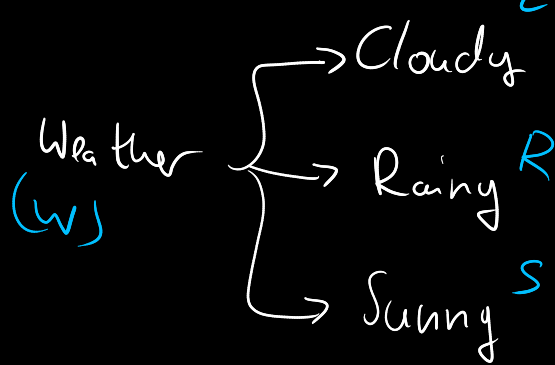


Categorical Distribution - Intro



Bernoulli

2 states



Categorical

> 2 states

$$V \in \{C^0, R^1, S^2\}$$

$$P(W=C) = \theta_0$$

$$P(W=R) = \theta_1$$

$$P(W=S) = \theta_2$$

$\left. \begin{matrix} P(W=C) = \theta_0 \\ P(W=R) = \theta_1 \\ P(W=S) = \theta_2 \end{matrix} \right\} \underline{\theta}$

important: $\sum_{i=0}^{D-1} \theta_i = 1.0$

→ last states probs (here θ_2) could be deduced
but is saved commonly

e.g. $\underline{\theta} = \begin{bmatrix} 0.2 \\ 0.3 \\ 0.5 \end{bmatrix} \begin{matrix} C \\ R \\ S \end{matrix}$

pmf: $P(W) = \prod_{i=0}^{D-1} \theta_i^{I(W=i)}$

$$I(W=i) = \begin{cases} 1, & W=i \\ 0, & \text{else} \end{cases}$$

example: prob of a rainy day

$$P(W=R) = 0.2^{I(1=0)} \cdot 0.3^{I(1=1)} \cdot 0.5^{I(1=2)}$$

$$= 0.2^0 \cdot 0.3^1 \cdot 0.5^0$$

$$= 1 \cdot 0.3 \cdot 1$$

$$= \underline{\underline{0.3}}$$