

## Information Theory

Information theory is a branch of math concerned with communication.

However, Shannon a mathematicians of Bell Labs in 1948 founded the Information theory discipline to measure how to charge customers for telegrams. Bits are the measurement for specific messages. For R users in Kaggle workshop, Information Theory helps decide which variables are most important for predicting outputs. Information theory helps us decide independent, dependent variables, mutual information, and divergence (least squared measurement), etc.

Entropy is the measurement for the information content of a variable.

Shannon defined the entropy  $H$  (Greek letter Eta) of a discrete random variable  $X$  with possible values  $\{x_1, \dots, x_n\}$  and probability mass function  $P(X)$  as:

$$H(X) = E[I(X)] = E[-\ln(P(X))].$$

### Sources:

<https://www.udacity.com/course/viewer#!/c-ud741/l-672178843/m-676859437>

[http://en.wikipedia.org/wiki/Entropy\\_%28information\\_theory%29](http://en.wikipedia.org/wiki/Entropy_%28information_theory%29)