Table of Contents

Activation Function

A function used in neural networks to introduce non-linearity into the model enabling it to learn complex patterns.

“The activation function allowed the neural network to capture complex relationships in the data.”

Algorithm

A set of rules that a machine can follow to learn how to do a task.

“The algorithm helped the computer to sort through data efficiently.”

Artificial Intelligence (AI)

The simulation of human intelligence processes by machines especially computer systems.

“Artificial intelligence is being used to develop more responsive and intuitive user interfaces.”

Artificial Neural Network (ANN)

A computing system inspired by biological neural networks used to approximate functions that can depend on a large number of inputs.

“Artificial neural networks are used for tasks such as image recognition and language processing.”

Attention Mechanism

A method used in neural networks that allows the model to focus on specific parts of the input sequence when making predictions.

“Attention mechanisms are crucial in improving the performance of transformers in NLP tasks.”

Autonomous

A machine is described as autonomous if it can perform its task or tasks without needing human intervention.

“The autonomous vehicle navigated through city streets without human assistance.”

Backpropagation

A method used in ML to calculate the gradient of the loss function with respect to the weights of the network facilitating the optimization of the weights.

“Backpropagation is essential for training deep learning models.”

Backward Chaining

A method where the model starts with the desired output and works in reverse to find data that might support it.

“The system used backward chaining to identify the root cause of the issue.”

Batch Size

The number of training examples utilized in one iteration of training a ML model.

“The batch size was set to 32 for each training iteration.”

Bias

An error introduced by making simplifying assumptions in the learning algorithm that can lead to systematic errors.

“High bias in the model led to inaccurate predictions in the test phase.”

Big Data

Datasets that are too large or complex to be used by traditional data processing applications.

“Analyzing big data can uncover hidden patterns and trends that were previously unnoticed.”

Bounding Box

Commonly used in image or video tagging, this is an imaginary box drawn on visual information. The contents of the box are labeled to help a model recognize it as a distinct type of object.

“The bounding box helped the AI identify the cat in the image.”

Chain of Thought Prompt

A prompting method where the model is guided step-by-step through a logical progression of thoughts or reasoning to arrive at the final answer. This is particularly useful for complex problem-solving and reasoning tasks.

“The chain of thought prompt helped the AI model to break down the problem into smaller, manageable steps, leading to a more accurate solution.”

Chatbot

A program that is designed to communicate with people through text or voice commands in a way that mimics human-to-human conversation.

“The company's website features a chatbot to assist with customer inquiries.”

Cognitive Computing

This is effectively another way to say artificial intelligence. It’s used by marketing teams at some companies to avoid the science fiction aura that sometimes surrounds AI.

“Cognitive computing solutions are transforming the healthcare industry by providing personalized patient care.”

Computer Vision (CV)

A field of AI that trains computers to interpret and understand the visual world.

“Computer vision is used for applications such as facial recognition and autonomous driving.”

Computational Learning Theory

A field within artificial intelligence that is primarily concerned with creating and analyzing machine learning algorithms.

“Advances in computational learning theory have led to more efficient algorithms.”

Contextual Prompt

A prompt that includes additional context or background information to help the model generate a more accurate and relevant response.

“By providing a contextual prompt with details about the user’s preferences, the AI was able to recommend more personalized products.”

Convolutional Neural Network (CNN)

A type of ANN particularly effective for image recognition and processing tasks.

“Convolutional neural networks are widely used in image and video recognition.”

Corpus

A large dataset of written or spoken material that can be used to train a machine to perform linguistic tasks.

“The researchers compiled a corpus of texts to train the language model.”

Cross-validation

A statistical method used to estimate the skill of ML models by partitioning the data into complementary subsets training the model on one subset and validating it on another.

“Cross-validation is used to ensure the model generalizes well to unseen data.”

Data Mining

The process of analyzing datasets in order to discover new patterns that might improve the model.

“Data mining techniques revealed several customer behavior trends.”

Data Science

Drawing from statistics, computer science, and information science, this interdisciplinary field aims to use a variety of scientific methods, processes, and systems to solve problems involving data.

“Data science plays a crucial role in developing predictive models for businesses.”

Dataset

A collection of related data points, usually with a uniform order and tags.

“The dataset used for training the model contained thousands of labeled images.”

Deep Learning (DL)

A subset of ML that uses neural networks with many layers (deep networks) to model complex patterns in large amounts of data.

“Deep learning algorithms have revolutionized image and speech recognition.”

Entity Annotation

The process of labeling unstructured sentences with information so that a machine can read them. This could involve labeling all people, organizations, and locations in a document, for example.

“Entity annotation improved the accuracy of the machine learning model in understanding texts.”

Entity Extraction

An umbrella term referring to the process of adding structure to data so that a machine can read it. Entity extraction may be done by humans or by a machine learning model.

“The software uses entity extraction to identify key information from documents.”

Epoch

A single pass through the entire training dataset during the training process of a ML model.

“The model was trained for 50 epochs to achieve optimal performance.”

Feature Engineering

The process of using domain knowledge to extract features from raw data to improve the performance of ML models.

“Feature engineering significantly improved the model's accuracy.”

Few-Shot Prompt

A prompting method where the model is given a few examples of the task before being asked to generate a response. This helps the model understand the task better and produce more accurate results.

“The few-shot prompt improved the model’s performance in text classification by providing it with a few labeled examples to learn from.”

Forward Chaining

A method in which a machine must work from a problem to find a potential solution. By analyzing a range of hypotheses, the AI must determine those that are relevant to the problem.

“Forward chaining allowed the AI to solve complex logical problems efficiently.”

Generative Adversarial Network (GAN)

A class of ML frameworks where two neural networks contest with each other to generate new synthetic instances of data that can pass for real data.

“Generative adversarial networks are used to create realistic images from random noise.”

General AI

AI that could successfully do any intellectual task that can be done by any human being. This is sometimes referred to as strong AI, although they aren’t entirely equivalent terms.

“General AI remains a theoretical concept as current AI systems are specialized for specific tasks.”

Generative Pre-Trained Transformer (GPT)

A type of large-scale language model developed by OpenAI that uses a transformer architecture to generate human-like text. GPT models are pre-trained on vast amounts of text data and then fine-tuned for specific tasks, leveraging their ability to understand and generate coherent and contextually relevant text.

“Generative Pre-trained Transformer models like GPT-3 have revolutionized natural language processing by enabling AI to generate realistic text, translate languages, and perform complex language-related tasks.”

GPU

A specialized processor designed to accelerate the rendering of images and video. GPUs are highly parallel in nature, making them ideal for handling complex

computations required in machine learning and deep learning tasks. They significantly speed up the training and inference processes in AI models.

“The use of GPUs in training the neural network reduced the computation time from weeks to just a few days, enabling faster development and experimentation.”

GPU Ring

A configuration where multiple GPUs are connected in a ring topology to enhance computational efficiency and parallel processing capabilities. This setup is often used to optimize deep learning tasks by distributing the workload evenly across the GPUs.

“The GPU ring setup allowed the neural network to process large datasets more efficiently by leveraging the parallel processing power of multiple GPUs.”

Gradient Descent

An optimization algorithm used to minimize the loss function in ML models by iteratively adjusting the model parameters.

“Gradient descent is used to optimize the parameters of the neural network.”

Hyperparameter

Occasionally used interchangeably with parameter, although the terms have some subtle differences. Hyperparameters are values that affect the way your model learns. They are usually set manually outside the model.

“Selecting the right hyperparameters is crucial for the model's performance.”

Instructional Prompt

A prompt that gives the model explicit instructions on how to perform a task, often used to guide the model's behavior in generating responses.

“The instructional prompt clearly outlined the steps the model needed to follow to complete the task, resulting in more precise outputs.”

Intent

Commonly used in training data for chatbots and other natural language processing tasks, this is a type of label that defines the purpose or goal of what is said. For example, the intent for the phrase “turn the volume down” could be “decrease volume”.

“Understanding the user's intent is key to providing accurate responses in a chatbot.”

Label

A part of training data that identifies the desired output for that particular piece of data.

“Each image in the dataset was given a label to indicate the object it contained.”

Large Language Model (LLM)

Advanced neural networks trained on vast amounts of text data to generate human-like text and perform various language-related tasks.

“Large language models like GPT-4o can generate coherent and contextually relevant text based on a given prompt.”

Linguistic Annotation

Tagging a dataset of sentences with the subject of each sentence, ready for some form of analysis or assessment. Common uses for linguistically annotated data include sentiment analysis and natural language processing.

