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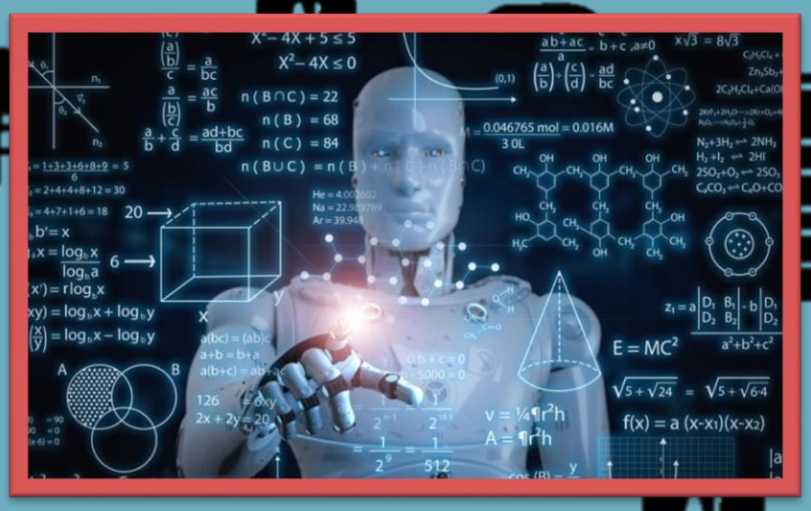
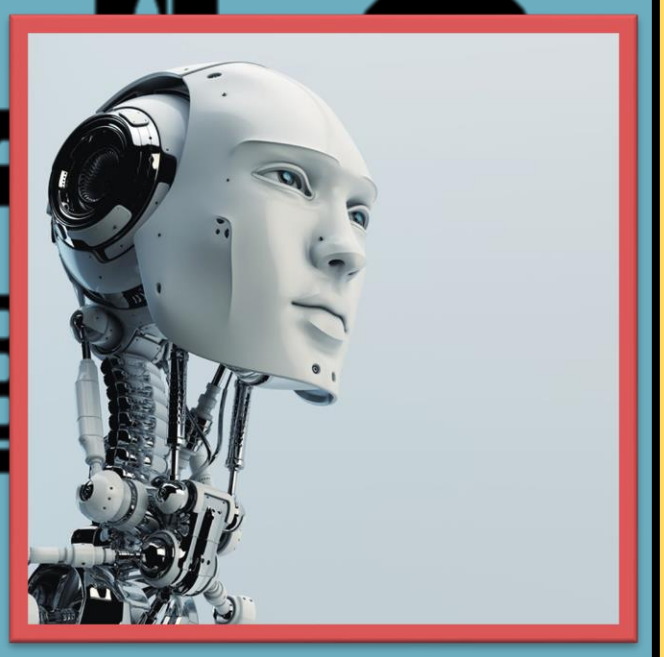
Mathematics in Artificial intelligence

Mathematics is a fundamental part of artificial intelligence (AI) system. The Mathematics helps to build the logical reasoning of the AI architecture. Mathematical theories are mainly used when developing the AI system to build the internal intelligence of the system.

Generally, there are three vital branches of mathematics which are incorporated in AI system which are Linear algebra, calculus, and Probability.

Linear Algebra is an essential field of applied mathematics in which AI experts require to understand the ideas behind the functionality of the AI. Typically, in large AI systems the amount of data that system should process is huge. There is a need for a modelling system to capture this volume of data and process. Linear algebra is a mathematical concept which can be used to handle large amounts and creates models which can be used by the AI system for further processing. The Linear Algebra includes the sequences, vectors and matrix, etc. for this purpose. AI system developers use these different methods of vectors to develop systems capable of creating solutions to resolve problems related to regression, speech recognition, machine translation, etc.





Matrix theory is applied in building the neural networks which is the essential part of the AI system. This is where artificial neurons are designed to replicate the reasoning of a human brain. In a human brain, there are neurons which process and communicate information which is received from our senses. Many neurons arranged and connected together are called a network of nerves. These nerves pass electrical impulses from one neuron to another to form a conclusion. For example, when touching a hot object, our receptors detect the hot object and send the information to our neurons which sends it back to the effectors which makes us quickly remove our hands from the hot object. This same theory is applied to AI by using mathematics concepts and formulas. The neurons are programed artificially on a computer system which creates an artificial neural network. These artificial neurons are similar to the neuron which is present in our brain. These neurons are organized in such a way that they form different layers which are the input layer, hidden layer and the output layer.

Lastly, probability is the heart of AI. The probability theory creates a concept for modelling and dealing with uncertainty. This theory is used to count how many times an event has occurred. It calculates the likelihood of an event occurring. Discrete random variables, continuous random variables, etc. are only some parts of probability which is used in Artificial Intelligence systems.

A popular example of an AI use cases is the Deep Blue chess computer. This is a chess-playing computer which was made by IBM. It was the first computer to win a chess match against a world champion chess player. Deep Blue has had a huge impact on many different industries and has allowed developers to design a computer to resolve many other complex problems.