# G.H RAISONI COLLEGE OF ENGINEERING, PUNE

An autonomous institute affiliated by SPPU

Deep Learning

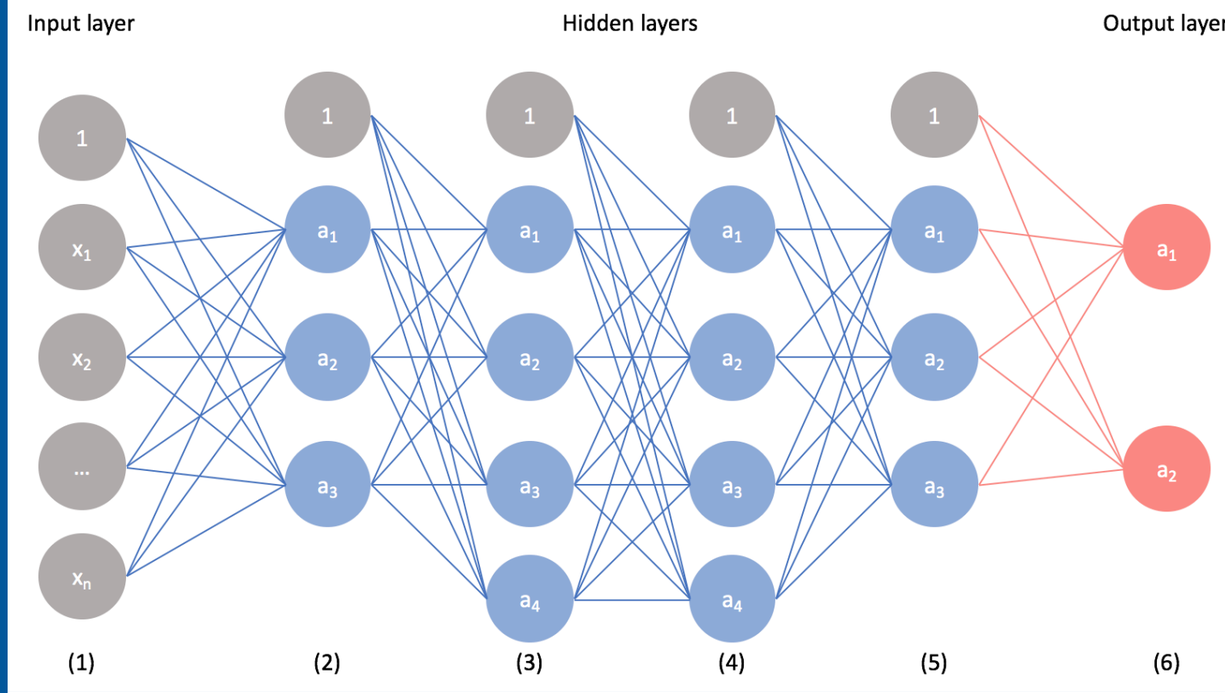
# Planar Data Classification with Hidden Layer

## *Introduction:*

- ***Planar Data Classification:*** *This refers to classifying data points on a 2D plane, typically using machine learning models. Such problems illustrate how neural networks can solve non-linear classification tasks.*
- ***Neural Networks:*** *Focuses on a simple neural network with one hidden layer, capable of learning complex decision boundaries.*

