

# Naive Bayes Classifier

Aarti Singh

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Optimal Classification (Bayes classifier)

$$f^* = \arg \min_f P(f(X) \neq Y)$$

Even the optimal classifier makes mistakes  $R(f^*) > 0$

Bayes rule  $P(Y|X) \propto P(X|Y)P(Y)$

- $P(X|Y)$ : class conditional distribution
- $P(Y)$ : class probability