Statistical Models

1. Linear Regression

[Linear regression](https://www.geeksforgeeks.org/machine-learning/ml-linear-regression/) is used to predict a continuous value by finding the best-fit straight line between input (independent variable) and output (dependent variable)

Use -Predicting a person’s weight based on their height or predicting house prices based on size.

2. Logistic Regression

[Logistic regression](https://www.geeksforgeeks.org/machine-learning/understanding-logistic-regression/) predicts probabilities and assigns data points to binary classes (e.g., spam or not spam).

Use : Predicting whether a customer will buy a product online (yes/no) or diagnosing if a person has a disease (sick/not sick).

ML models

3. Decision Trees

A [decision tree](https://www.geeksforgeeks.org/machine-learning/decision-tree-introduction-example/) splits data into branches based on feature values, creating a tree-like structure.

Uses- Predicting a borrower's creditworthiness.

Helping determine treatment paths for patients.

4. Support Vector Machines (SVM)

[SVMs](https://www.geeksforgeeks.org/machine-learning/support-vector-machine-algorithm/) find the best boundary (called a hyperplane) that separates data points into different classes.

Uses-Such as face detection.

Sentiment analysis of product reviews.

Gene and cancer classification.

7. Random Forest

[Random forest](https://www.geeksforgeeks.org/machine-learning/random-forest-algorithm-in-machine-learning/) is an ensemble method that combines multiple decision trees.

Identifying fraudulent transactions.

Classifying conditions like cancer.

Analyzing satellite imagery to create thematic maps.

Deep Learning models:

1. RNN (Recurrent Neural Network)

Definition: A neural network designed to process sequential data by retaining information through loops.

Use: Ideal for time-series prediction and language modeling (e.g., next-word prediction).

2. CNN (Convolutional Neural Network)

Definition: A neural network specialized in processing grid-like data using convolutional layers.

Use: Commonly used for image classification and object detection.

3. Transformer

Definition: A neural network architecture that uses self-attention mechanisms to process sequences in parallel.

Use: Dominates natural language processing tasks like translation and text generation (e.g., GPT models).

Generative models:

1. GAN (Generative Adversarial Network)

Definition: A generative model with two networks (generator and discriminator) that compete to produce realistic synthetic data.

Use: Used for generating realistic images, videos, and deepfakes.

2. Diffusion Model

Definition: A generative model that learns to reverse a gradual noising process to create high-quality data samples.

Use: Popular for high-resolution image generation (e.g., DALL·E 2, Stable Diffusion).

3. LLM (Large Language Model)

Definition: A transformer-based model trained on massive text data to understand and generate human-like language.

Use: Used in chatbots, content creation, code generation, and more (e.g., ChatGPT, Claude).