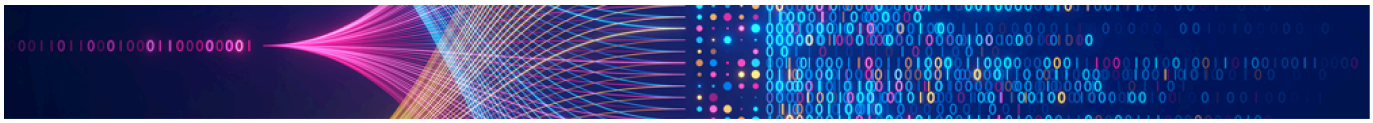
Week 3 Overview



Week 3 Overview

Training a neural network is not just about reducing the loss — it’s about ensuring the model generalizes well to unseen data. In this lesson, we’ll explore how to monitor a model's performance during training using learning curves, identify the classic signs of underfitting and overfitting, and apply early stopping to prevent overfitting. We’ll also examine how neural networks are initialized and trained and address common challenges such as exploding gradients, unstable updates, and poor generalization. Finally, we’ll apply regularization techniques like weight decay and dropout to improve the model’s ability to generalize to new data.

Week 3 Introduction

Watch the video for an introduction to Week 3.

(04:25)

Learning Objectives

At the end of this week, you should be able to:

- Use learning curves to evaluate model progress and make decisions about stopping or adjusting training.
- Identify signs of overfitting and underfitting by analyzing training and validation metrics in a learning curve.
- Explain the role of early stopping in improving generalization and saving computation.
- Describe how different weight initialization strategies impact learning dynamics.
- Understand the causes of exploding and vanishing gradients and how gradient clipping can help.
- Explain how dropout acts as a regularization technique during training.
- Compare different forms of regularization in deep learning (e.g., weight decay/L2).

This Week's Activities

Assignment	Title	Type	Graded / Not Graded	Due
Knowledge Check	Week 3 Knowledge Check	Multiple choice	Ungraded	Sunday
Assignment	Coding Homework	Jupyter Notebook	Graded	Sunday

Weekly Cadence

- Faculty Live Session: Monday 7-8 pm ET
- Sunday deadline: 11:59pm ET