



DAILY WORK  
REPORT  
TR-02

INFOWIZ

21 JUNE 2024

# Day 15: Introduction to Neural Networks

**Summary:** Today, we embarked on our journey into deep learning with an introduction to neural networks (NN), a powerful class of algorithms inspired by the human brain's structure and function. We explored the basic components of neural networks, their architecture, and their applications in solving complex machine learning problems.

## Key Learnings:

### 1. Basics of Neural Networks:

- **Neurons and Layers:** Discussed the basic building blocks of neural networks: neurons, which receive inputs, apply weights, and pass outputs through activation functions; and layers, which organize neurons into sequential or parallel structures.
- **Feedforward Propagation:** Explored the process of passing data through the network layer by layer to generate predictions, with each layer performing specific transformations on the input data.

### 2. Activation Functions:

- **Role and Types:** Learned about activation functions such as sigmoid, tanh, ReLU (Rectified Linear Unit), and softmax, which introduce non-linearity into neural networks, enabling them to learn complex patterns and relationships in data.

### 3. Neural Network Architectures:

- **Fully Connected (Dense) Networks:** Introduced the concept of fully connected neural networks, where neurons in one layer are connected to all neurons in the subsequent layer, facilitating intricate feature learning and representation.
- **Deep vs. Shallow Networks:** Contrasted deep neural networks (with many hidden layers) and shallow networks (fewer hidden layers), understanding how depth affects model capacity and ability to learn hierarchical representations.

### 4. Implementation and Tools:

- Overviewed popular deep learning frameworks like TensorFlow and PyTorch for building and training neural networks, highlighting their capabilities for efficient computation and gradient optimization.
- Discussed the importance of GPU acceleration in speeding up neural network training, particularly for large-scale datasets and complex model architectures.

Today's session provided a foundational understanding of neural networks as a cornerstone of deep learning, preparing us to explore advanced architectures and applications in subsequent sessions. The theoretical insights gained will guide our practical implementation and experimentation with neural networks in upcoming projects and exercises.