Definition

The mutual information of a joint distribution over two random variables is the entropy of the product of the marginal distributions relative to the joint distribution.

Notation

Let A and B be two non-empty sets. Let $p_{12} : A \times B \to \mathbf{R}$ be a distribution with marginal distributions $p_1 : A \to \mathbf{R}$ and $p_2 : B \to \mathbf{R}$. The mutual information of p is $d(p, p_1 p_2)$ where d denotes the relative entropy.

Mutual Information

Marginal Distributions · Relative Entropy

Similarity Functions

Metrics

Distance · Absolute Value

Space Distance

Plane Distance · Joint Distributions · Discrete Entropy · Cross Entropy

Interval Length · Probability Distributions · Logarithm

Intervals

Real Space

Real Plane · Real Line · Real Summation

Integral Line · Real Order · Real Numbers

Geometry · Rational Order · Real Numbers

Rational Numbers

Lists · Integer Arithmetic

Set Numbers · Integer Products · Natural Multiplicative Identity · Natural Additive Identity

Finite Sets · Direct Products · Arithmetic · Identity Elements

Equivalent Sets · Natural Powers · Natural Summation

Comparisons · Function Inverses · Integer Order · Integer Sums · Natural Products · Family Unions and Intersections · Family Operations

Orders · Function Images · Function Composites · Integer Numbers · Natural Sums · Families · Operations

Converse Relations · Natural Order · Functions · Equivalence Relations · Recursion Theorem

Relations · Peano Axioms · Uncertain Outcomes

Set Products · Set Powers · Natural Induction

Partitions · Unordered Triples · Intersection of Empty Set · Successor Sets · Natural Numbers · Generalized Set Dualities · Set Dualities · Set Unions and Intersections · Set Symmetric Differences

Ordered Pairs · Set Intersections · Pair Unions · Set Complements · Pair Intersections

Set Differences · Set Unions

Unordered Pairs · Empty Set

Set Specification

Set Equality

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets · Identities

Names

Letters · Objects

4