

## Perceptron – Single-Slide Summary

### What is a Perceptron?

- A **binary linear classifier** that predicts based on a **weighted sum** of input features.
- Inspired by biological neurons.

### Model Function

- Output:  $y = \text{sign}(w \cdot x + b)$   
where:
- $w$ : weight vector
- $x$ : input features
- $b$ : bias
- $\text{sign}$ : returns +1 or -1

### Learning Algorithm

- Initialize weights to 0 or small values.
- For each training sample:
- Predict output.
- Update weights if prediction is wrong:
- Repeat over multiple iterations.

### Key Points

- Works only if data is **linearly separable**.
- Converges in finite steps if data is separable.
- Simple, fast, and forms the base of neural networks.