1. Linear Regression

- Definition Predicts a continuous value based on input features using a straight-line relationship.

- Use Case Predicting house prices based on size, location, etc.

- Example Predicting salary based on years of experience.

2. Logistic Regression

- Definition Predicts a binary outcome (yesno, truefalse) using a sigmoid function.

- Use Case Email spam detection.

- Example Predicting whether a customer will buy a product (1) or not (0).

3. Decision Tree

- Definition A tree-like model that splits data based on feature values to make decisions.

- Use Case Loan approval systems.

- Example If income ₹50K and credit score 700 → approve loan.

4. Random Forest

- Definition An ensemble of decision trees that improves accuracy and reduces overfitting.

- Use Case Disease diagnosis from medical data.

- Example Predicting diabetes based on multiple health indicators.

5. SVM (Support Vector Machine)

- Definition Finds the best boundary (hyperplane) to separate classes.

- Use Case Face detection in images.

- Example Classifying images as cat vs. dog.

6. CNN (Convolutional Neural Network)

- Definition Deep learning model specialized for image and spatial data.

- Use Case Medical image analysis (e.g., detecting tumors).

- Example Classifying handwritten digits (MNIST dataset).

7. RNN (Recurrent Neural Network)

- Definition Neural network for sequential data with memory of previous inputs.

- Use Case Language modeling and text generation.

- Example Predicting the next word in a sentence.

8. Transformers

- Definition Deep learning architecture using attention mechanisms for sequence modeling.

- Use Case Machine translation (e.g., English to Hindi).

- Example ChatGPT and BERT use transformers.

9. GANs (Generative Adversarial Networks)

- Definition Two neural networks (generator and discriminator) compete to create realistic data.

- Use Case Generating realistic images or art.

- Example Creating fake celebrity faces.

10. Diffusion Models

- Definition Generate data by reversing a noise process, often used in image synthesis.

- Use Case AI art generation (e.g., DALL·E, Stable Diffusion).

- Example Creating a painting from a text prompt.

11. LLMs (Large Language Models)

- Definition Deep learning models trained on massive text data to understand and generate language.

- Use Case Chatbots, code generation, summarization.

- Example ChatGPT, Gemini, Claude.