Why

We want to make a statement like "good performance on a correctly labeled training dataset of independent and identically distributed inputs leads to good generalization error."

ERM Learns Finite Realizable Classes

PAC Learnable Hypotheses

Hypothesis Classes   Probably Approximately Correct Inductors

Probabilistic Data-Generation Models

Induction   Independent Identically Distributed Random Variables

Random Variable Independence

Datasets   Random Variable

Topological Sigma Algebra   Measurable Function

Outcome Variables   Topological Spaces

Sigma Algebra Independence

Metrics

Event Independence

Absolute Value   Distance

Space Distance

Probability Measure   Conditional Event Probability

Plane Distance

Event Probabilities   Measure

Interval Length   Probability Distributions   Extended Real Numbers

Sigma Algebra

Intervals

Subset Algebra

Real Line   Real Plane   Real Space   Real Limits

Set Operations   Cardinality

Integral Line   Real Order   Sequences   Real Sequences

Real Summation

Geometry   Set Numbers   Real Numbers

Finite Sets   Rational Numbers

Uncertain Outcomes

Direct Products   Integer Arithmetic   Natural Summation

Natural Multiplicative Identity   Natural Additive Identity   Family Operation

Equivalent Sets   Arithmetic   Identity Elements   Algebras

Natural Exponents   Integer Products   Function Inverses   Integer Sums   Operations   Family Unions and Intersections

Natural Products   Function Image   Integer Numbers   Function Composites   Families

Natural Sums   Equivalence Relations   Functions

Natural Order   Recursion Theorem   Relations

Peano Axioms   Cartesian Products   Subset Systems

Set Powers   Ordered Pairs

Natural Induction

Unordered Triples   Generalized Set Dualities

Natural Numbers

Set Symmetric Differences   Partitions   Successor Sets   Intersection of Empty Set   Set Dualities   Set Unions and Intersections

Set Complements   Pair Unions

Set Intersections

Set Differences   Set Unions   Pair Intersections

Empty Set   Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets   Identities

Names

Letters   Objects