Claude Shannon - A Mathematical Theory of Communication (1948)

Tom Rochette <tom.rochette@coreteks.org>

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0.1 Context

A Mathematical Theory of Communication is a critical piece of knowledge for anyone interested in the topic of information.

0.2 Learned in this study

0.3 Things to explore

1 Overview

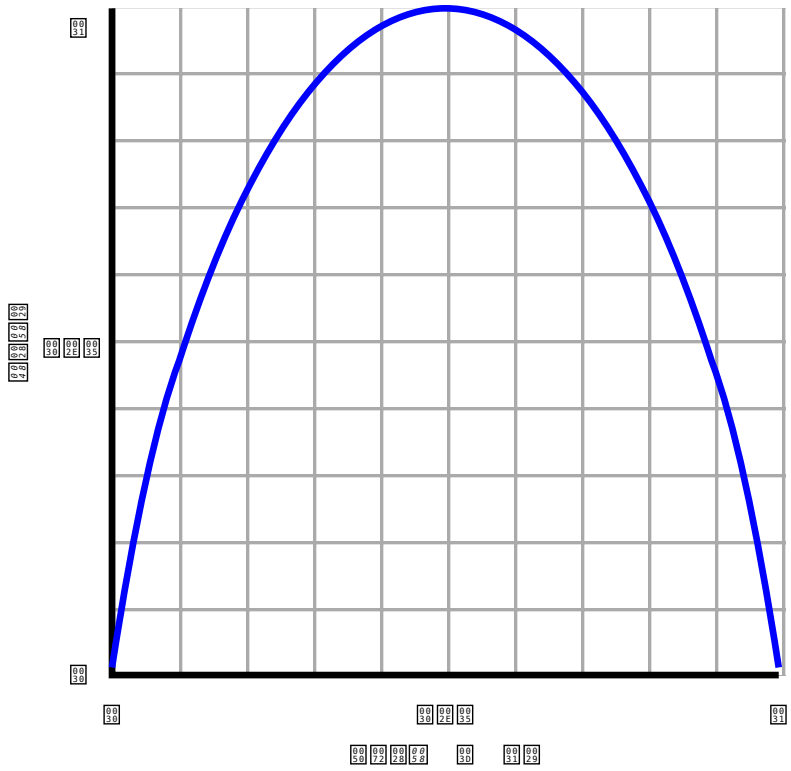
Capacity is defined as

$$C = \lim_{T \to \infty} \frac{\log N(T)}{T}$$

We want the capacity of a discrete channel to be as high as possible (highest throughput possible).
At the same time, we want the message that are transmitted to be as small as possible.

Binary entropy function

$$H = -(p \log p + q \log q)$$



1.1 8 Representation of the encoding and decoding operations

- A transducer can be described by two functions:

$$y_n = f(x_n, \alpha_n)$$

$$\alpha_{n+1} = g(x_n, \alpha_n)$$

where

- x_n is the n^{th} input symbol
- α_n is the state of the transducer when the n^{th} input symbol is introduced
- y_n is the output symbol (or sequence of output symbols) produced when x_n is introduced if the state is α_n

2 See also

3 References

- Shannon, Claude E. (October 1948). "A Mathematical Theory of Communication". Bell System Technical Journal 27 (4): 623–656. doi:10.1002/j.1538-7305.1948.tb00917.x.
- https://en.wikipedia.org/wiki/Binary_entropy_function