# INFIERI23: Fundamentals of Neural Networks

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Description:

This comprehensive tutorial is designed to introduce you to the core concepts and foundations of neural networks, the building blocks of today's AI and machine learning technologies. Whether you're a physics student delving into the BSM, an aspiring electronics engineer, or a computer science student eager to dive into machine learning, understanding neural networks is crucial. This tutorial aims to provide a solid foundation in neural networks to enable you to understand how they function and how they can be applied in various domains.
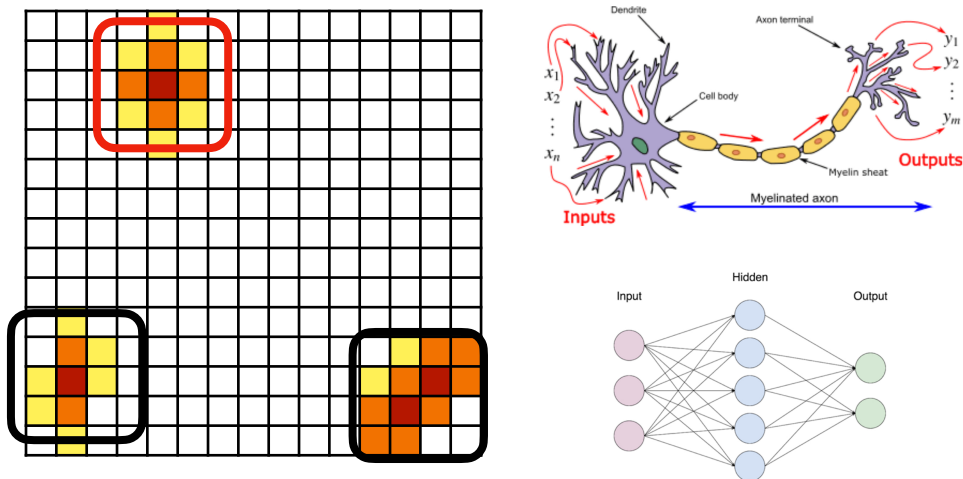
What You'll Learn:

Introduction to Neural Networks:
Learn what neural networks are, and why they are so essential in today's technological landscape.

Basic Architecture:
Discover the components that make up a neural network—nodes, layers, weights, and biases—and how they interact.

Activation Functions:
Understand the role of activation functions and explore commonly used types like Sigmoid, ReLU, and Tanh.

Loss Functions: Familiarize yourself with the concept of loss functions and why they are crucial for training neural networks.

Loss Minimization: Grasp the underlying math and algorithms that allow neural networks to 'learn' from data.

Training a Neural Network: Step-by-step guide on how to train a neural network with a hands-on example.

Optimize hyperparameters: A practical example illustrating how to fine-tune your model for optimal performance.

The tutorial is divided into two parts, spanning a total of three hours. In the first part, we will establish the framework and provide the necessary background information. In the second part, we will troubleshoot a malfunctioning neural network code and optimize it to achieve the best performance.