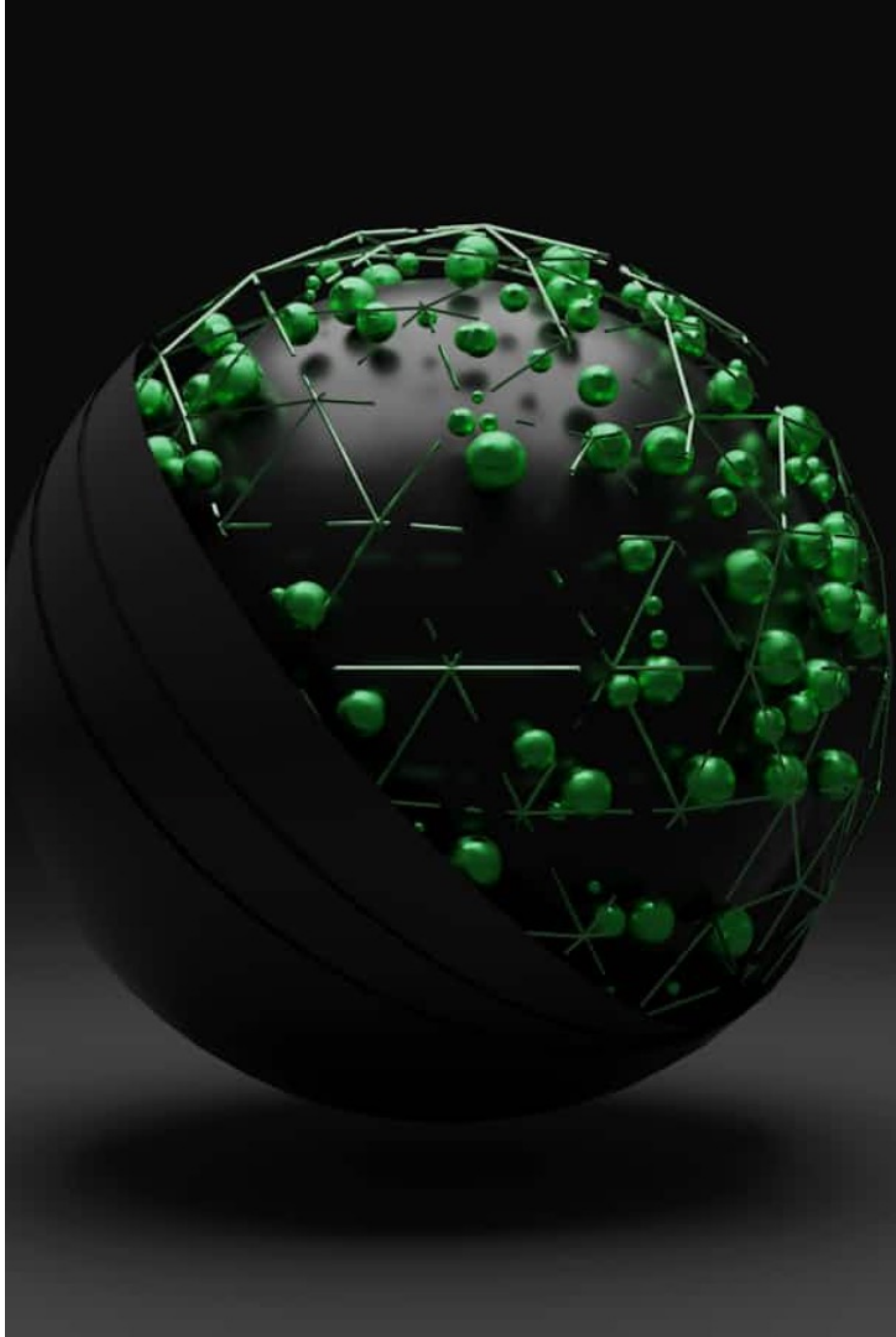
Day 9, Neural Networks: ReLU vs. Sigmoid

This presentation explores ReLU and Sigmoid. These activation functions are vital in neural networks. We will examine how they enable decision-making. Discover their roles in modern AI and deep learning applications.

