Why

A simple example of an embedding.[1]

Definition

Fix $d \in \mathbf{N}$. A *polynomial feature map* of degree d is a function $\phi : \mathbf{R} \to \mathbf{R}^d$ with

$$\phi(x) = \begin{pmatrix} 1 & x^2 & \cdots & x^d \end{pmatrix}^\top.$$

For $x \in \mathbf{R}$, we call $\phi(x)$ the *polynomial embedding* of x.

A *polynomial regressor* is a least squares linear predictor using a polynomial feature embedding (of any degree, but to be precise one must specify the degree). The task of consructing a linear predictor is often referred to as *polynomial regression.*

Given a dataset of paired records $(x^1, y^1), \ldots, (x^2, y^2) \in \mathbf{R}^2$, one can construct a predictor $g : \mathbf{R} \to \mathbf{R}$ for y by embedding the dataset $(\phi(x^1), \ldots, \phi(x^n))$ and finding the least squares linear regressor $f : \mathbf{R}^d \to \mathbf{R}$ for y. One defines the predictor $g : \mathbf{R} \to \mathbf{R}$ by $g(\phi(x))$.

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[1]Future editions will expand, or perhaps collapse this sheet.

Polynomial Regressors

Feature Maps

Least Squares Linear Regressors

Norms

Linear Predictors

Real Function Approximators

Matrix Transpose

Input Designs

Matrix Inverses

Approximators

Vector Space Bases

Loss Functions

Consistent Inductors

Matrix-Matrix Products

Regressors

Similarity Functions

Span

Matrix-Vector Products

Linearly Dependent Vectors

Linear Transformations

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Real Function Space

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Absolute Value

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Real Functions

N-Dimensional Space

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Space Distance

Plane Distance

Interval Length

Intervals

Real Line

Real Plane

Real Space

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Integral Line

Real Optimizers

Real Order

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Rings

Sequences

Geometry

Optimizers

Real Numbers

Groups

Set Numbers

Total Orders

Rational Numbers

Integer Additive Inverse

Finite Sets

Partial Orders

Integer Arithmetic

Inverse Elements

Direct Products

Natural Additive Identity

Natural Multiplicative Identity

Integer Sums

Element Functions

Equivalent Sets

Identity Elements

Integer Products

Arithmetic

Algebras

Function Inverses

Family Unions and Intersections

Integer Numbers

Natural Powers

Operations

Function Composites

Function Images

Families

Equivalence Relations

Natural Products

Functions

Relations

Natural Sums

Recursion Theorem

Natural Order

Peano Axioms

Cartesian Products

Natural Induction

Set Powers

Natural Numbers

Generalized Set Dualities

Partitions

Unordered Triples

Successor Sets

Intersection of Empty Set

Set Dualities

Set Unions and Intersections

Ordered Pairs

Set Intersections

Pair Unions

Set Complements

Set Unions

Set Differences

Pair Intersections

Unordered Pairs

Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Sets

Identities

Names

Letters

Objects