Entropy H(X) Measures Randomness of X
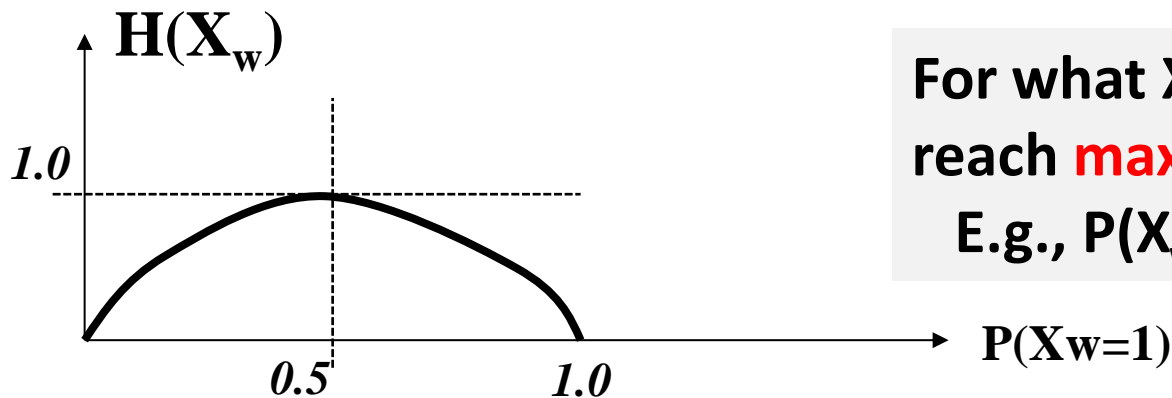
$$H(X_w) = \sum_{v \in \{0,1\}} -p(X_w = v) \log_2 p(X_w = v)$$

$$X_w = \begin{cases} 1 & w \text{ is present} \\ 0 & w \text{ is absent} \end{cases}$$

$$= -p(X_w = 0) \log_2 p(X_w = 0) - p(X_w = 1) \log_2 p(X_w = 1)$$

Define $0 \log_2 0 = 0$

For what X_w, does $H(X_w)$ reach maximum/minimum?
  E.g., $P(X_w=1)=1$? $P(X_w=1)=0.5$?

or equivalently $P(Xw=0)$ (Why?)

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