Presented By

Maheshkumar Paik



Neural Network Architecture

1

2

3

Input Layer

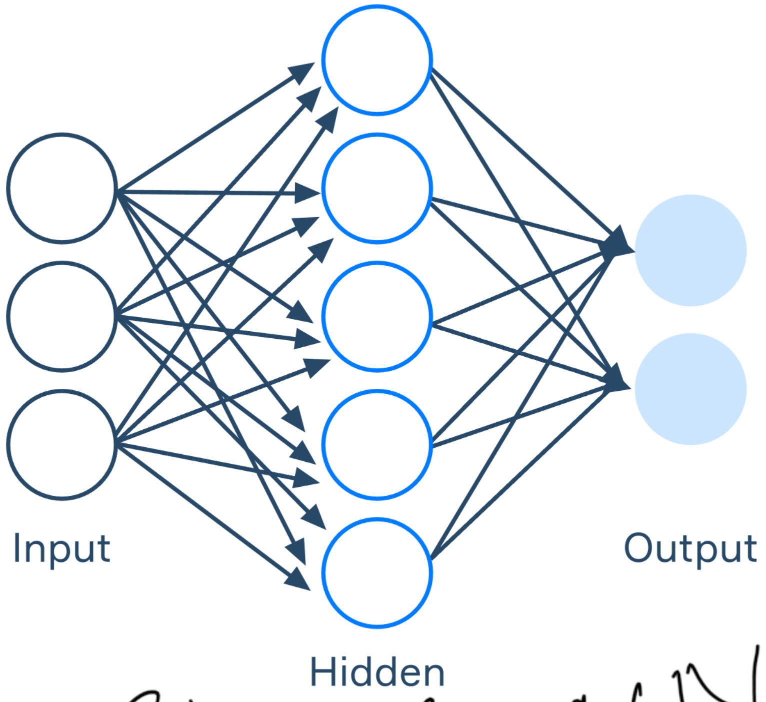
Receives initial data.

Hidden Layers

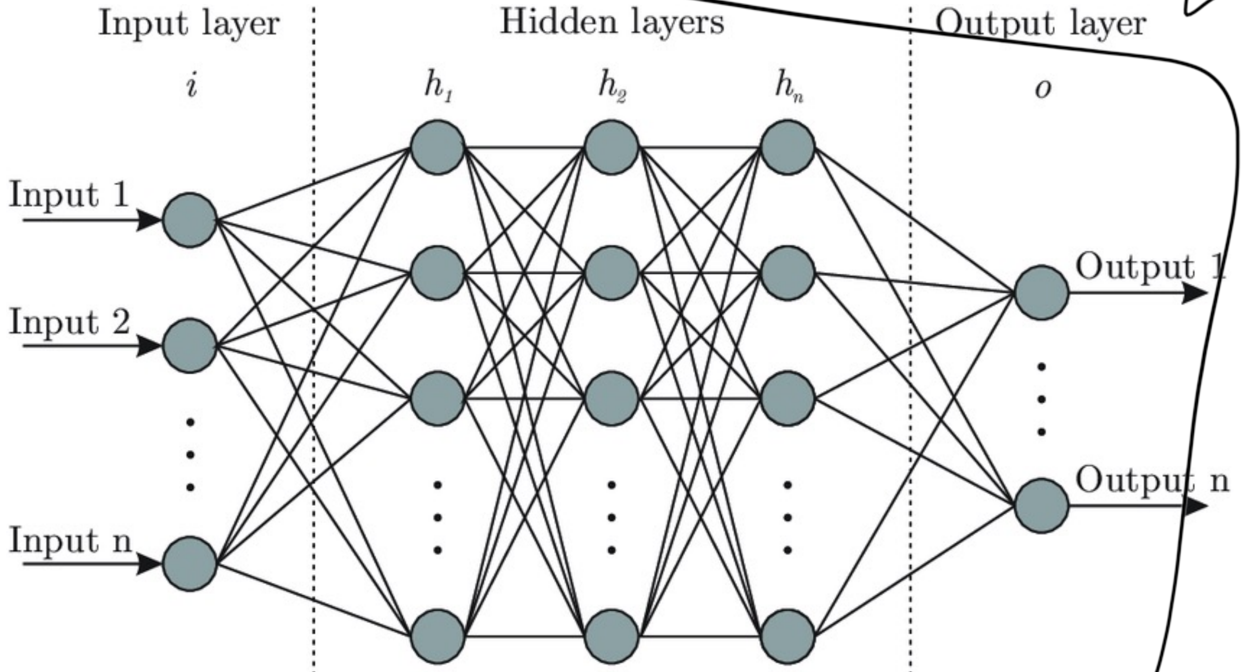
Processes data using activation functions.

