CS420 Machine Learning

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1 Prequisitions

1.1 ML's Goal

Machine learning has a loss function $\mathcal{L}$, and we have to let it take the minimum by learning the parameters of f_θ.

$$\min\{\frac{1}{N}\Sigma_{i=1}^{N}\mathcal{L}(y_i, f_\theta(x_i))\}$$

是预测结果接近真实的标签，是机器学习总体的目标。

1.2 Outline of Proper Nouns

欠拟合、过拟合 算法无法捕捉数据基础变化趋势时，出现欠拟合；模型把随机误差和噪声也考虑进去时，出现过拟合。

正则化 (Regularization) Add a parameter($\lambda\Omega(\theta)$) penalty to prevent the model from overfitting the data.

L2 regularization(Ridge): $\Omega(\theta) = ||\theta||_2^2 = \Sigma_{m=1}^{M}\theta_m^2$.

L1 regularization(Lasso): $\Omega(\theta) = ||\theta||_1 = \Sigma_{m=1}^{M}|\theta_m|$.

交叉验证 (Cross Validation) The training data were randomly divided into k groups, and every time we use one group to verify our model.

模型泛化性 (Model Generalization)

判别模型和生成模型 判别模型关注数据中的一维（显式函数）；生成模型关注数据之间的联系（隐函数）.

2 Linear Model