2016. november 11., péntek 14:30

Problem: $H(x) \leq L(x) \leq H(x) + \varepsilon$

→ Given an "ε" ⇒ how to develop a code

$$H(\underbrace{X_1, \dots X_K}_{\substack{\text{independent}\\ \text{identically}\\ \text{distributed}}}) = \sum_{i=1}^{K} H(X_i) = K \cdot H(X_1)$$

Block coding

$$\begin{array}{c|cccc|c} \underline{X} \rightarrow & X(t), & X(t-1), & \dots & X(t-K+1) & Y \\ \hline & a_1 & a_1 & \dots & a_1 & y_1 \\ N^K & a_2 & a_2 & \dots & a_2 & y_2 \\ & \vdots & \vdots & \ddots & \vdots & \vdots \\ & a_N & a_N & \dots & a_N & y_{N^K} \end{array}$$

Data Speed: $O\left(\frac{1}{K}\right) \Longleftrightarrow O(N^K)$: LUT size

IT Source Y

→ Shannon-Fano coding on Y

$H(Y) \leq L \leq H(Y) + 1$

$K \cdot H(x) \leq L \leq K \cdot H(x) + 1$

$$\boxed{H(x) \leq \lambda \leq H(x) + \frac{1}{K}}$$

→ given ε : $K = \left\lceil \frac{1}{\varepsilon} \right\rceil$ ⇒ we can approach L with $H(x)$ as close as we want

→ Then what is the problem

⇒ we need a N^K size LUT

Next question: How do we do source coding without the knowledge of $p(x)$?

⇒ Non-parametric / Distribution-free data compression

different name for same thing

⇒ $p(x)$ can change in time