



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



Artificial Intelligence & Machine Learning

Process of Machine Learning Algorithms

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What is ML?

- Machine learning (ML) is a type of artificial intelligence (AI) that allows software applications to become more accurate at predicting outcomes without being explicitly programmed to do so. Machine learning algorithms use historical data as input to predict new output values.



How does supervised machine learning work?

Supervised machine learning requires the data scientist to train the algorithm with both labeled inputs and desired outputs. Supervised learning algorithms are good for the following tasks:

- **Binary classification:** Dividing data into two categories.
- **Multi-class classification:** Choosing between more than two types of answers.
- **Regression modeling:** Predicting continuous values.
- **Ensembling:** Combining the predictions of multiple machine learning models to produce an accurate prediction.



How does unsupervised machine learning work?

Unsupervised machine learning algorithms do not require data to be labeled. They sift through unlabeled data to look for patterns that can be used to group data points into subsets. Most types of deep learning, including neural networks, are unsupervised algorithms. Unsupervised learning algorithms are good for the following tasks:

Clustering: Splitting the dataset into groups based on similarity.

Anomaly detection: Identifying unusual data points in a data set.

Association mining: Identifying sets of items in a data set that frequently occur together.

Dimensionality reduction: Reducing the number of variables in a data set.



How does semi-supervised Machine learning work?

Semi-supervised learning works by data scientists feeding a small amount of labeled training data to an algorithm. From this, the algorithm learns the dimensions of the data set, which it can then apply to new, unlabeled data. The performance of algorithms typically improves when they train on labeled data sets. But labeling data can be time consuming and expensive. Semi-supervised learning strikes a middle ground between the performance of supervised learning and the efficiency of unsupervised learning. Some areas where semi-supervised learning is used include:

Machine translation: Teaching algorithms to translate language based on less than a full dictionary of words.

Fraud detection: Identifying cases of fraud when you only have a few positive examples.

Labelling data: Algorithms trained on small data sets can learn to apply data labels to larger sets automatically.



How does reinforcement learning work?

Reinforcement learning works by programming an algorithm with a distinct goal and a prescribed set of rules for accomplishing that goal. Data scientists also program the algorithm to seek positive rewards -- which it receives when it performs an action that is beneficial toward the ultimate goal -- and avoid punishments -- which it receives when it performs an action that gets it farther away from its ultimate goal. Reinforcement learning is often used in areas such as:

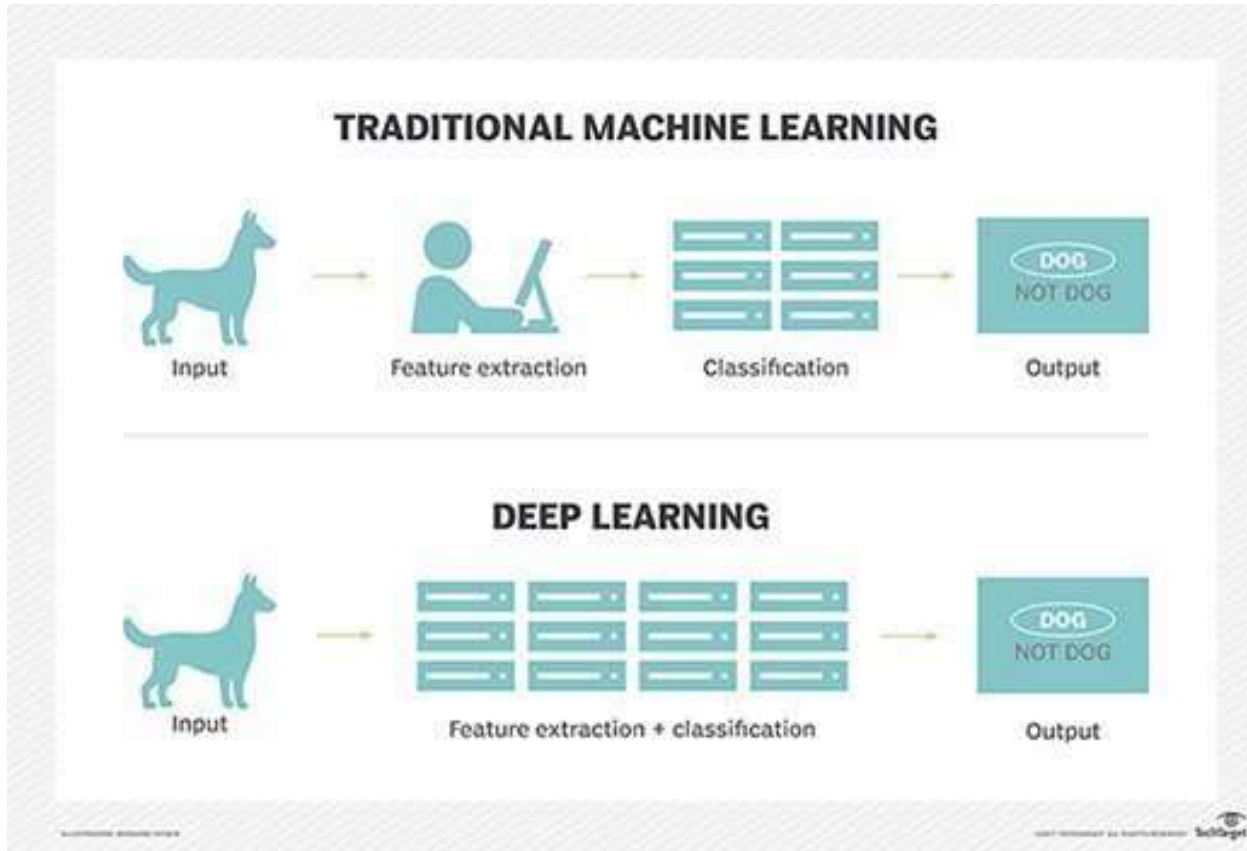
Robotics: Robots can learn to perform tasks the physical world using this technique.

