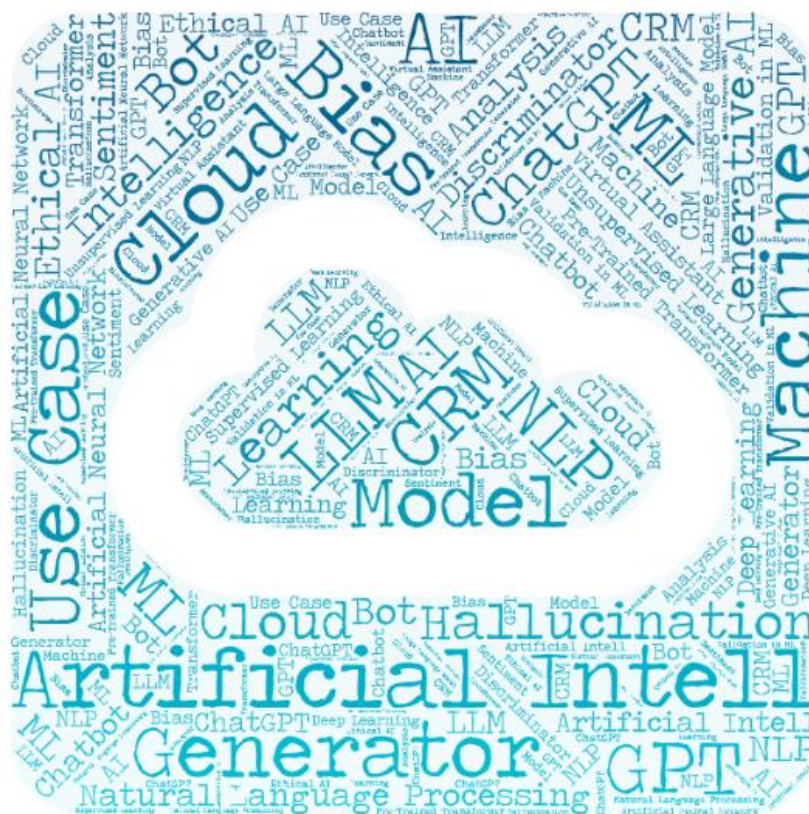
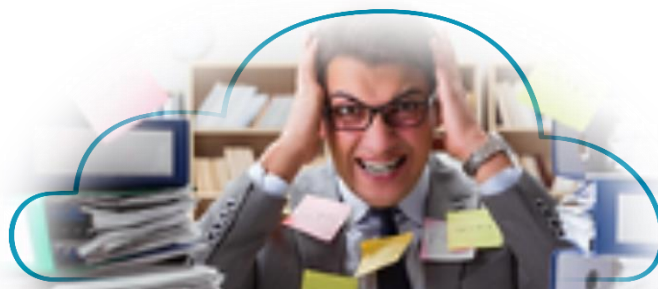


Machine Learning & Artificial Intelligence

ML and AI 101



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Demystifying ML and AI

Terms, Examples, Use Cases

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Acronyms and Key Definitions

AI	Artificial Intelligence – branch of computer science that empowers machines to replicate human-like intelligence.
AI with AA	Artificial Intelligence with Agent Assist – uses AI and ML learning to provide facts and make real-time suggestions that help human agents respond
ALGORITHM	Finite Sequence of Rigorous Instructions to Perform a Computation
ANN	Artificial Neuro Network
CHATGPT	AI Powered Language Model – capable of generating human-like text; form of Generative AI
CONVERSATIONAL AI	A type of AI that enables computers to understand, process, and general human language
CRM	Customer Relationship Management
DATA ASSETS	Any type of system, file, document, database, or website that companies use as a way to generate revenue
DATA DEFINITIONS	Central to Efforts on Data Governance – providing clear outline of data assets
DATA GOVERNANCE	Collection of Processes, Policies, Metrics, and Standards to Ensure Effective and Efficient Use
DATA HYGIENE	Process of Ensuring Clean Data, Data Sets, Groups of Data
DATA QUALITY	State of Qualitative and Quantitative Information – focused on things like duplication, incompleteness, inconsistency inaccuracy
DATA STEWARD	Oversight or Data Governance Role - responsible for data assets
DATA VISUALIZATION	Visualization of Data - show trends, contextualize stories, illustrate concepts, reinforce arguments
DNN	Deep Neural Network
GAN	Generative Adversarial Network
EAI	Explainable AI
GPT	Generative Pre-Trained Transformer
LLM	Large Language Model
ML	Machine Learning
NLP	Natural Language Processing
PERFORMANCE AI	Using AI models trained on billions of data points to optimize an organization’s business
ROX	ML and AI return on customer eXpectations, cost savings eXpectations, and how does it influence employee eXpectations, business eXpertise
SPOT	Single Point of Truth - practice of structuring models and data schemas in one place
SSOT	Single Source of Truth - aggregate data within an organization to single location
VA	Virtual Assistants
ZPD	Zone of Proximal Development

Transformational AI

While there is significant hype in the transformational power of AI in the Contact Center (CC), Contact Center as a Service (CCaaS), and digital transformation discussions, there is still much to be learned.

- Can it revolutionize and optimize the way organizations do business?
- Does it transform the customer's experience and drive better engagement?
- Does it streamline operations and reduce overall costs?
- Does it deliver hyper-personalized interactions that transform customer service?
- Can it improve the accuracy and efficiency of agent responses?
- Does it improve customer satisfaction, customer loyalty, and customer expectations?
- Does it positively impact first contact resolution (FCR), the number 1 driver of customer dissatisfaction?
- Can it really scale multiple conversations concurrently to reduce handle times? How many is "multiple"?
- Is it worth the potential risks of our most important asset – our customers?
- Can this type of transformation progressively learn new skills and improve their ability to take on more difficult tasks?

These are just some of the things that are being pushed, peddled, publicized, and touted as the next big wave of accelerated and innovated transformation.

AI and ML are now at the forefront of everything we hear and see.

- How is it making progress into the CC and CCaaS organizations?
- Is ML and AI a solution in search of a problem to solve for CC and CaaS?

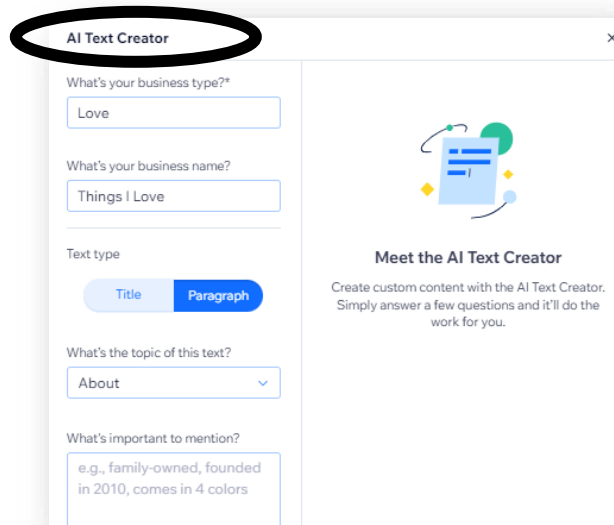
The controversial answer to all these questions is really based on the eyes and experiences of the beholder. They have all seen and experienced different variations of truth. In other words, the responses are subjective.

The one common theme in all the discussions are the possible negative effects of AI. To name a few:

- AI terrorism – unintended consequences due to infancy of AI
- Downward shift in human experience and expectations – loss of human connection
- Loss of uncertain jobs and job displacement
- AI bias – built by humans that may inject bias into the models

As I write this, I find myself relying on ML and AI to do work outside of what I get paid to do. It is, in fact, invading my everyday tasks. I could write the ROX on my personal experiences from just a single week. Here are just a few quick examples from this week:

- In building my website, I am offered ways to use AI to create and generate text around key words and phrases I've populated into the creator fields. While it takes away the human side of thinking and creating, it absolutely shortens and reduces time needed to complete website tasks. With a few quick tweaks to add my personal style, I begin editing and creating.
- This website design company, WIX, uses ChatGPT.



- In building a PPT, using the Canva application, their new Magic Design uses GPT-3 and allowed me to use AI to quick start my design. I uploaded a picture and text; it generated the design template to match my needs. While it takes away some of the creativity and inspiration, it absolutely shortens and reduces time needed to create a relevant design template.
- This subscription design tool, Canva, uses a proprietary ML model to predict and generate text based on instructions you provide.

Magic Design templates

Browse high quality Magic Design templates for your next design

All Filters Category

Try Magic Design BETA

Inspiring templates crafted with your media.

Insert media

- While traveling, I stopped working to take a quick lunch break and decided to grab a few tacos from Taco Bell. As I grabbed my phone to find a location near me, I used Face ID with my iPhone to authenticate into my phone.
- iPhone uses TrueDepth camera technology, along with ML; and in an instant I was doing my search.



- Not to be forgotten in this process, I then proceeded to ask Siri for the nearest Taco Bell. In general, Siri waits for the command: “Hey Siri”, to detect the command or query and then uses DNN (Deep Neural Network) to convert the acoustic patterns into probability distribution using speech sounds.
- We often refer to this type of example as conversational AI.
- The more I use Siri, the better she understands me through the use of NLP (Natural Language Processing) and ML (machine learning).



By now, I've covered a few of the questions posted in this overview and covered quite a few of the acronyms in the hopes of sharing real life experiences with all the jargon being disseminated.

While my examples made AI and ML look easy to use, building and incorporating the value of AI and ML is far more complex. The use of this type of technology comes down to understanding, mastering, and controlling a set of key capabilities with the right combination of people, process and technology.

- **People** – the organizational structure, the unique culture that exists, and the talent and competencies of your teams.
- **Process** – understanding how current processes will be augmented or changed to adapt to the new technology.
- **Technology** – technology is only the means to an end. A well thought out plan must be in place to understand the outcomes needed and the end goals of implementing this type of technology.

Let's move to some examples of the acronyms we hear. I'll try to provide context on what each mean in the CC and CCaaS world, as well as some examples of Use Cases. This type of technology is especially relevant at a time when centers are short-staffed, agent churn is at an all-time high, the cost of on-boarding continues to rise, customer expectations have dramatically increased, and customers will leave for another company for minor infractions in their experience.

Most companies are still figuring out how to implement and scale ML and AI in their business. If they are in early implementation of a solution, they are still figuring out how to tackle and optimize it and how to get maximum value of the outcomes. If they have seen some early successes, they are still trying to understand how they set up things such as Data Governance Team, AI Council, Bias Task Force, and Change Management to truly transform and revolutionize all the hype.

Terms Defined

Artificial intelligence (AI)

- AI is the broad and wide-ranging concept of having machines think and act like humans, with very diverse opinions on advantages and disadvantages. AI is getting all the buzz across all mediums (e.g., video, ad, news report) and in every channel (e.g., blog, FB post, YouTube).
- Generative AI is a specific type of AI that can generate new content, such as text, images, and audio.



EXAMPLE: If you have used auto correct within Microsoft Word, you have used a form of AI. If you no longer rely on printed maps and use a navigation application, you have used a form of AI. If you use facial detection and recognition on your phone login or at airport security, you have used a form of AI.

Customer / Client	Business Value
It can be helpful, personalized, efficient and friction free if careful consideration has been placed in the modeling and data quality. Understanding the input and outcome is imperative to successful utilization of AI.	Helps business work smarter and faster by automating routine tasks or outcomes customers need. While it increases productivity, reduces costs and optimizes tasks, it must also focus on understanding impact on CX which is a delicate balance.



USE CASE: Business case and results derived from outputs - predictive analytics, automated quality, next best action, data visualization, etc.

Expect to hear outcomes leaning into things commonly referred to as ROX: return on customer eXpectations, cost savings eXpectations, and how does it influence employee eXpectations, business eXpertise



Generative AI

- Generative AI is the field of artificial intelligence that focuses on creating new content based on existing data. Generative AI is a specific type of AI that can generate new content, such as text, images, and audio in response to prompts.
- It does this by using LLM and algorithms to learn from data. It then generates new examples that are like the original.
- ChatGPT is a form of Generative AI.



EXAMPLE: If you have called a business recently, you have probably been introduced to Generative AI. Have you interacted with a chatbot or virtual assistant asking you for info during a website visit? Have you phoned your local credit union and interacted with an IVR bot to understand how to move you to the right department? Have you used an online website design app where it offers help in building content for your site? If so, you are likely dealing with generative AI.

Customer / Client	Business Value
It can provide targeted content (e.g., training, marketing, sales, product) to quickly get customers exactly what they need.	Speed and Scalability
Clients must think through job redesign, task redesign and reskilling people as Generative AI finds a path into the organization.	Cost Savings
	Faster content creation and design build times



USE CASE: AI powered tools like Generative AI are particularly effective when analyzing customer conversations within a CC in real-time or near-real time and providing suggestions and recommendations to the agent during the conversation or with quality / management team after conversation.

