

The background of the slide features a complex network diagram. It consists of numerous nodes, represented by small circles in various shades of blue and grey, interconnected by thin, light blue lines. The nodes are distributed across the slide, with a higher density on the left side, creating a sense of a vast, interconnected system.

信息的描述

武汉理工大学

Information theory
and
coding



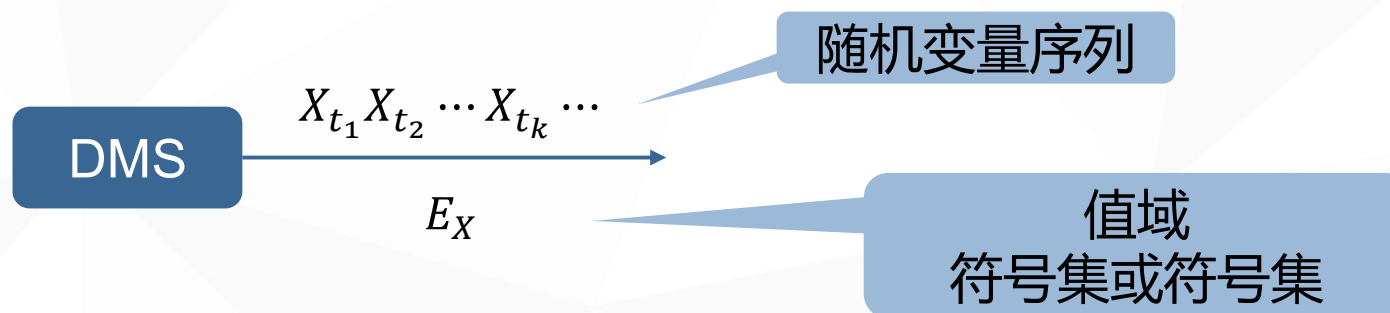
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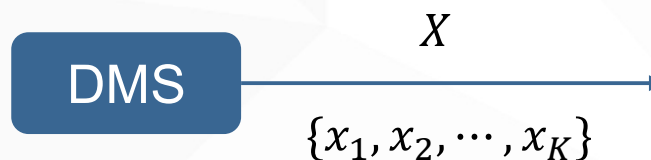
02. 非理想观察模型

»» 离散无记忆信源

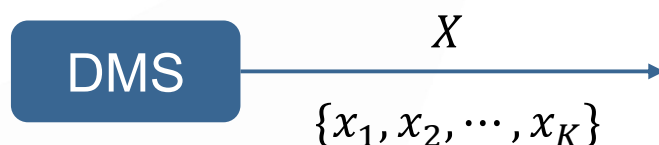


DMS: Discrete Memoryless Source , 离散无记忆信源。

$X_{t_1} X_{t_2} \cdots X_{t_k} \cdots$: 独立同分布随机变量序列。



»» 离散无记忆信源



有用的记号:

$$X = \{x_k | k = 1, 2, \dots, K\}$$

先验概率:

$$P(x_k) \geq 0 \quad k = 1, 2, \dots, K$$

先验概率集合:

$$P_X = \{P(x_k) | k = 1, 2, \dots, K\}$$

DMS的概率空间:

$$[X, P_X] = [x_k, P(x_k) | k = 1, 2, \dots, K]$$

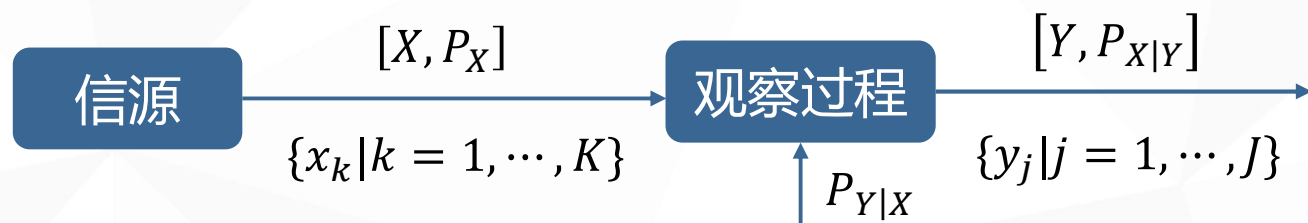
$$\begin{bmatrix} X \\ P_X \end{bmatrix} = \begin{bmatrix} x_1 & x_2 & \dots & x_K \\ P(x_1) & P(x_2) & \dots & P(x_K) \end{bmatrix}$$

概率的完备性条件:

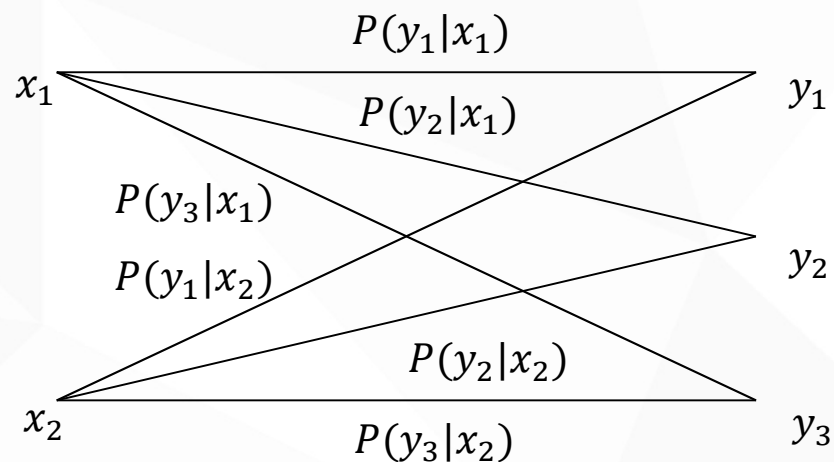
$$\sum_{k=1}^K P(x_k) = 1$$

完备信源: 满足概率完备性的信源。

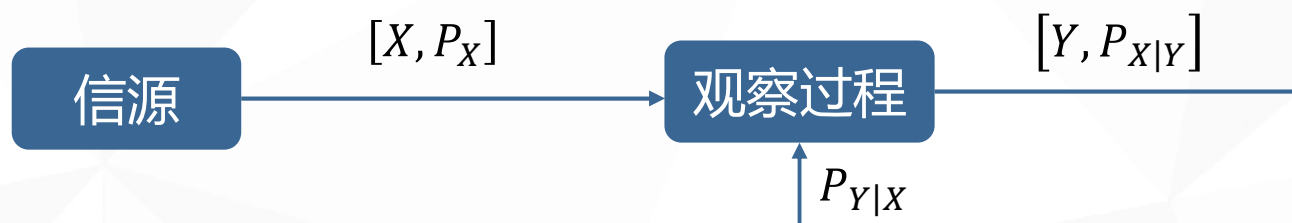
»» 非理想观察模型



P_X : 先验概率集合
 $P_{X|Y}$: 后验概率集合
 $P_{Y|X}$: 转移概率集合



»» 非理想观察模型



▶ 先验不确定性:

是对信源观察之前，认识主体对信源所具有的不确定，与先验概率有关。
eg.筛子。

▶ 后验不确定性:

观察之后，对信源还持有的不确定性，与后验概率有关。

▶ 信息是不确定性的减小，通过对信源输出的观察，认识主体所获得的信息为:

信息 = 先验不确定性 - 后验不确定性

A background network diagram consisting of numerous nodes (dots) connected by thin lines, forming a complex web. The nodes are colored in shades of blue and grey, and the lines are thin and light blue. The overall shape of the network is roughly triangular, with the base at the bottom and the apex at the top.

感谢观看！

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