Why

We want to talk about learning associations between objects in time or space.

Definition

Let A and B be sets. An *inductor* is a function mapping a dataset of records in $A \times B$ to a function from A to B. We call the elements of A the *precepts* and the elements of B the *postcepts*.

We call a function from the precepts to the postcepts a *predictor*. We call the result of a precept under a predictor a *prediction*. An inductor maps datasets to predictors. A predictor maps precepts to postcepts.

Notation

Let D be a dataset of size n in $A \times B$. Let $g : A \to B$, a predictor, which makes prediction $g(a)$ on precept $a \in A$. Let $f : (A \times B)^n \to (A \to B)$, an inductor. Then $f(D)$ is the predictor which the inductor associates with dataset D.

Other terminology

Many authorities call the precepts the *independent variables*, *inputs*, *covariates*, *pattern* or *observations*. Similarly, some call the postcepts the *dependent variables*, *outputs*, *targets*, *outcomes* or *observational outcomes*. Some call a predictor an

input-output mapping. A predictor is sometimes called a *point predictor*.[1] Some authors refer to a prediction as a *guess*.

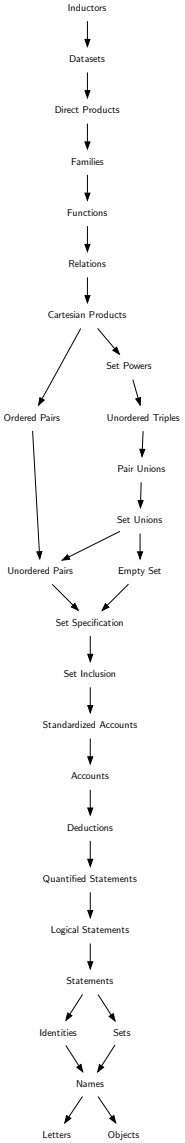
Learning algorithms

We use a predictor to make guesses on precepts which do not appear in the dataset that was used to construct the predictor. We refer to the task of proposing a predictor for a particular dataset a *learning problem*.

It is common in this context to refer to an inductor as a *learning algorithm* and call the task or problem of constructing a predictor from a dataset *supervised learning*. By supervision, we mean to indicate that we have the postcepts corresponding to the precepts.

In line with this usage, the postcepts are often called *labels* and the labels are said "to provide supervision." In this context, the dataset used to construct the predictor (i.e., the argument to the inductor) is called the *training dataset*.

[1] Future editions may remove this. The intuition for the word point is from the real numbers, which we need not have discussed for this point.


Inductors
Datasets
Direct Products
Families
Functions
Relations
Cartesian Products
Set Powers
Ordered Pairs
Unordered Triples
Pair Unions
Set Unions
Unordered Pairs
Empty Set
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Identities
Sets
Names
Letters
Objects