Business case and results from increased sales, improved delivery of content, increased CX and NPS from personalize experience and tailored content.



Ethical AI

- Ethical AI is the structure and framework that helps organizations assess and enhance their ethical practices and data governance when using AI technology. It maps out and presents for discussion the methods an organization can use to evaluate their ethical AI practices. This will progress an organization toward more responsible and sophisticated AI usage over time with confidence.



Example: If you have had music or a book created from key words or suggestions, you are using a form of AI. Ethical AI comes into play when you start determining who owns that music or book. A real example in recent news is the entertainment writers demanding labor safeguards ethical fairness against AI replacing their role.

Customer / Client	Business Value
Leverage well-defined ethical guidelines around using data responsibly.	Ability to put in safety guardrails around rights, privacy, non-discrimination, etc. Discussions with client on fairness and bias, accountability and privacy are required.
Testing must take place to ensure AI-based decisions are not susceptible to bias.	Also see Explainable AI (XAI).



USE CASE: Increased CX and wallet share from transparency, privacy, power balance, accountability, fairness, and models unbiased.



Explainable AI (XAI)

- Explainable AI (XAI) must provide insight into what influenced the AI’s results, which will help users to interpret, and more importantly trust, the outputs.
- Think of this as the same type of effort you did in elementary school where you were required to show your work and how arrived at your answer in math.
- This kind of transparency is important when dealing with sensitive data in healthcare, banking, insurance, or finance, where explanations are required to ensure fairness and regulatory compliance.



Example: Trust, confidence, fairness, unbiased, framework for contextual understanding.

$$\begin{aligned}
 3n + 2 &= 17 \\
 3n + 2 - 2 &= 17 - 2 \\
 \frac{3n}{3} &= \frac{15}{3} \\
 n &= 5
 \end{aligned}$$

Customer / Client	Business Value
Clients will be expected to provide an explanation of outputs from AI that are understood by humans.	Ability to explain how decisions are made by machines so that people trust and understand what is happening so that we can rely on them.



USE CASE: Increased CX and wallet share from explanations for outcomes such as decision trees or linear regression. Increased EX (employee experience) from transparency in meaningful work being done.



Artificial neural network (ANN)

- ANN is a computer program that mirrors or mimics the way our human brain processes information. With humans and computers, it’s all about the power of teamwork.
- Our brains have billions of connected neurons, and an ANN (aka “neural network”) has lots of tiny processing units working together.

- The human brain and ANN are each like a team all working on solving the same problem with every team member doing their part, then passing the results to the next stage and at the end you have the answer to the problem.
- Often you will hear ANN helps teach computers how to process data in a way that is inspired by the human brain.

Customer / Client	Business Value
Typically seen in engineering, science, and math for complex and nonlinear equations	Suitable for pattern recognition and pattern classification tasks. Widely applied in analyzing the business data stored in database or data warehouse.



USE CASE: Significant advantages in data analysis for things such as stock market forecasting predictions, pattern recognition analysis, customer behavior pattern identification, plan and optimize delivery routes, weather predictions, and recognizing handwriting for check processing.



Augmented intelligence

- Think of augmented intelligence as a blending of people and computers to get the best of both because it offers suggestions to humans to make decisions. (Counter to AI which works through data and makes anonymous decisions.)
- Computers are great at handling lots of data and quickly doing complex calculations that would be tedious and vast for human intelligence. Humans are great at understanding context of data, finding connections between data sets, and making decisions on instinct; but augmented intelligence combines both computer and human skill sets.
- To be clear, it is not about computers replacing people or doing all the work. It's more like hiring an intelligent, well-organized, super-fast assistant that enhances knowledge and skills of people using machines. Who wouldn't want this super-fast assistant?

Customer / Client	Business Value
Instances where a client needs assistance for individual's workload to make smarter decisions by enhancing their capabilities, tasks, and tool or application usage.	Any industry that mines big data for patterns and predictive indicators. This is a way to improve decision-making without taking humans out of equation.



USE CASE: Online stores using data analytics to predict customer preferences, political teams using big data analytics to identify undecided voters.

If you have used Alexa or Siri, you have used augmented intelligence because they don't make decisions for you, they just provide data you need.