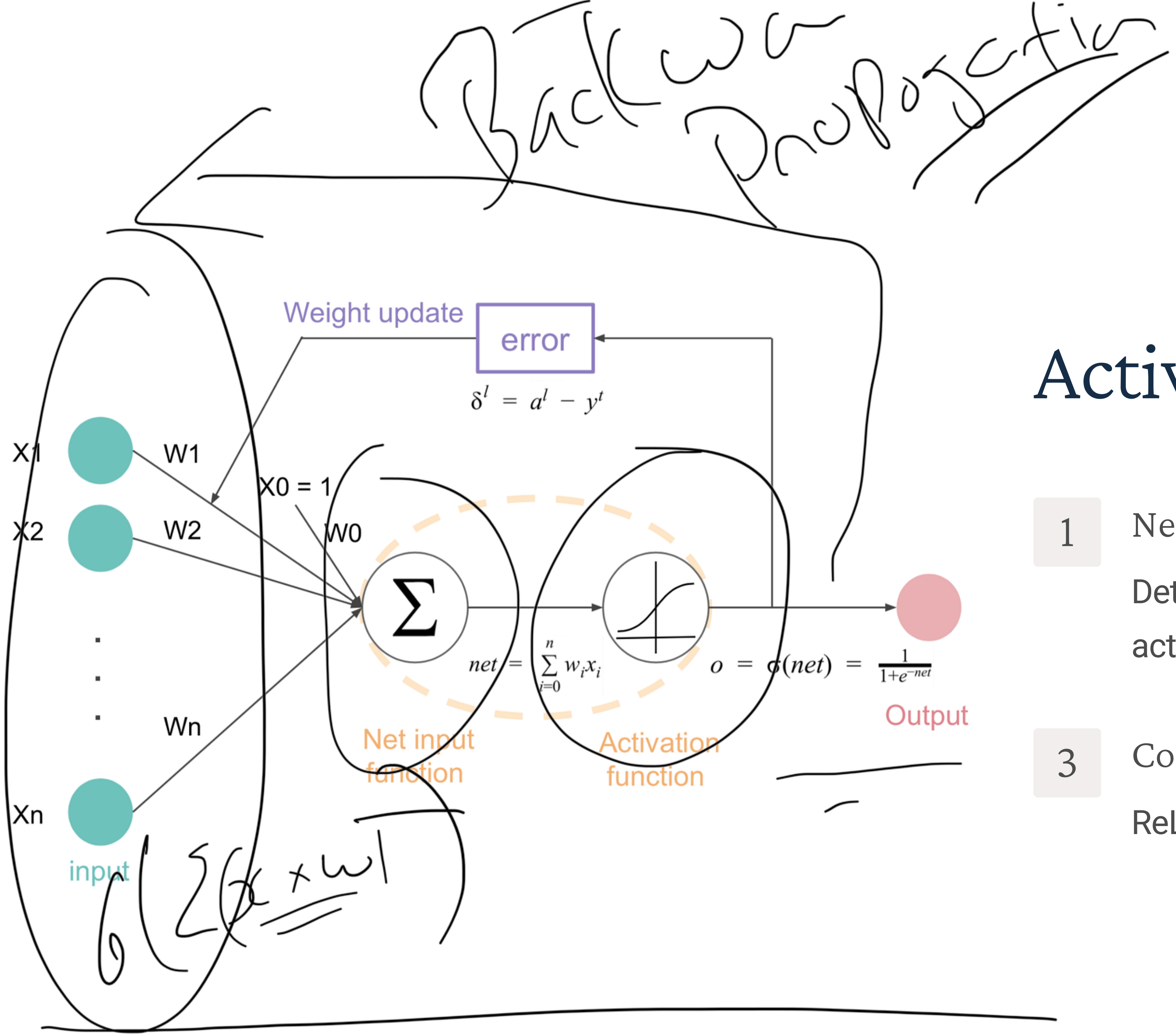
Output Layer

Provides the final result.



Simple NN





Activation Functions: Key Role

1 Neuron Activation

Determine if a neuron activates.

