

NAIVE BAYES CLASSIFICATION DESIGN

$$\begin{aligned} 1a) \quad P(X|Y) &= \frac{P(X \cup Y)}{P(Y)} = \frac{P(X \cup Y)}{P(X)} = P(Y|X) \\ P(X|Y)P(Y) &= P(Y|X)P(X) \\ P(Y|X) &= \frac{P(X|Y)P(Y)}{P(X)} \end{aligned}$$

1b) This equation is always true and makes no assumptions on Y , X only that $P(X)$ and $P(Y) > 0$.

$$1c) \quad P(Y \mid X_1, X_2, \dots, X_{|W|}) = \frac{P(X_1, X_2, \dots, X_{|W|} | Y) P(Y)}{P(X_1, X_2, \dots, X_{|W|})}$$

1d) $P(Y)$ is the probability of decade C_i before X is observed.