Customer Relationship Management (CRM) with generative AI

- CRM is a technology that keeps customer records in one place as the SSOT and helps organizations manage current and prospect relationships.
- Generative AI can augment CRM functionality and make it more powerful such as offering personalized emails pre-written for sales teams, product descriptions written based on an image, marketing campaign for website, and contextual customer service ticket responses.
- Earlier in this paper, I used the example of website design using ChatGPT (a form of generative AI) to assist. This is the same concept.

Customer / Client	Business Value
At a time with CX is imperative to stay in business, CRMs, with generative AI, are making it faster and easier to connect with customers and grow the relationship	Speed and Scalability Cost Savings Increased Revenue



USE CASE: availability of data, speed to data insights, scalability on market campaigns, recommended customer service responses based on issue, identification of possible future upsell.

This is focused on speed, scalability, reduced cost of sale, and increased revenue..



Generative adversarial network (GAN) with generator, discriminator, and hallucination

- GANs are made up of two neural networks - a generator and a discriminator. The two networks compete.
- The generator creates an output based on some input, and the discriminator tries to determine if the output is real or fake.
- The generator then fine-tunes its output based on the discriminator's response or feedback, and the cycle continues until it stumps the discriminator.
- GANs are typically unsupervised machine learning because the starting point of the data is unlabeled.

Customer / Client	Business Value
There are so many real-life applications and are uniquely developed by each company.	Helps dev and ops teams generate artificial data when there is a lack of customer data, or you want to mockup data sets; especially when there are privacy concerns around real customer data being used. Or it can attempt to generate fake data that looks real by learning the features from real data.



USE CASE: Speed to useable outputs. Cost savings. Text to image creation for illustrations, animations, or virtual environments. Image to image translating a summer scene to a winter scene. Image editing. Creating 3 dimensional objects. Super resolution to medical imaging (radiology, ultrasound, etc.). Removing noise from data. If you have used Facebooks photo option to build your personal emoji, you have used a GAN.

GENERATOR (in a GAN)

- In a GAN, the generator is an AI-based software tool that creates new content from a request or input. It will learn from any supplied data you use to train it, then creates new information that mimics those patterns and characteristics.
- ChatGPT by OpenAI is a well-known example of a text-based generator.
- A GAN is trained on images of a dog can generate random images of a dog having two eyes, two ears, and a tail but the color pattern on the dog could be very random.

DISCRIMINATOR (in a GAN)

- In a GAN, the discriminator is like a detective. When it's shown pictures (or other data), it must guess which are real and which are fake. Analogy - continuously building a better raccoon trap.
- The "real" pictures are from a dataset, while the "fake" ones are created by the other part of the GAN, called the generator. The discriminator's job is to get better at telling real from fake, while the generator tries to get better at creating fakes.
- If GAN generates a picture of a dog (that may resemble half dog and half cat) where the image has two eyes, two ears, and a tail, and the discriminator thinks that there is 60% probability that this is a real dog, this detective functionality will assume it is a real dog.
- If the image is, in fact, a cat, the generator must fine-tune its output based on the discriminator's response showing 60% dog probability.

HALLUCINATION

- A hallucination happens when generative AI analyzes the content -we provide- but comes to an incorrect or erroneous conclusion and produces new content that doesn't correspond to reality.
- An example would be an AI model that's been trained on thousands of photos of dogs. When asked to generate a new image of a dog, it might combine the head of a dog with the trunk of an elephant or the whiskers of a cat.
- While they can be interesting and funny outputs, hallucinations are undesirable outcomes and indicate a problem in the model's outputs.



Generative pre-trained transformer (GPT)

- GPT is a neural network family that is trained to generate content.
- GPT models are pre-trained on a large amounts of text data (LLM), which then lets them generate clear, related, appropriate, and relevant text-based response based on user queries.

