is fit for use.
Human Oversight	Any and every AI output should be validated by a human before it is used.
Large Language Model (LLM)	GenAI trained on vast text datasets for understanding and generating human-like text.
Machine Learning	A type of AI where systems learn from data without being explicitly programmed for every scenario. Systems improve accuracy as they process more data.
Narrow (Weak) AI	AI designed for specific, single tasks.
Natural Language Processing (NLP)	AI enabling computers to understand and generate human language.
Neural Networks	AI inspired by the human brain, recognizing complex patterns after training.
Optical Character Recognition (OCR)	A technology that converts text from scanned or image-based documents into machine-readable text, which eliminates manual data entry and is a foundational step for NLP and ML applications in document processing
Training Data	Historical data used to teach ML models. The model learns patterns from this data to make predictions on new data.