“Linguistic annotation helped the AI model to perform better in sentiment analysis tasks.”

Loss Function

A method of evaluating how well the algorithm models the given data. It measures the difference between the predicted values and the actual values.

“The loss function indicated that the model needed further optimization.”

Machine Intelligence

An umbrella term for various types of learning algorithms, including machine learning and deep learning.

“Machine intelligence is at the core of modern AI applications.”

Machine Learning (ML)

This subset of AI is particularly focused on developing algorithms that will help machines to learn and change in response to new data, without the help of a human being.

“Machine learning algorithms have enabled significant advancements in predictive analytics.”

Machine Translation

The translation of text by an algorithm, independent of any human involvement.

“Machine translation services like Google Translate have become more accurate over time.”

Modality

Refers to a type of data or form of input (e.g., text, audio, image) that a machine learning model can process.

“The AI system can process multiple modalities, including text, images, and audio.”

Model

A broad term referring to the product of AI training, created by running a machine learning algorithm on training data.

“The trained model was able to predict outcomes with high accuracy.”

Multi-Modal

Involving or integrating multiple forms of input data or types of information.

“Multi-modal AI systems can analyze and interpret information from both visual and auditory inputs simultaneously.”

Multi-Turn Prompt

A type of prompt used in conversational AI where the model engages in multiple turns of dialogue to gather more context and provide a better response.

“The multi-turn prompt allowed the chatbot to maintain a coherent and contextually relevant conversation with the user over several interactions.”

Natural Language Generation (NLG)

This refers to the process by which a machine turns structured data into text or speech that humans can understand. Essentially, NLG is concerned with what a machine writes or says as the end part of the communication process.

“NLG systems are used to generate reports from raw data automatically.”

Natural Language Processing (NLP)

A field of AI that focuses on the interaction between computers and humans through natural language. The focus of NLP is enabling machines to understand, interpret, and respond to human language.

“NLP technologies are integral to the development of voice-activated assistants.”

Natural Language Understanding (NLU)

As a subset of natural language processing, natural language understanding deals with helping machines to recognize the intended meaning of language — taking into account its subtle nuances and any grammatical errors.

“NLU allows chatbots to understand user queries with greater accuracy.”

Neural Network (NN)

A series of algorithms that attempt to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates.

“Neural networks have been used to achieve state-of-the-art results in various AI tasks.”

Overfitting

An important AI term, overfitting is a symptom of machine learning training in which an algorithm is only able to work on or identify specific examples present in the training data. A working model should be able to use the general trends behind the data to work on new examples.

“To avoid overfitting, the model was tested on a separate validation dataset.”

Parameter

A variable inside the model that helps it to make predictions. A parameter’s value can be estimated using data and they are usually not set by the person running the model.

“Parameters within the model were fine-tuned to improve its accuracy.”

Pattern Recognition

The distinction between pattern recognition and machine learning is often blurry, but this field is basically concerned with finding trends and patterns in data.

“Pattern recognition techniques were used to identify fraud in financial transactions.”

Persona Prompt

A type of prompt that provides the AI model with a specific persona or character profile to adopt when generating responses. This can include details about the persona's background, personality traits, preferences, and speaking style, allowing the AI to produce more personalized and consistent responses that align with the given character.

“By using a persona prompt, the chatbot was able to interact with users in a more engaging and relatable manner, as if it were a friendly customer service representative.”

Predictive Analytics

By combining data mining and machine learning, this type of analytics is built to forecast what will happen within a given timeframe based on historical data and trends.

“Predictive analytics helped the company to forecast future sales trends.”

Prompt

A prompt is an input or instruction given to an AI model, particularly large language models, to generate a response or perform a task.

“By providing a detailed prompt, the user was able to receive a highly accurate and relevant response from the AI model.”

Python

A popular programming language used for general programming.

“Python is widely used for developing machine learning models due to its extensive libraries.”

Recurrent Neural Network (RNN)

A type of ANN where connections between nodes can create cycles allowing the network to maintain a memory of previous inputs.

“Recurrent neural networks are particularly effective for sequence prediction tasks.”

Reinforcement Learning (RL)

A type of ML where an agent learns to make decisions by performing actions and receiving rewards or penalties.

“Reinforcement learning allowed the AI to improve its performance through trial and error.”

Retrieval Augmented Generation (RAG)

A natural language processing (NLP) technique that combines the strengths of both retrieval and generative based artificial intelligence models.

“Using retrieval augmented generation, the chatbot could provide more accurate and contextually appropriate responses by leveraging both stored knowledge and generative capabilities.”

Ring Attention

A memory-efficient attention mechanism designed to handle large context sizes in transformers by distributing the input sequence across multiple devices in a ring-like topology. This approach allows incremental computation and efficient data parallelism, significantly reducing memory requirements while maintaining high performance.

By enabling larger context windows, Ring Attention allows AI tools to process and understand more extensive sequences of data, improving the model's ability to capture long-range dependencies and making it ideal for applications like language modeling and long-form content generation.

“Ring Attention enabled the transformer model to process near-infinite context sizes without a significant increase in computational resources, making it ideal for tasks requiring long-range dependencies.”

Semantic Annotation

Tagging different search queries or products with the goal of improving the relevance of a search engine.

“Semantic annotation improved the accuracy of the search engine results.”

Sentiment Analysis

The process of identifying and categorizing opinions in a piece of text, often with the goal of determining the writer’s attitude towards something.

“Sentiment analysis revealed that customers were generally satisfied with the new product.”

Strong AI

This field of research is focused on developing AI that is equal to the human mind when it comes to ability. General AI is a similar term often used interchangeably.

“Strong AI remains a long-term goal for many researchers in the field.”

Supervised Learning

A type of ML where the model is trained on labeled data meaning the output for each input in the training set is known.

“Supervised learning algorithms were used to develop the predictive model.”

Swarm Intelligence

A type of AI inspired by the collective behavior of social colonies like ants, bees, or birds, used to solve optimization problems.

“Swarm intelligence algorithms are applied to solve complex optimization tasks in robotics and logistics.”

Test Data

The unlabeled data used to check that a machine learning model is able to perform its assigned task.

“The model was validated using test data to ensure its accuracy.”

Training Data

This refers to all of the data used during the process of training a machine learning algorithm, as well as the specific dataset used for training rather than testing.

“The quality of the training data significantly impacts the model's performance.”

Transfer Learning

A technique in ML where a model developed for a particular task is reused as the starting point for a model on a second task.

“Transfer learning improved the model's accuracy in analyzing product reviews after being trained on social media data.”

Transformers

A type of model architecture that relies on self-attention mechanisms to process sequential data, particularly effective for NLP tasks.

“Transformers have revolutionized NLP by providing a scalable and efficient way to handle long-range dependencies in text.”

Turing Test

Named after Alan Turing, famed mathematician, computer scientist, and logician, this tests a machine’s ability to pass for a human, particularly in the fields of language and behavior. After being graded by a human, the machine passes if its output is indistinguishable from that of human participant’s.

“The AI chatbot successfully passed the Turing test by convincingly mimicking human conversation.”

Unsupervised Learning

A type of ML where the model is trained on unlabeled data and must find patterns and relationships in the data on its own.

“Unsupervised learning algorithms identified hidden patterns in the data without any labeled examples.”

Validation Data

Structured like training data with an input and labels, this data is used to test a recently trained model against new data and to analyze performance, with a particular focus on checking for overfitting.

“Validation data was used to fine-tune the model and prevent overfitting.”

Variance

An error introduced by the sensitivity of the model to small fluctuations in the training set.

“High variance in the model led to inconsistent predictions.”

Variation

Also called queries or utterances, these work in tandem with intents for natural language processing. The variation is what a person might say to achieve a certain purpose or goal. For example, if the intent is “pay by credit card,” the variation might be “I’d like to pay by card, please.”

“Understanding variations in user queries helps improve the chatbot's responses.”

Weak AI

Also called narrow AI, this is a model that has a set range of skills and focuses on one particular set of tasks. Most AI currently in use is weak AI, unable to learn or perform tasks outside of its specialist skill set.

“Most current AI applications are examples of weak AI, specialized in performing specific tasks.”

Zero-Shot Prompt

A prompt that asks the model to perform a task without providing any prior examples or fine-tuning. The model relies solely on its pre-trained knowledge to generate the response.

“Using a zero-shot prompt, the AI was able to generate a summary of the article even though it had never been specifically trained on that task.”