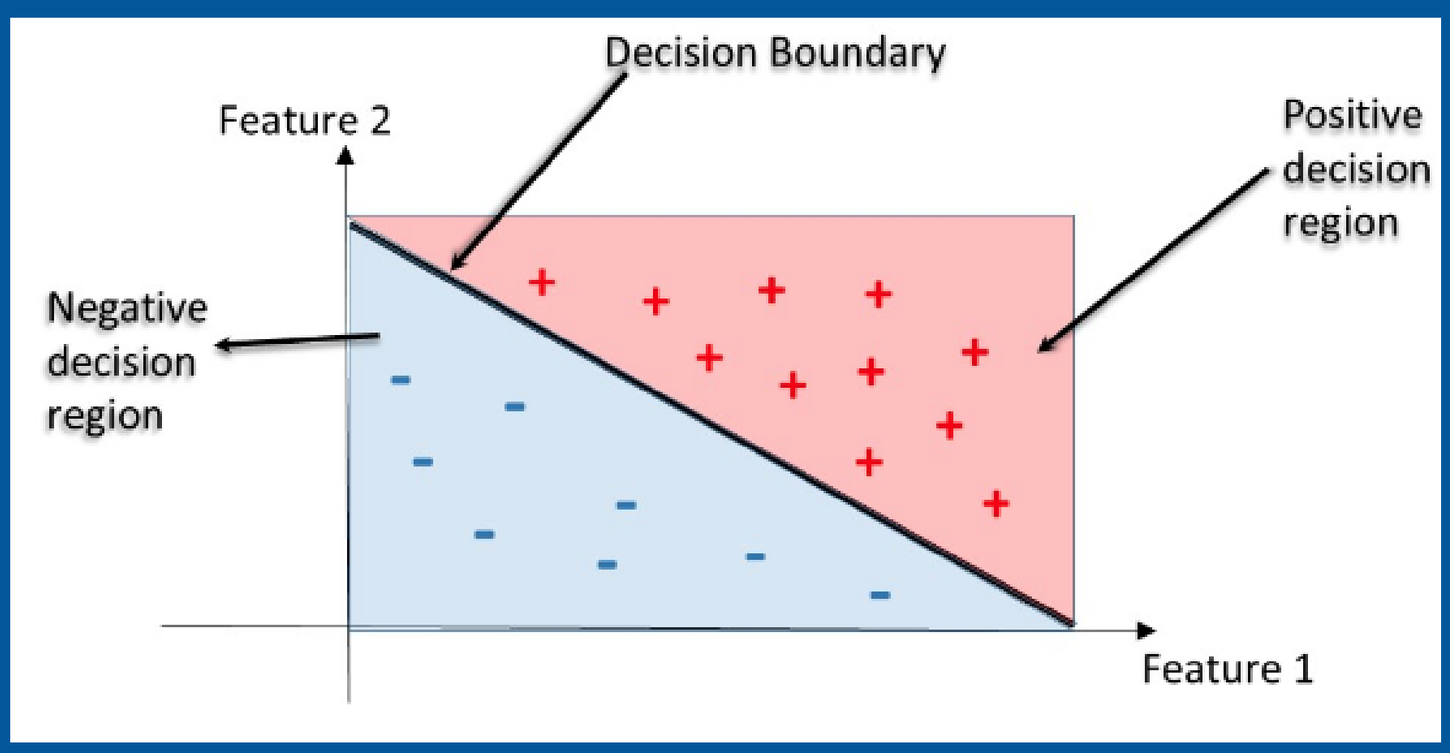
## Neural Network Architecture:

- ***Input Layer:*** *Consists of two neurons corresponding to the 2D input features.*
- ***Hidden Layer:*** *Includes a small number of neurons (e.g., 3-5) with non-linear activation functions like Sigmoid or ReLU.*
- ***Output Layer:*** *Typically, a single neuron with a Sigmoid activation function for binary classification.*




## Methodology:

- ***Dataset:*** *Common synthetic datasets used include spirals, moons, or circles that are not linearly separable.*
- ***Training Process:*** *Backpropagation and gradient descent are used to minimize the loss function (e.g., cross-entropy loss).*
- ***Activation Functions:*** *Discusses the role of non-linear activation functions in enabling the network to learn complex patterns.*




## Results:

- **Decision Boundary:** **A visualization showing how the trained network classifies different regions of the plane.**
- **Performance Metrics:** **Metrics such as accuracy, loss curves, and confusion matrices are used to evaluate the model's performance.**

**Class : TY CSE(AIML-A)**


Refrence Paper Title: "Understanding the Difficulty of Training Deep Feedforward Neural Networks"
Published: AISTATS, 2010 , Author: Xavier Glorot & Yoshua Bengio



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