Lecture Contents

Part 1: **Initialization Strategies**

Strategies for setting **weights and biases** before training begins. Proper initialization prevents gradient vanishing/exploding problems, accelerates training speed, and ensures better convergence. (e.g., Xavier, He initialization)

Part 2: **Normalization Techniques**

Techniques for normalizing the **input distribution** to each layer during training. Reduces Internal Covariate Shift, stabilizes training, and enables the use of higher learning rates. (e.g., Batch Norm, Layer Norm, Group Norm)

Part 3: **Normalization and Generalization**

Explores how normalization techniques affect model **generalization performance**. Covers theoretical and empirical analysis of how normalization prevents overfitting, improves test performance, and enhances model robustness.