Why

We often want to predict one of several outcomes.

Definition

A *classifer* is a predictor whose codomain is a finite set. In this case, we call the codomain the *label set* and we call its elements *classes* (or *labels*, *categories*). We call the prediction of a classifier on an input a *classification*.

If the set of labels has two elements, then we call the classifier a *binary classifier* (or *two-way classifier*, *two-class classifier*, *boolean classifier*). In the case that there are k labels, we call the classifier a *k-way classifier* (or *k-class classifier*,*multi-class classifier*). The second term is meant to indicate, not that the classifier assigns to each point several classes, but that the classification decision is made *between* several classes.

Basic examples

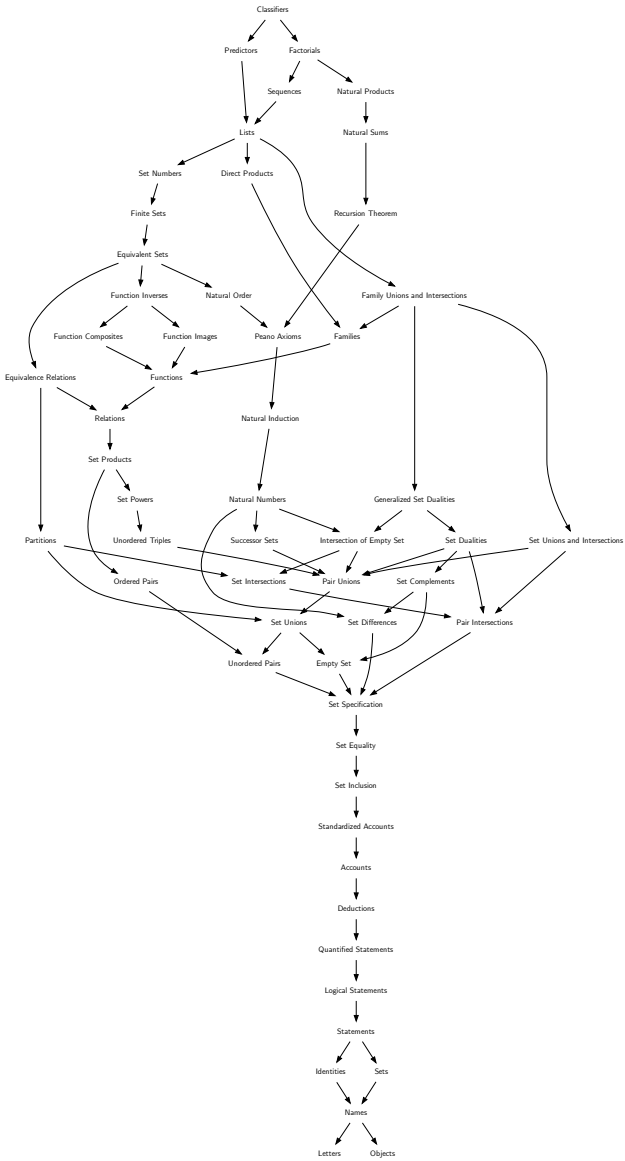
Let A be a set of inputs and let B be a set of labels. Define $B = \{0, 1\}$ (or $\{-1, 1\}$, FALSE, TRUE, NEGATIVE, POSITIVE). Then B is finite with two elements and $f : A \to B$ is a binary classifier with labels 0 and 1.

If the case $B = \{$NO, MAYBE, YES$\}$, we call $f : A \to B$ a three-way classifier. Other examples for B include a list of languages, the set of English words in some dictionary, or the set of $m!$ possible orders of m horses in a race. Often convenient to take $B = \{1, \ldots, k\}$ for $k \in \mathbf{N}$.

Other terminology

Following our terminology, but speaking of processes, some authors refer to the application of inductors for these special cases as *binary classification* and *multi-class classification*. Or they speak of *classification* and a *classification problems*. Roughly speaking, a classifier *classifies* all inputs into categories.

Alternatively, some authors (especially in the statistics literature) refer to a classifier as a *discriminator* and reference *discrimination problems*.


Classifiers
Predictors
Factorials
Sequences
Natural Products
Lists
Natural Sums
Set Numbers
Direct Products
Finite Sets
Recursion Theorem
Equivalent Sets
Function Inverses
Natural Order
Family Unions and Intersections
Function Composites
Function Images
Peano Axioms
Families
Equivalence Relations
Functions
Relations
Natural Induction
Set Products
Set Powers
Natural Numbers
Generalized Set Dualities
Partitions
Unordered Triples
Successor Sets
Intersection of Empty Set
Set Dualities
Set Unions and Intersections
Ordered Pairs
Set Intersections
Pair Unions
Set Complements
Set Unions
Set Differences
Pair Intersections
Unordered Pairs
Empty Set
Set Specification
Set Equality
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects