

# Lecture 3: Theoretical Analysis of Boosting Methods

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# 1 Boosting Algorithm

## 1.1 AdaBoost

## 1.2 Gradient Boost

# 2 Theoretical Guarantee for Boosting

## 2.1 Settings

## 2.2 Training Error Bounds

## 2.3 Generalization Error Bounds via VC Dimension

## 2.4 Generalization Error Bounds via Large Margin Theory

# 3 Fundamental Perspectives

## 3.1 Game Theory

## 3.2 Online Learning

## 3.3 Maximum Entropy Estimation

## 3.4 Iterative Projection Algorithms and Convergence Analysis