Why

We use the language of probability distributions to characterize predictions.[1]

Definition

A *probabilistic classifier* is a function from precepts to probability distributions on the set of classes. Throughout this sheet, let A be a set of precepts and B a set of postcepts.

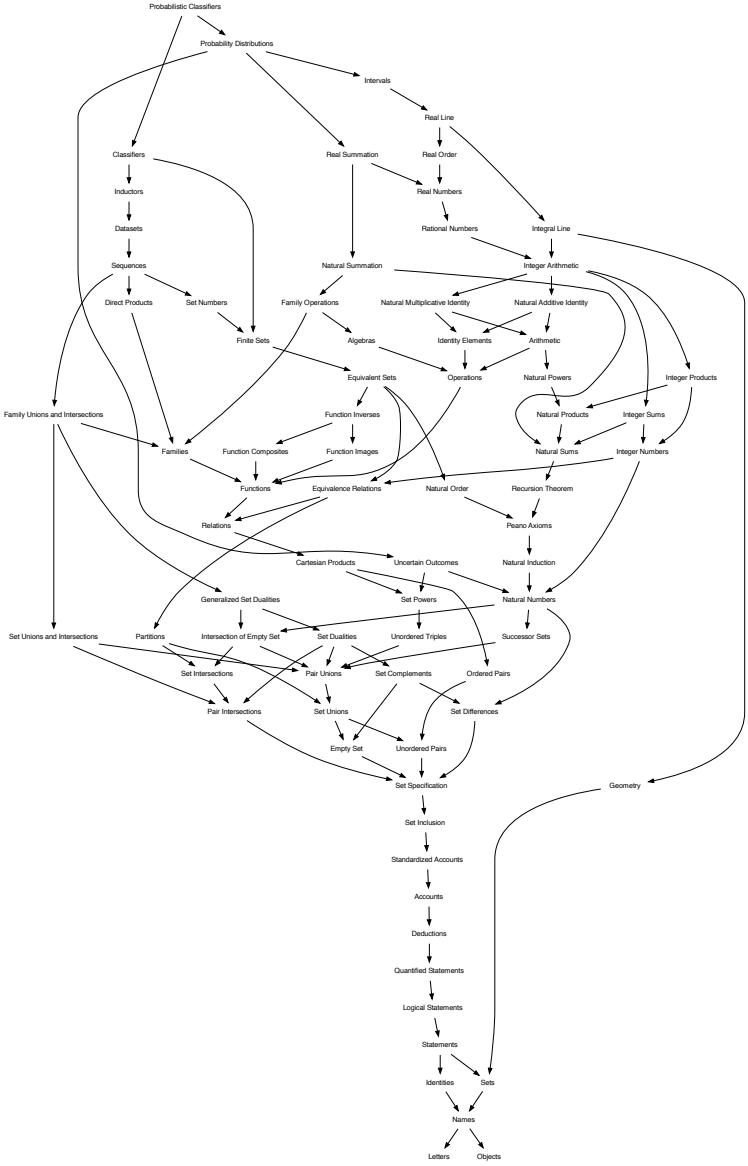
Point classifier as probabilistic classifier

Let $f : A \to B$ be a point classifier. One can always obtain a probabilistic classifier from f in the following way. Define the probabilistic classifier at a precept $a \in A$ to be the distribution that takes 1 on the predicted value of the point classifier at a and 0 otherwise.

Probabilistic classifer from point classifier

Now let $g : A \to (B \to [0, 1])$ be a probabilistic classifier. One can always obtain a point classifier from g in the following way. Assign to a precept a the value of the distribution $g(a)$ with the most probability mass. If there are ties, order the (finite) set B arbitrarily, and break ties accordingly. We call this the *maximum likelihood classifier* corresponding to the probabilisstic classifier g.

[1] Future editions will improve this.


Probabilistic Classifiers
Probability Distributions
Intervals
Real Line
Classifiers
Real Summation
Real Order
Inductors
Real Numbers
Datasets
Rational Numbers
Integral Line
Sequences
Natural Summation
Integer Arithmetic
Direct Products
Set Numbers
Family Operations
Natural Multiplicative Identity
Natural Additive Identity
Finite Sets
Algebras
Identity Elements
Arithmetic
Equivalent Sets
Operations
Natural Powers
Integer Products
Family Unions and Intersections
Function Inverses
Natural Products
Integer Sums
Families
Function Composites
Function Images
Natural Sums
Integer Numbers
Functions
Equivalence Relations
Natural Order
Recursion Theorem
Relations
Peano Axioms
Cartesian Products
Uncertain Outcomes
Natural Induction
Generalized Set Dualities
Set Powers
Natural Numbers
Set Unions and Intersections
Partitions
Intersection of Empty Set
Set Dualities
Unordered Triples
Successor Sets
Set Intersections
Pair Unions
Set Complements
Ordered Pairs
Pair Intersections
Set Unions
Set Differences
Empty Set
Unordered Pairs
Set Specification
Geometry
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects