Lecture

Advanced Machine Learning: Deep Neural Networks

Author: Prof. AI Researcher
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Institute: University of Pisa - Master in AI

Overview

Today we'll explore the cutting-edge world of deep neural networks, covering:

- Mathematical foundations of deep learning
- Advanced architectures and their applications
- Optimization techniques and regularization
- Practical implementation strategies

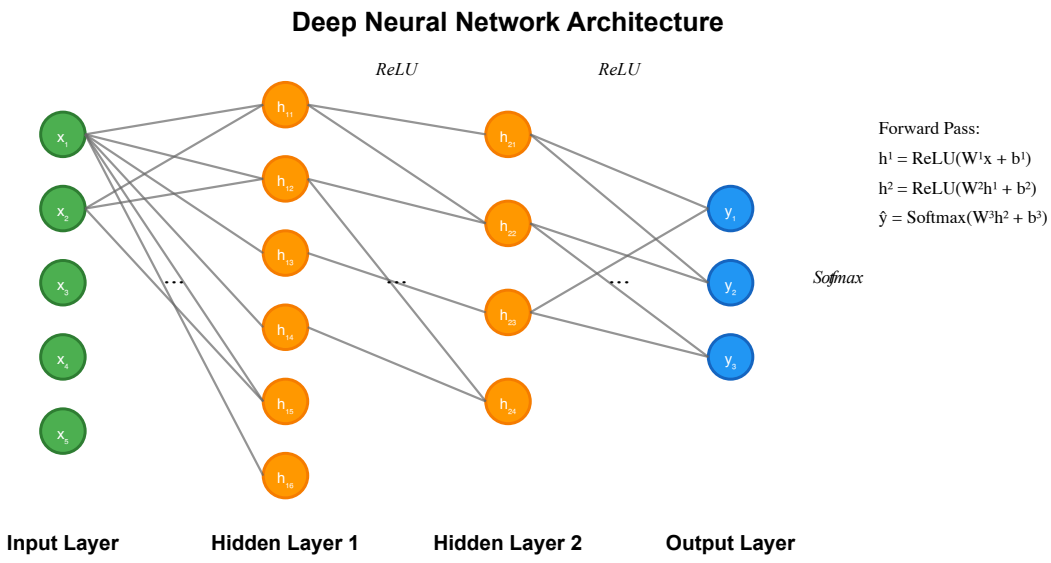

Figure 1: Neural Network Architecture

Deep Learning Mathematics

Gradient Computation via Backpropagation

The chain rule enables efficient gradient computation:

$$\frac{\partial L}{\partial W^{(l)}} = \frac{\partial L}{\partial z^{(l+1)}} \cdot \frac{\partial z^{(l+1)}}{\partial a^{(l)}} \cdot \frac{\partial a^{(l)}}{\partial W^{(l)}}$$

This slide covers gradient computation via backpropagation. Note the mathematical expressions.
