



Depp-Learning-Hands-on

DEEP LEARNING HANDS-ON DONE IN LEARNBAY INTERNSHIP

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Neurons (Nodes):

A neuron is the fundamental unit of a neural network. It performs the following tasks:

1. **Accepts Inputs:**

- Each neuron receives one or more inputs, which can be features of the data or outputs from previous neurons.

2. **Applies Weights and Biases:**

- **Weights** adjust the importance of each input.
- **Bias** shifts the activation threshold of the neuron.

3. **Processes Data Through an Activation Function:**

- The weighted sum of the inputs is passed through an activation function, which decides whether the neuron should "fire."

4. **Produces Outputs:**

- The output is passed to neurons in the next layer.

LAYERS IN A NEURAL NETWORK:

Neural networks are organized into layers, each serving a distinct purpose:

1. **Input Layer:**

- The first layer in the network.
- Accepts raw input data (e.g., images, text, numerical data).

2. **Hidden Layers:**

- These layers perform computations and extract complex features from the input data.
- A network can have one or more hidden layers, making it a **deep neural network**.

3. **Output Layer:**

- Produces the final predictions or classifications.

- The number of neurons in the output layer typically corresponds to the number of output categories.

WEIGHTS AND BIASES:

Weights:

- Represent the strength of the connection between two neurons.
- Larger weights signify a stronger influence of the input on the neuron's output.

Biases:

- Allow the activation function to be adjusted, providing flexibility in the learning process.
- Helps the neuron activate even if all weighted inputs are zero.

Mathematical Representation:

For a neuron with inputs X_1, X_2, \dots, X_N , weights W_1, W_2, \dots, W_N , and bias b , the output z is computed as:

$$Z = W_1X_1 + W_2X_2 + \dots + W_NX_N + B$$