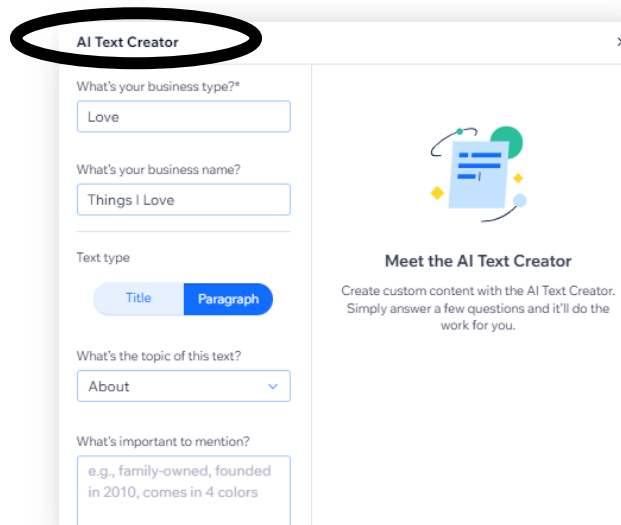
- ChatGPT by OpenAI is a well-known example of a GPT.

Customer / Client	Business Value
Since the content is pretrained on large amounts of text data, the customer receives more personalized interactions on each specific and unique need.	Two-fold: <ol style="list-style-type: none"> 1. Analyze large amounts of customer feedback to extract insights, trends, or variational responses. 2. Automate the creation of customer facing content or variations of content to choose from.



USE CASE: Build website content or AI chatbots from quick messaging for speed in completion on humanlike content. If you can think of any humanlike conversational dialogue you might need, GPT can compose various written content, including articles social media posts, essays, code, and emails.

This is an example of an AI Text Creator using GPT. Once the key information is added, this will create or generate three different variations to use for content. You can use any one of the variations or mix and match to make your own personalized story with the help of GPT.



Large language model (LLM)

- LLM is a type of artificial intelligence that has been trained on a lot of text data over time. LLM is trained to understand and generate human language. LLMs have a much larger vocabulary and a great capacity for understanding our complex language structure, our conversation nuances, and context.
- It is like a smart dialogue companion or conversation partner that can create human-sounding response based on a given prompt.
- Some LLMs can answer questions, write essays, create poetry, and even generate code. See GPT section that speaks to use of large amounts of text data or LLM. These models are trained on billions of parameters.

Customer / Client	Business Value
Build personalized chatbots that offer realistic, human interaction between chatbot and end customer.	Offers customers and clients quick, easy solutions to common challenges or problems in ways that feel authentic and human-like.



USE CASE: The ecosystem of these models is growing dramatically every day which will provide a more rapid pace for innovation and transformation. Use cases include any need to create and scale with responses to questions, writing essays or papers, creating poetry, generating code, building chatbots, writing email or chat responses, etc. LLM also play an important role in automating quality (QA, QM) and training through speech analytics and real-time monitoring and guidance.



Machine learning

- Machine learning is how computers can learn new things without being programmed to do them.
- For example, when teaching a child to identify animals or firetrucks, you show them pictures and provide feedback. As they see more examples and receive feedback, they learn to classify animals or firetrucks based on unique characteristics.
- Machine learning models are very similar to this example and learn from labeled data to make accurate predictions, projections, and decisions. They generalize and apply that knowledge to new examples, just as humans do.

Customer / Client	Business Value
Allows companies to better understand how to improve CX and what their customer or clients value and want for products or services.	Machine learning can be used to predict customer behavior, customer needs, personalize content, or automate tasks based on learning algorithms.



USE CASE: If you have ever had Netflix personalize its recommendations for movies, or had Facebook recommend friends in your photop to tag them (facial recognition), or had search pages recommend things that you have previously searched for, you are seeing machine learning in action.

AI powered tools like ML are particularly effective when analyzing customer conversations within a CC in real-time or near-real time and providing suggestions and recommendations to the agent during the conversation or with quality / management team after conversation.

MACHINE LEARNING BIAS

- We've all heard the phrase "garbage in, garbage out" when we talk about CRM or LMS platforms. Machine learning bias is just a turbocharged AI version of this same concept.
- When computers are supplied biased information, they make biased decisions.

- This can be the result of a deliberate decision by the humans feeding the computer data, by accidentally incorporating biased data, or by purposely feeding the computer data by incorporating specific data sets for some type of analysis.
- When computers are supplied this biased information, the algorithms make wrong assumptions during the learning process, leading to biased results.

Customer / Client	Business Value
Customers and clients must ensure ML and AI have human oversight and that governance and processes are in place to address bias.	There are several steps that must be taken to mitigate bias in ML models. Removing sensitive variables, using bias mitigation techniques, regularly evaluating ML model, and using human oversight are critical pieces to addressing ML bias.



