

## Limitations of Logistic Regression

### 1 Linear Decision Boundary

Can only separate data with linear boundaries. Fails on non-linear patterns like XOR problem.

### 2 Limited Feature Interactions

Cannot automatically learn complex feature interactions without manual feature engineering.

### 3 Single-layer Architecture

Lacks hierarchical representation learning. Cannot build abstract features from raw inputs.

### 4 Low Model Capacity

Limited expressiveness for complex patterns. Struggles with high-dimensional non-linear data.



## Solution: Multi-layer Neural Networks

Neural networks overcome these limitations through multiple layers and non-linear activations