

# Lecture 09:

## Sayan Mukherjee

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### Description

Necessary and sufficient requirements for uniform convergence for both real-valued loss functions and classification are introduced. VC entropy, VC dimension, empirical covering numbers, and V-gamma dimension are introduced and explained.

### Suggested Reading

- N. Alon, S. Ben-David, N. Cesa-Bianchi, and D. Haussler **Scale-sensitive Dimensions, Uniform Convergence, and Learnability**. Journal of the ACM, 44(4):615-631, 1997.
  - V. N. Vapnik. **The Nature of Statistical Learning Theory**. Springer, 1995.
  - Cucker and Smale. **On the mathematical foundations of learning**. Bulletin of the American Mathematical Society, 2002.
  - V. N. Vapnik and A. Ya. Chervonenkis. **Necessary and Sufficient conditions for the uniform convergence of the means to their expectations**. Probability Theory and Its Applications, 26, 532-553 1981.
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