USE CASE: If you were paying attention at the end of 2018, a high-tech, Silicon Valley company was using an ACS (Automated Candidate Screening) system where it ranked potential hires. It was found that the algorithms being used was screening out and filtering women out of the rankings which is why ML bias is real and must be addressed in any form of usage.

VALIDATION IN MACHINE LEARNING

- In machine learning, validation is a step used to check how well a model is doing during or after the ML training process. It is like a pop quiz in Algebra in the middle of the week but specific to ML
- The model is tested on a subset of data (the validation set), that it has not seen during training, to ensure it is learning. You must be certain that it is not just memorizing answers.

Customer / Client	Business Value
Customers must ensure that the learning validation process are built with high quality, compliant and unbiased data so that it will be accepted by the business to increase adoption.	Model validation ensures that you are adhering to the best possible data usage that aligns with the design objectives and provides proper use for end user(s).



USE CASE: Real world use of ML and AI require understanding bias and validating the models to get them into production and consumed by the wider business and/or the general public. Understanding bias and validation, and putting governance and process around them, will reduce risks in using ML and AI.



Supervised and Unsupervised learning

SUPERVISED

- Standard ML technique that involves training a model with labeled data.
- Supervised learning is when a model learns from human examples.

- Think of it as a teacher that provides students with questions and the correct answers. The student studies these questions and the correct responses, and over time, learns to answer similar questions on their own.
- It's helpful to train systems that will predict likely outcomes such as recognizing images, translating languages, and recognizing behaviors.

Customer / Client	Business Value
Efficiency and effectiveness measures Speed to information Helps VA and other applications recognize and understand spoken commands like managing reminders, playing music, or controlling smart home devices.	Continue to build automation into everyday tasks Predict customer behavior, credit scoring, voice recognition, segment customers, etc.



USE CASE: If you have utilized a credit bureau's online modeling on how to increase your score, you have used supervised ML. If you have spam filters on your Outlook or Gmail account, this is supervised learning.

UNSUPERVISED

- Unsupervised learning allows AI to find hidden patterns in data without any guidance. This allows the computer to explore and discover interesting things on its own.
- Algorithms learn patterns exclusively from unlabeled data.
- Imagine you have a box of puzzle pieces in a jar and don't know what the end picture will look like. Unsupervised learning is learning how the pieces fit together, looking for similarities without knowing what the final picture will be, and then determining the puzzle picture.
- Goal is to recognize and identify patterns and relationships in data. Clustering is common use case.

Customer / Client	Business Value
Easy, faster, and less costs to use than supervised ML since it doesn't require labeling data. However, it could be less accurate since input data is not labeled and the exact output isn't known in advance.	Anomaly detection which is often used in fraud detection. Fraudulent transactions can be determined by identifying unusual data points in the person's dataset(s).



USE CASE: Data science and data scientists use unsupervised learning with teams that don't know what they are looking for in the data set(s). It can be used to search for unknown similarities and differences in data. It can then use this information to create corresponding groups.



Deep learning

- Deep learning is a method in AI that teaches computers to process data in a way that is inspired by our human brain.
- It is an advanced form of AI that helps computers become good at recognizing complex patterns in data. Deep learning networks learn by discovering intricate structures in the data.
- It mimics the way our brain works by using what’s called layered neural networks (see ANN), where each layer is a pattern (like features of an animal) that then lets you make predictions based on the patterns you’ve learned before (ex: identifying new animals based on recognized features). When building computational models that are composed of multiple processing layers, the network can create multiple levels of abstraction to represent the data.
- It’s useful for things like image recognition, text, sounds, speech processing, and natural language understanding and can produce accurate insights and predictions.

Customer / Client	Business Value
Utilizing technology to enable efficiency and effectiveness measures that impact cost savings.	Deep learning technology drives many AI applications used in everyday products, such as voice-activated remotes, fraud detection, facial recognition, and digital assistants, etc.



USE CASE: If you are using an insurance carrier’s insurance discount service where you have a remote installed or in your glove box that provides data to the insurance carrier, you are using a form of deep learning. The navigation system knows the road speed and whether you are crossing into other lanes of tracking and provides that data analysis to the insurance app which then determines your insurance risk to the company.



