

## Linear Classifier Concepts

Goal:

Find a line (hyperplane) that separates two classes

Decision Function:

$$f(\mathbf{x}) = \mathbf{w}^T \mathbf{x} + b$$

Classification Rule:

if  $f(\mathbf{x}) > 0 \rightarrow$  Class 1

else  $\rightarrow$  Class 0



Geometric View

Distance from decision boundary



Weight Vector  $w$

Perpendicular to decision boundary



Bias Term  $b$

Shifts boundary position



Multiple Features

Hyperplane in high-dimensional space