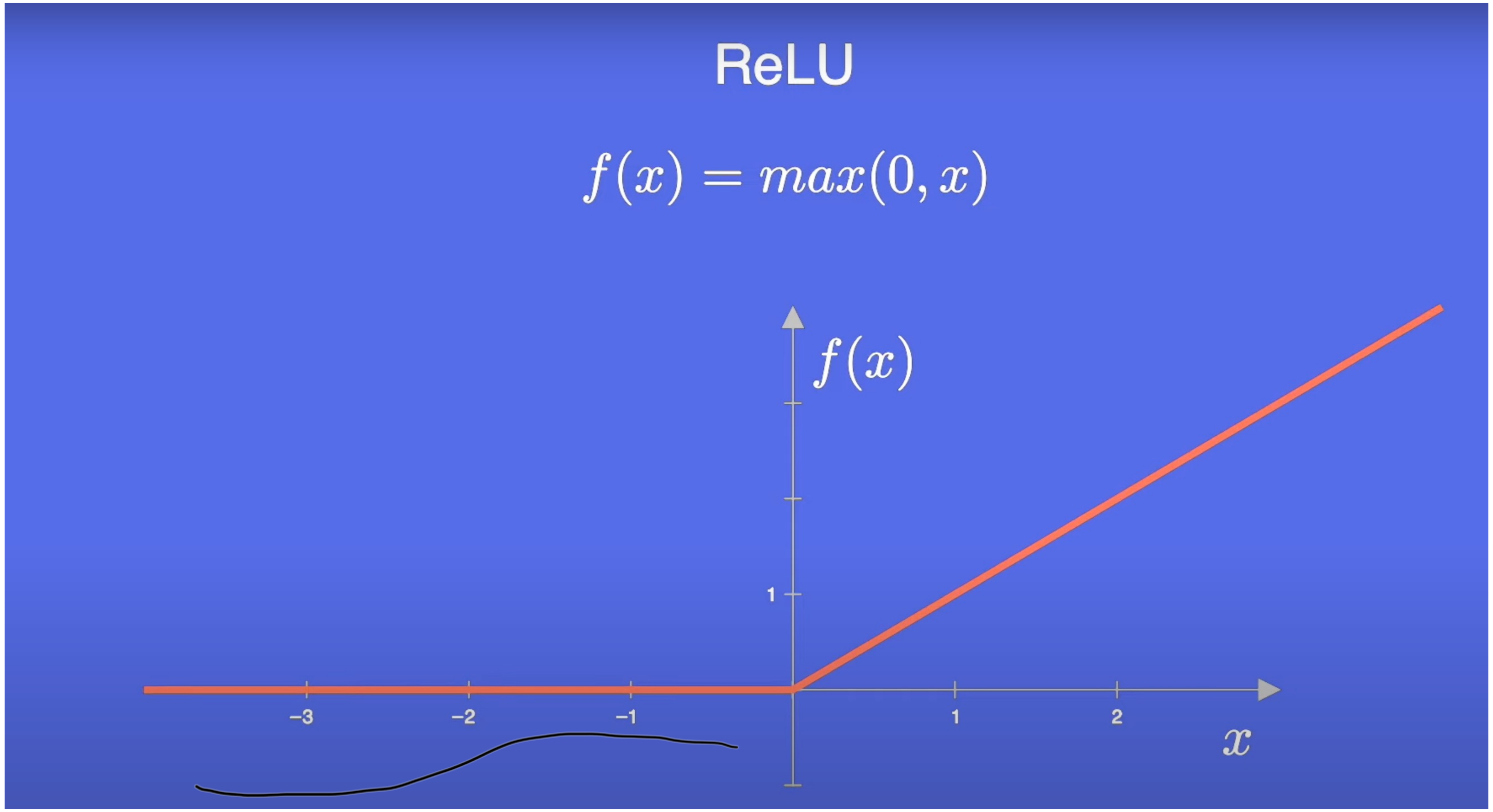
2 Add Non-Linearity

Networks learn complex patterns.

3 Common Choices

ReLU and Sigmoid are prevalent.

ReLU (Rectified Linear Unit) Activation Function



- Zero for negative inputs; input for positive ones.
- Enables efficient, rapid learning.

ReLU Advantages

Simplicity and Speed

Computationally efficient.

