Why

We discuss inductors that produce relations consistent with their given datasets.

Definition

Let $(x_1, y_1), \ldots, (x_n, y_n)$ be a dataset in $X \times Y$. Let $\mathcal{R}$ be the set of all relations on $X \times Y$.

A *consistent inductor* $\{G_n : (X \times Y)^n \to \mathcal{R}\}_n$ is one for which, for all $n \in \mathsf{N}$, for all $D_n \in (X \times Y)^n$, D is consistent with $G_n(D_n)$. In other words, a consistent inductor always produces a relation with which the dataset is consistent.

The interpretation follows. Fix a relation $R^\star$. And let every dataset "shown" to the algorithm G_n be constructed by selecting elements from $R^\star$. In other words, every dataset is a sequence in $R^\star$. In this case, a dataset $D_n \in (X \times Y)^n$ is always consistent with $R^\star$ and so a consistent inductor will never "eliminate" $R^\star$. In other words, the inductor, in order to be consistent "must eliminate" every inconsistent relation.

We may "hope" to give the algorithm a "large and diverse" datset, so that several of the elements of $R^\star$ are included. In this case, the algorithm can "eliminate" many smaller relations in $\mathcal{R}$ which did not include records in the dataset.

Functionally consistent

The rub is that any dataset is consistent with the complete relation $X \times Y$. So we can often consider a set $\mathcal{H} \subset \mathcal{R}$ of relations. It is common to call this a *hypothesis class*, especially for the case in which it consists of functional relations.

Consistent Inductors

Inductors

Datasets

Sequences

Direct Products

Set Numbers

Finite Sets

Equivalent Sets

Family Unions and Intersections

Natural Order

Function Inverses

Families

Function Composites

Function Images

Peano Axioms

Functions

Equivalence Relations

Natural Induction

Relations

Cartesian Products

Generalized Set Dualities

Natural Numbers

Set Powers

Set Dualities

Set Unions and Intersections

Intersection of Empty Set

Successor Sets

Unordered Triples

Partitions

Set Complements

Pair Unions

Set Intersections

Ordered Pairs

Set Differences

Pair Intersections

Set Unions

Empty Set

Unordered Pairs

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects