AI Definition: The purpose of AI is to create intelligent machines that can mimic human behavior.

AI applications are

Google's search engine, computer vision, speech recognition, decision-making, perception, reasoning, cognitive capabilities, classification of email as spam, detection of disease, virtual assistants such as Amazon's Alexa, Echo, Google Home Speaker.

Name some popular **programming languages** in AI.

R
Lisp
Prolog
Java
Julia
Haskell

The tools of artificial intelligence are:

Scikit Learn
Keras
TensorFlow
PyTorch

Keras is an open-source library written in Python for artificial neural networks It is designed to enable fast experimentation with deep neural networks.

Artificial intelligence is the branch of computer science to build machines that are capable like humans. Example: Robotics

Machine learning is the subset of AI. It is the practice of getting machines to make decisions without being programmed. It aims to build machines learning through data so that they can solve problems. Example: churn prediction, detection of disease, text classification.

Deep Learning is the subset of Machine Learning. It has neural networks that can perform unsupervised learning from unstructured

data. Example: uncrewed cars and how they can recognize stop signs on the road.

Natural Language Processing (NLP), a branch of data science and one of the principal areas of Artificial Intelligence, processes for analyzing, understanding, and deriving information from the text data in a smart and efficient manner.

Applications of NLP are: text classification, text summarization, automated chatbots, multilingual translation, entity detection, machine translation, question answering, sentiment analysis, intent analysis, speech recognition, and topic segmentation.

An expert system, an Artificial Intelligence program, has expert-level knowledge about a specific area of data and utilizes the information to react appropriately. These systems tend to have the capability to substitute a human expert and solve real-life problems.

In reinforcement learning, a domain of artificial intelligence uses agents that senses or perceives the environment by sensors that allow them to understand the settings. The agents have specific goals, and can learn and use the knowledge to achieve the goals.

A Turing Test allows checking the intelligence of a machine as compared to human intelligence. In this test, the computer challenges human intelligence, and only on passing the test is a machine considered intelligent.

A subset of AI, fuzzy logic is a way of encoding human learning for artificial processing. It is represented as IF-THEN rules and the digital values of YES and NO. It is based on degrees of truth.

Types of AI

Weak AI	Strong AI
Narrow application, with very limited scope	Widely applied, with vast scope
Good at specific tasks	Incredible human-level intelligence
Uses supervised and unsupervised	Uses clustering and association to

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learning to process data	process data
E.g., Siri, Alexa, etc.	E.g., Advanced Robotics

A* is a computer algorithm that is extensively used for the purpose of finding the path or traversing a graph in order to find the most optimal route between various points called the nodes.

Differentiation Based on	Supervised Learning	Unsupervised Learning	Reinforcement Learning
Features	The training set has both predictors and predictions.	The training set has only predictors.	It can establish state-of-the-art results on any task.
Algorithms	Linear and logistic regression, support vector machine, and Naive Bayes	K-means clustering algorithm and dimensionality reduction algorithms	Q-learning, state-action-reward-state-action (SARSA), and Deep Q Network (DQN)
Uses	Image recognition, speech recognition, forecasting, etc.	Preprocessing data, pre-training supervised learning algorithms, etc.	Warehouses, inventory management, delivery management, power system, financial systems, etc.

A recommendation system is an information filtering system that is used to predict user preference based on choice patterns followed by the user while browsing/using the system.

Dimensionality reduction is the process of reducing the number of random variables. We can reduce dimensionality using techniques such as missing values ratio, low variance filter, high correlation filter, random forest, principal component analysis, etc.

Bias error is used to measure how much on average the predicted values vary from the actual values. In case a high-bias error occurs, we have an under-performing model.
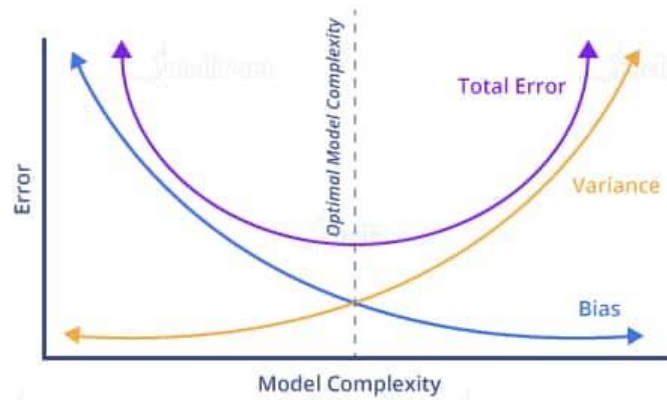
Variance is used to measure how the predictions made on the same observation differ from each other. A high-variance model will overfit the dataset and perform badly on any observation.