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

Set 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