Supervised Learning

Definition

Building a model using labelled examples that learns to predict new examples

#Classification

- Finite set of labels
- GIven a training set $T = (x_1, y_1), \ldots, (x_m, y_m)$ learn a function f to predict y given x[1]

Applications

- Facial recognition
- Character recognition
- Spam detection
- Medial diagnoses [2]
- Biometrics [3]

#Regression

- Each label is a "real" value [4]

Applications

- Economics/finance [5]
- Epidemiology
- Car/plane navigation
- Temporal trends [6]

#Ranking

- Each label is a ranking [7]

Example

Given a query and a set of web pages, rank them according to relevance [1]

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1. traditional search engine ↩

Example

Given a query image, find the most visually similar images in the database [1]

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1. image-based search engine ↩

Applications

- User preference
- Image retrieval
- Search
- Re-ranking N-best output lists

Nearest Neighbours

Decision Trees and Random Forests

Kernel Methods

Deep Neural Networks

Feedforward, convolutional, and recurrent networks

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1. y is "categorical" $\therefore d = 1$ where d stands for "dimensionality" or "number of dimensions" ↩
2. suggest possible illnesses given symptoms ↩
3. recognition/authentication using physical and/or behavioural characteristics, such as the face, an iris, or a signature ↩
4. represented with a number, quantitative ↩

5. predict the value of a stock ↩
6. weather over time ↩
7. could reference a preference or priority ↩