Machine Learning Topic 4

Empirical Risk Minimization and VC Theory

Aimee Barciauskas

29 March 2016

- Fundamental inequalities: *slide 1*
- General description of how we study **maximal deviations of empirical frequencies from their expectations**: *slide 2*
- Infinite classes and symmetrization by ghost sample: *slide 3*
- Definition of the shatter coefficient: *slide 4*
  - **The shatter coefficient of a class $\mathcal{C}$ is the number of possible ways n data points can be classified in $\mathcal{C}$**
  - The *effective* number of classifiers
- Bounding the rademacher average using the shater coefficient: *slide 4*
- Applications of bounds for empirical risk minimization with example in half-lines and intervals: *slide 5*
- Definition of VC dimension: *slide 6*
- Sauer's Lemma (bound on shatter coefficient using VC dimension): *slide 6*
- Examples of shatter coefficients and VC dimensions: *slide 7*