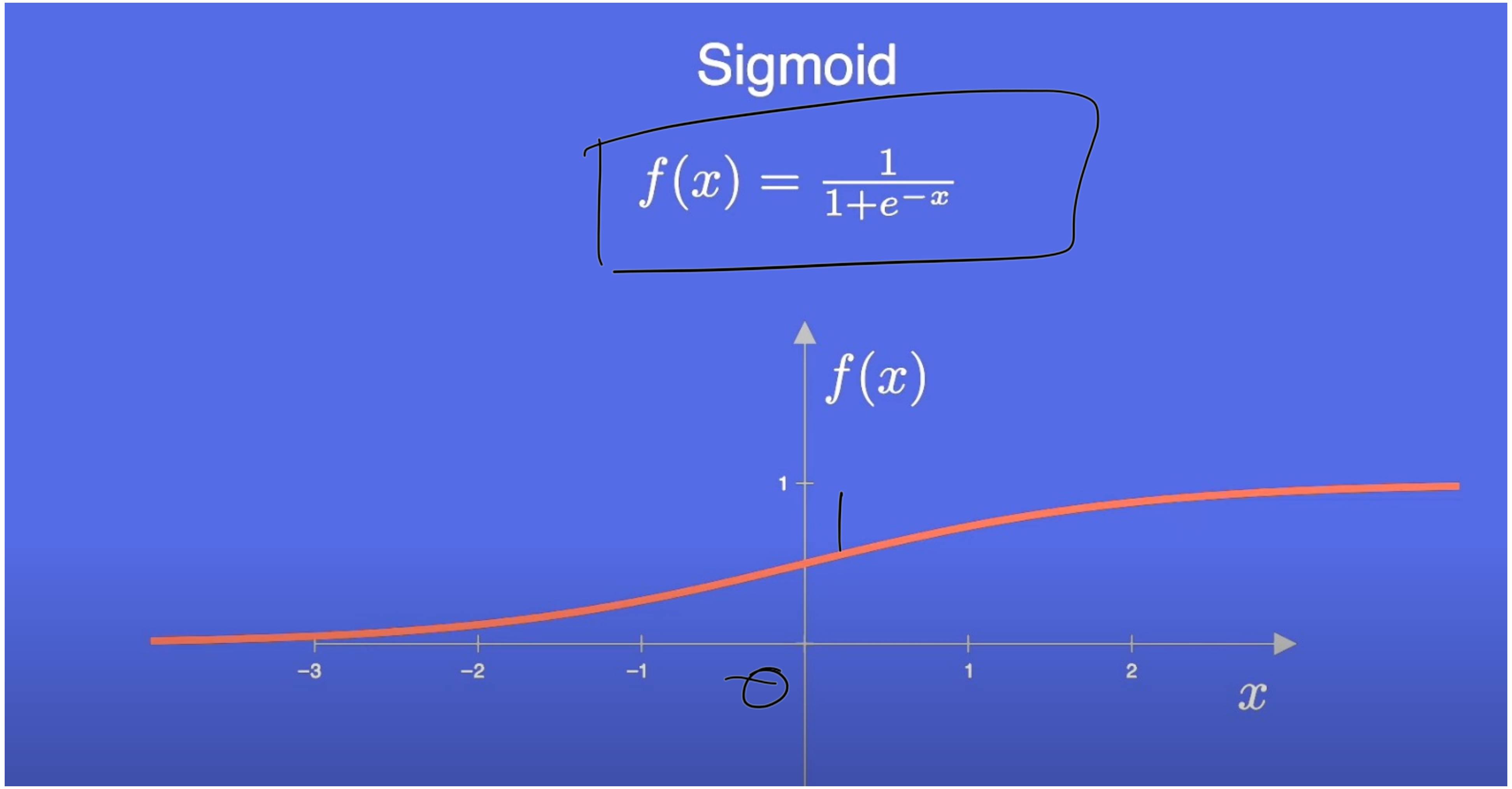
Deep Network Benefit

Reduces vanishing gradient issues.

Widespread Use

Standard in deep learning models.

Sigmoid Activation Function



- Smoothly maps any input to values between 0 and 1, making it perfect for normalized outputs
- Widely used in binary classification problems such as medical diagnosis (positive/negative) or fraud detection (legitimate/fraudulent)

Sigmoid Advantages

1

Smooth Gradient ✓

Aids smooth learning processes.

2

Probabilistic Output

Suited to binary classification tasks. ✓

3

Interpretability

Outputs represent probabilities. ✓

Next Steps

Explore More

Discover advanced activation functions like Tanh for normalized outputs and Softmax for multi-class classification problems.

Real-World Problems

Implement ReLU and Sigmoid functions in practical applications like image recognition and binary classification tasks.

Coding Practice

Build neural networks using popular Python frameworks like TensorFlow and PyTorch to gain hands-on experience.