Transformer – a type of deep learning

- Transformers are typically useful for processing language; its name coming from the different transformations from input to final representation.
- Transformers are very good at understanding context of words in a sentence.
- They create outputs based on sequential data (conversation), not individual data points (like different words in a dictionary).
- The name “transformer” comes from the way they can transform input data (like a sentence) into output data (like a translation of the sentence).

Customer / Client	Business Value
This is typically where you will hear discussions about AI chatbots in a contact center. These chatbots can analyze past behavior and provide personalized content or product recommendations. While it is thought to provide better customer experience and	As the technology continues to improve, the goal is to generate customer-facing content and power chatbots that can handle more than the basic interactions.

higher customer engagement, there is not enough data or complex customer usage to support full adoption across the board.	Transformers, along with other technology features, is being used to perform sophisticated sentiment analysis on interactions.
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USE CASE: Currently used in language models, speech recognition, text-to-speech transformation, translating one language to another language. Each has many important use cases.



Model

- This is simply a program or software that has been trained to recognize patterns in data.
- In its simplest form, a model airplane is a smaller, simpler version of a real airplane; and an AI model is a mathematical version of a real process, pattern, or approach.

Customer / Client	Business Value
Speed to information or results.	You could have a model that predicts the overall customer experience, weather in a specific city, translates language from English to French, identifies pictures of cats versus rabbits, etc.



USE CASE: There are so many use cases floating around for using ML and AI models. The question becomes, how much does it cost to build out the project(s), what are the defined outcomes needed, what is the true return on investment and timing of that investment, and what percentage of these projects still fail.



Natural language processing (NLP)

- NLP is a field of machine learning technology and artificial intelligence that gives computers the ability to understand, interpret, manipulate, comprehend, and generate human language.
- It's the technology behind things like voice-activated virtual assistants, language translation apps, and chatbots.

Customer / Client	Business Value
Sensitive data redaction is common use of NLP for insurance or healthcare providers in keeping sensitive customer attributes from documentation.	Many uses for business which includes text summarization, chatbot usage, sentiment analysis, etc.



USE CASE: Companies use NLP for many automated tasks such as: 1. processing, analyzing, and archiving large documents 2. Analyzing customer and agent discussions using contact center recordings 3. Run chatbots in automated customer service channels

AI powered tools like NLP are particularly effective when analyzing customer conversations within a CC in real-time or near-real time and providing suggestions and recommendations to the agent during the conversation or with quality / management team after conversation.



Prompt engineering

- Prompt engineering means figuring out how to ask a question to get exactly the answer you need. You don't need an engineering degree or be a data scientist.
- You do need to build the input in a way that the output is in accord with the intent.
- This is about carefully crafting and determining the input (prompt) that you give to a ML model to get the best possible output.
- Also referred to as prompt design.
- A prompt can have instructions, a question, input data or examples.



USE CASE: You must express the prompt in a way to get the right output.

Poor example: give me a good website name

Good example: give me a website name that has keywords and explains the purpose of my site

Poor example: write an essay on AI

Good example: write a 500 word essay on AI, focusing on its effects on the healthcare industry



Sentiment analysis

- Sentiment analysis involves determining the emotional tone behind words to gain an understanding of the attitudes, opinions, and emotions of a speaker or writer.
- It is commonly used in CRM to understand customer feedback or social media conversation about a brand or product.
- AI powered tools like sentiment analysis are particularly effective when analyzing customer conversations within a CC in real-time or near-real time and providing suggestions and recommendations to the agent during the conversation or with quality / management team after conversation.



USE CASE: Understanding and determining the sentiment or emotional tone of given text using tools that are powered by technology such as GPT-4. Speech sentiment analysis is another beast and will be covered later. In this example, technology needs to determine whether the text is positive, negative, or neutral.

“The ice cream at Freezer Treats was **really good**; but it was **so much more money** than Ice Cream to Go.” The attributes are around taste and price. Model training will help determine how your organization determines this sentiment.



Zone of proximal development (ZPD)

- The Zone of Proximal Development (ZPD) is an education concept.
- For example, each year students advance their math skills from adding and subtracting, to multiplication and division, and order of mat operations.
- The key to advancing is progressively learning those skills. In machine learning, ZPD is when models are trained on progressively more difficult tasks, so they will improve their ability to learn.



USE CASE: Without going too deep, this is about what ML and AI can learn on their own (supervised, unsupervised or deep learning), can learn with help from other technology, tools or people, and what is beyond the reach of ML and AI as it is today.

