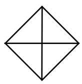


Why

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

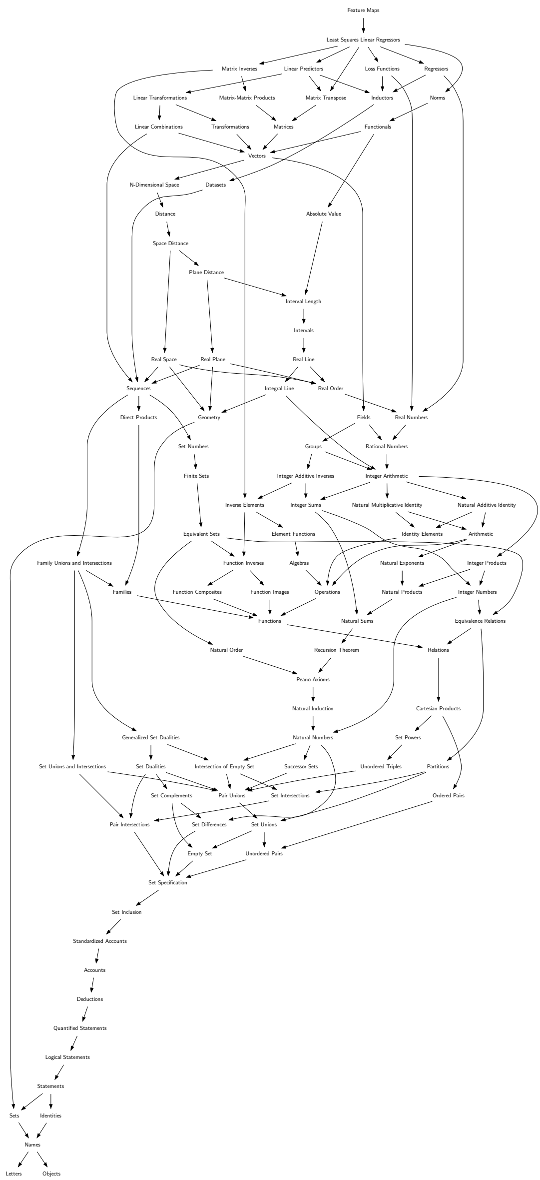
A *feature map* for postcepts A is a mapping $\phi : A \to \mathbf{R}^d$. In this setting, we call $a \in A$ the *raw input record* and we call $\phi(a)$ an *embedding*, *feature embedding* or *feature vector*. We call the components of a feature vector the *features*.

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