Video gameplay: Reinforcement learning has been used to teach bots to play a number of video games.

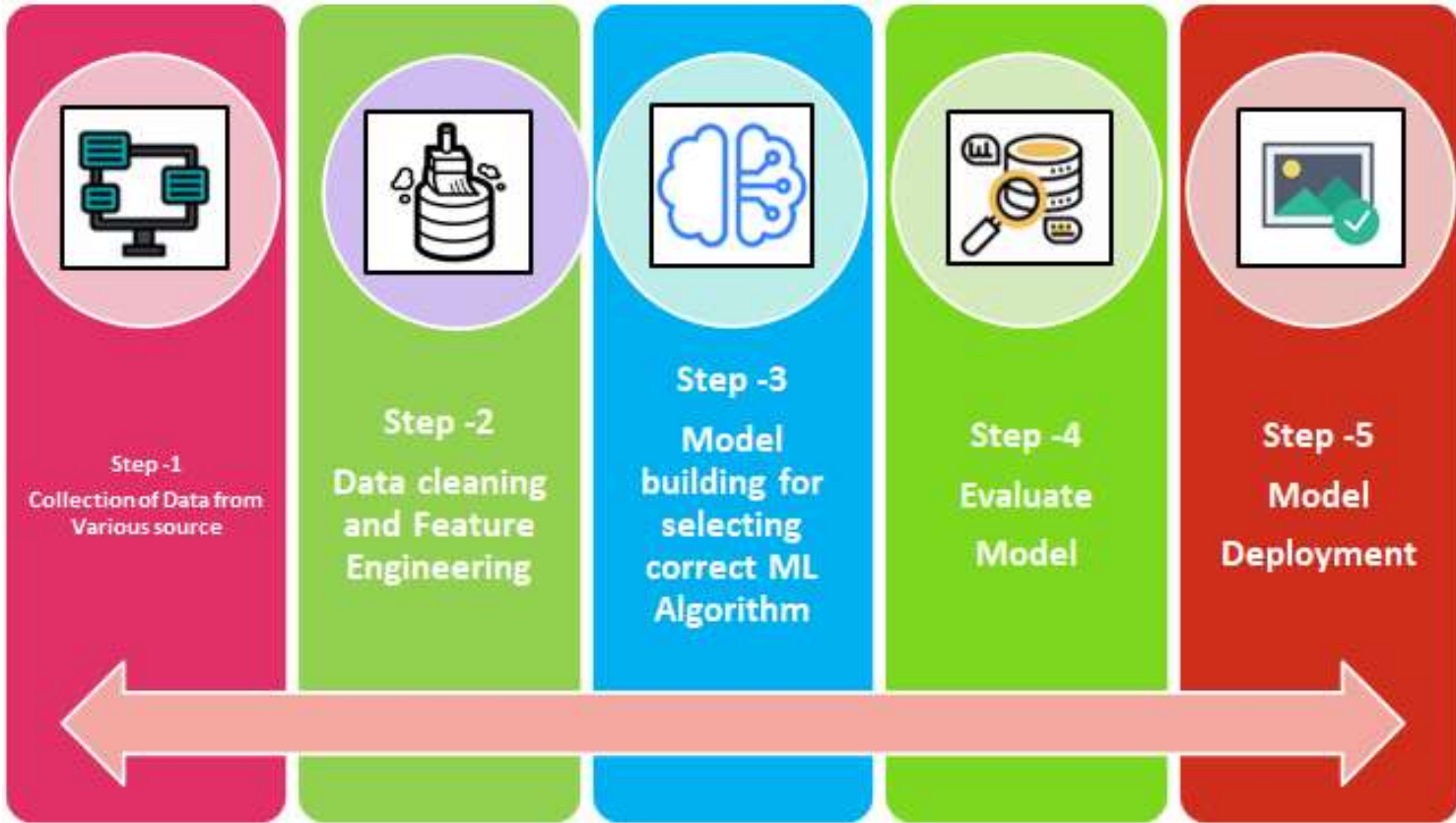
Resource management: Given finite resources and a defined goal, reinforcement learning can help enterprises plan out how to allocate resources.



A Simple Example of ML & DL



Process of Machine Learning



Thank you