Neural netwerodsk

A neural network, also known as an artificial neural network (ANN), is a computational model in machine learning inspired by how the human brain processes information. These models consist of layers made up of interconnected "neurons" or nodes, where each neuron receives inputs, applies weights and biases, passes the result through an activation function, and produces an output.[1] [2] [3]

Core Concepts

- Neural networks are designed to recognize complex patterns and relationships directly from data, without requiring explicit rules.[2] [3]
- Each connection between neurons has a weight, which determines how much influence one neuron has on another.[3] [1]
- Neurons are organized into layers: an input layer, one or more hidden layers, and an output layer that delivers the final prediction or classification.[1] [2]
- The learning process involves adjusting weights and biases to minimize the error between the network's predictions and the actual outcomes using methods like backpropagation and optimization algorithms such as stochastic gradient descent (SGD).[2]

How Neural Networks Learn

- During forward propagation, input data flows through the network, and each neuron's output is determined by the weighted sum of its inputs, plus a bias, passed through a non-linear activation function such as ReLU, sigmoid, or tanh.[2]
- The output is measured against the target, and the difference (loss) is calculated.
- Using backpropagation, the network computes how to adjust each weight and bias to reduce the loss, refining its predictions over many iterations (epochs).[3] [2]
- As a result, the neural network evolves to adapt to different tasks and datasets, enabling it to perform complex tasks like image recognition, language translation, and decision making.[1] [2]

Example Structure

Layer	Elements (Neurons)	Role	
Input Layer	Feature values	Receives data	
Hidden Layers	Multiple neurons	Learns complex features; increases abstraction	

Layer	Elements (Neurons)	Role	
Output Layer	Target variables	Produces predictions or classifications	[2] [1]

Neural networks are a foundational technology in artificial intelligence and support a wide range of modern machine learning applications.[4] [5]

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1. https://en.wikipedia.org/wiki/Neural_network_(machine_learning)
2. https://www.geeksforgeeks.org/machine-learning/neural-networks-a-beginners-guide/
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