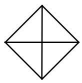


Why

Linear predictors are simple and we know how to select the parameters. The main downside is that there may not be a linear relationship between inputs and outputs.

Definition

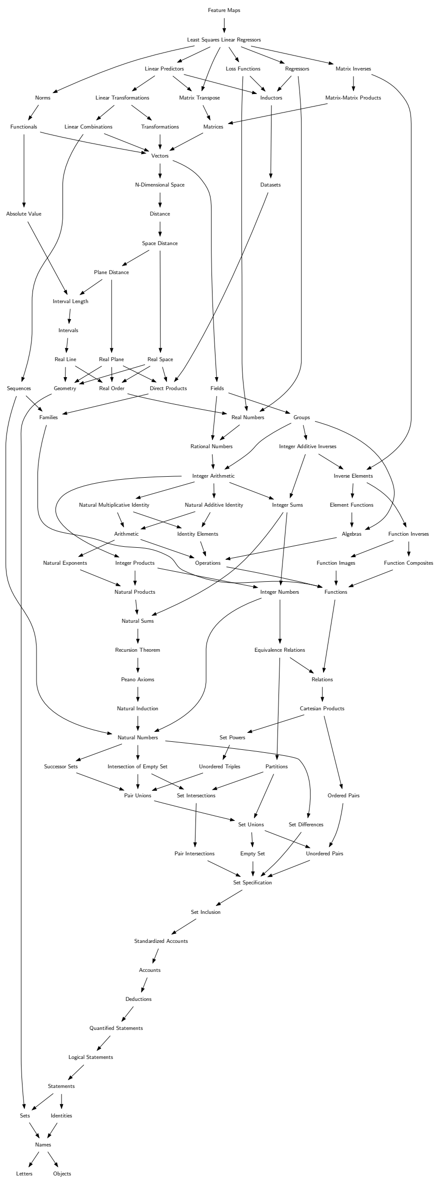
A *feature map* for postcepts A is a mapping $\phi : A \to \mathbf{R}^d$. In this setting, we call $a \in A$ the *raw input record* and we call $\phi(a)$ an *embedding*, *feature embedding* or *feature vector*. We call the components of a feature vector the *features*.

A feature map is *faithful* if, whenever records a_i and a_j are in some sense "similar" in the set A, the embeddings $\phi(a_i)$ and $\phi(a_j)$ are close in the vector space $\mathbf{R}^d$.

Since it is common for raw input records $a \in A$ to consist of many fields, it is regular to have several feature maps ϕ_i which operate component-wise on the fields of a. These are sometimes called *basis functions.*[1] We concatenate these field feature maps and commonly add a constant feature 1. Since $\mathbf{R}^d$ is a vector space, it is common to refer to it in this case as the *feature space.*

Given a dataset $a = (a^1, \dots, a^n)$ in A and a feature map $\phi : A \to \mathbf{R}^d$, the *embedded dataset* of a with respect to ϕ is the dataset $(\phi(a^1), \dots, \phi(a^n))$ in $\mathbf{R}^d$.

[1] Future editions will clarify, and perhaps remove.


Feature Maps
Least Squares Linear Regressors
Linear Predictors
Loss Functions
Regressors
Matrix Inverses
Norms
Linear Transformations
Matrix Transpose
Inductors
Matrix-Matrix Products
Functionals
Linear Combinations
Transformations
Matrices
Vectors
N-Dimensional Space
Datasets
Absolute Value
Distance
Space Distance
Plane Distance
Interval Length
Intervals
Real Line
Real Plane
Real Space
Sequences
Geometry
Real Order
Direct Products
Fields
Families
Real Numbers
Groups
Rational Numbers
Integer Additive Inverses
Integer Arithmetic
Inverse Elements
Natural Multiplicative Identity
Natural Additive Identity
Integer Sums
Element Functions
Arithmetic
Identity Elements
Algebras
Function Inverses
Natural Exponents
Integer Products
Operations
Function Images
Function Composites
Natural Products
Integer Numbers
Functions
Natural Sums
Recursion Theorem
Equivalence Relations
Peano Axioms
Relations
Natural Induction
Cartesian Products
Natural Numbers
Set Powers
Successor Sets
Intersection of Empty Set
Unordered Triples
Partitions
Pair Unions
Set Intersections
Ordered Pairs
Set Unions
Set Differences
Pair Intersections
Empty Set
Unordered Pairs
Set Specification
Set Inclusion
Standardized Accounts
Accounts
Deductions
Quantified Statements
Logical Statements
Statements
Sets
Identities
Names
Letters
Objects