

## About AI:

Artificial intelligence (AI) is intelligence demonstrated by machines, as opposed to the natural intelligence displayed by animals including humans. AI research has been defined as the field of study of intelligent agents, which refers to any system that perceives its environment and takes actions that maximize its chance of achieving its goals. The term "artificial intelligence" had previously been used to describe machines that mimic and display "human" cognitive skills that are associated with the human mind, such as "learning" and "problem-solving". This definition has since been rejected by major AI researchers who now describe AI in terms of rationality and acting rationally, which does not limit how intelligence can be articulated.

Supervised learning, as the name indicates, has the presence of a supervisor as a teacher. Basically supervised learning is when we teach or train the machine using data that is well labelled. Which means some data is already tagged with the correct answer. After that, the machine is provided with a new set of examples(data) so that the supervised learning algorithm analyses the training data(set of training examples) and produces a correct outcome from labelled data. Unsupervised learning is the training of a machine using information that is neither classified nor labeled and allowing the algorithm to act on that information without guidance. Here the task of the machine is to group unsorted information according to similarities, patterns, and differences without any prior training of data. Reinforcement learning differs from supervised learning in not needing labelled input/output pairs be presented, and in not needing sub-optimal actions to be explicitly corrected. Instead the focus is on finding a balance between exploration (of uncharted territory) and exploitation (of current knowledge).

Machine learning is how AI technology learns and gets smarter on its own. In machine learning, a human trains a machine to achieve an outcome, using data prepared by the human. Using what it learned from the human, the machine then goes and tries to achieve the outcome using data it's never seen before. Every time the machine tries to achieve the outcome, it learns from the results—even if they're bad. And it applies these learnings to its next attempt. In this way, the machine uses machine learning to rapidly improve at a task without direct human involvement. *Pattern recognition is when machines detect patterns in data.* These patterns help machines better optimize towards outcomes, which makes pattern recognition a key function in machine learning. Pattern recognition is also what powers AI's predictive capabilities. A machine uses patterns in historical data to predict which future outcomes are most likely. *Natural language generation is when AI writes or speaks human-sounding language.* Natural language generation powers everything from writing tools to smart home assistants to chatbots. It makes it possible to converse with machines. *Natural language processing is when AI interprets what human language means.* To do NLG, a machine must use natural language processing to first understand written or spoken language. For instance, Google Translate uses NLP to understand the text you type, then generate its translation in whatever language you select.

*Image recognition is when AI accurately identifies objects in photos.* Using machine learning, AI systems can identify objects in images with a high degree of accuracy. The AI system is trained on millions or billions of images to detect certain objects. Trained well, it can then go and recognize those

objects in images it hasn't seen before. One example of image recognition used today is in radiology. AI is able to identify certain tumors with a high degree of accuracy better, faster, and cheaper than humans.

AI frameworks provide data scientists, AI developers, and researchers the building blocks to architect, train, validate, and deploy models, through a high-level programming interface. Hailing from the Google family, Tensor Flow proves to be a robust open-source framework that supports deep learning and which can be accessed even from a mobile device. Microsoft CNTK is a faster and more versatile open-source framework that is based on neural networks that support text, message, and voice remodeling. It provides an efficient scaling environment due to a faster overall evaluation of the machine models while taking care of accuracy. Caffe is a deep learning network that comes along with the preloaded set of trained neural networks. This should be your first pick if your deadline is close. Known for its image processing capabilities, this framework also has extended support of MATLAB. Using GPUs in place of CPU, this framework supports deep learning research and is capable of delivering accuracy for networks that need high computational power. For instance, the computation of multi-dimensional arrays requires high power, and Theano is capable of that. Theano is based on python, which is a proven programming language when it comes to faster processing and response.