SUPERVISED LEARNING

SREELEKSHMY SELVIN

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Overview

1. SUPERVISED LEARNING
2. CLASSIFICATION
3. REGRESSION
4. SVM
5. CONCEPT OF KERNEL

SUPERVISED LEARNING

- A machine learning technique which focuses on modeling input output relationships
- Supervised learning is further classified as follows
  - Classification
  - Regression

CLASSIFICATION

- Process of predicting the class of given data points
- Classes are sometimes called as targets,labels or categories
- Output variable is always a category

REGRESSION

- Predictive modeling technique which investigates the relationship between a dependent and an independent variable.
- Three major uses
  - Determines the impact of independent variable on the dependent variable (Eg : Relation between sales and marketing)
  - Forecasting an effect (gives an idea about how the variation of independent variable affect the dependent variable)
  - Trend forecasting

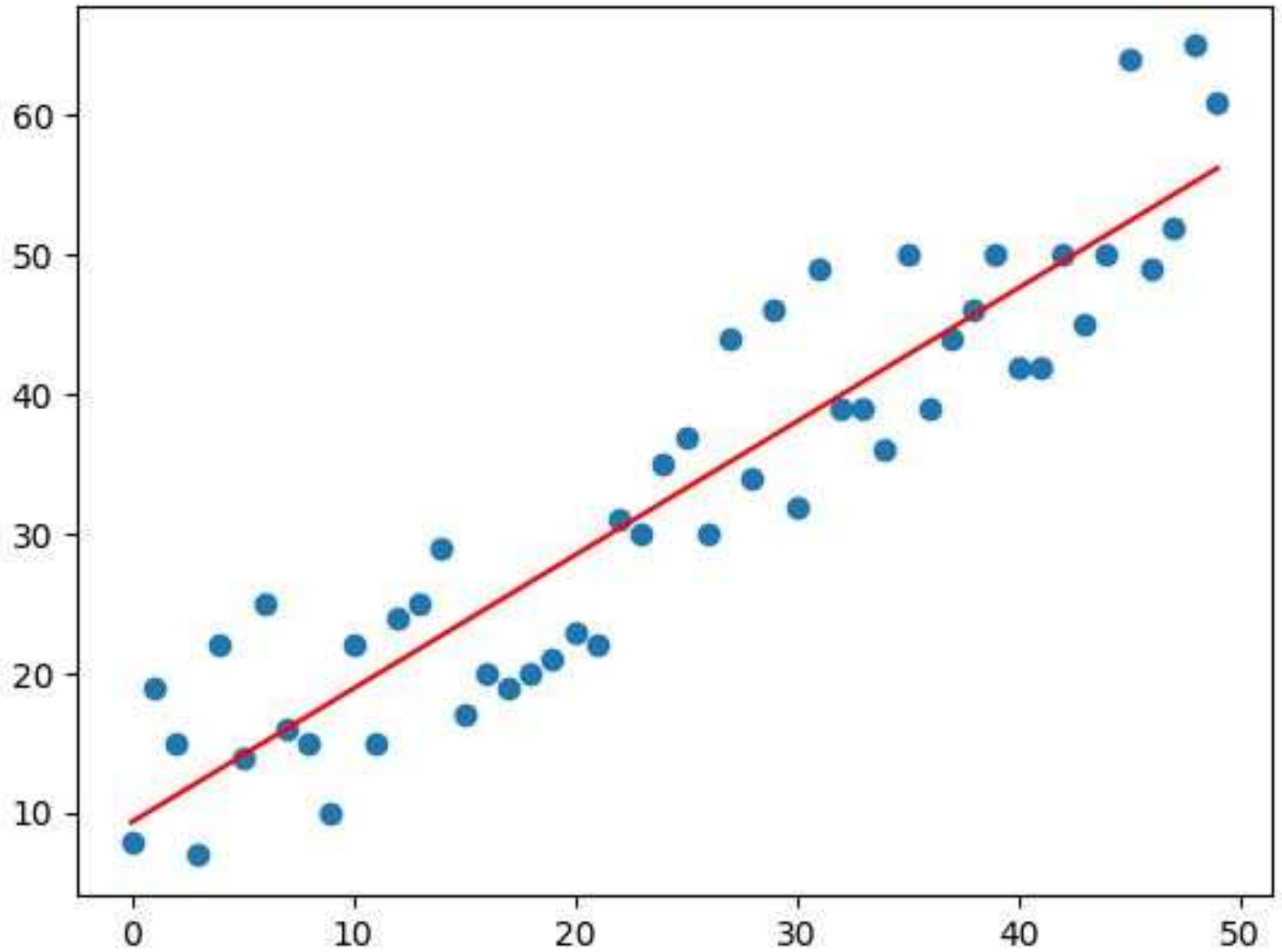

Figure: Regression Example

SVM

- Support Vector Machine (SVM) is a classification algorithm
- Uses a linear function to model the relationship between input and output
- Effective in high dimensional spaces
- How the algorithm works ?
  - In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate.
  - We will find some line that splits the data between the two differently classified groups of data.The line will be such that the distances from the closest point in each of the two groups will be farthest away.

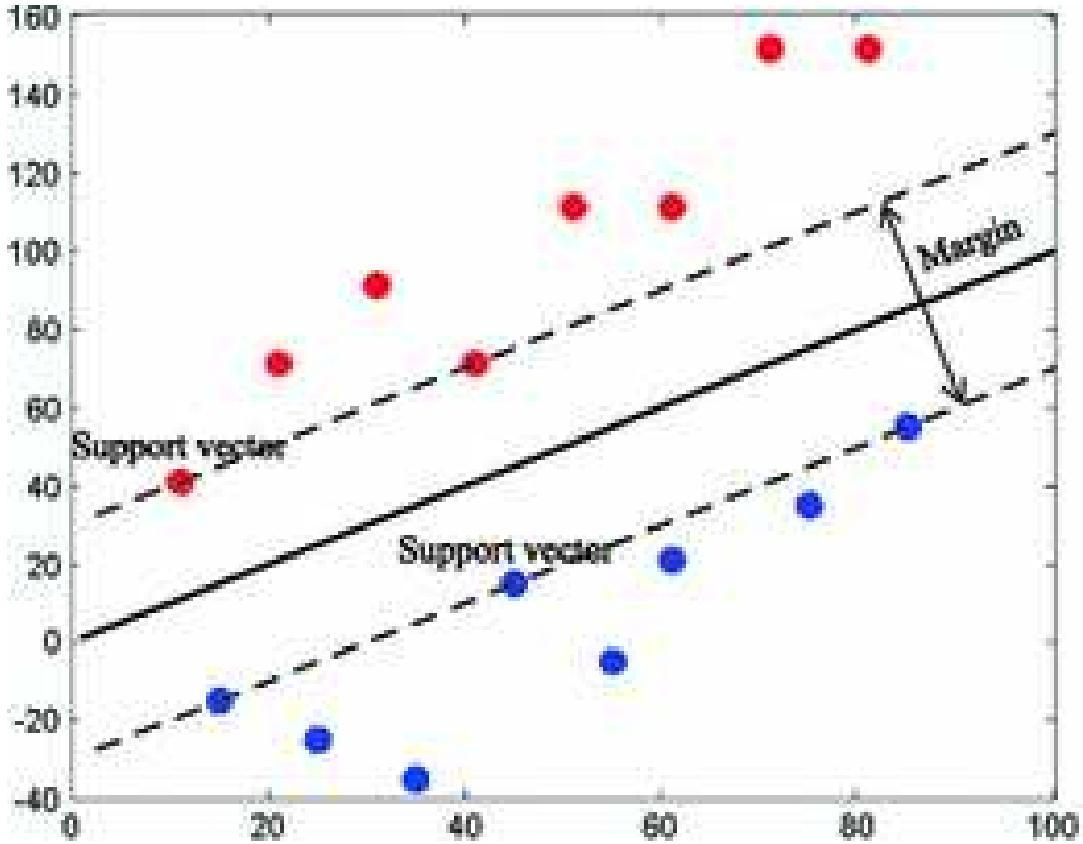

Figure: SVM Visualization

CONCEPT OF KERNEL

- SVM is a linear classification algorithm and fails to classify data which are not linearly separable
- Kernals deals with non-linear data
- Enables the linear SVM model to separate non-linearly separable data points

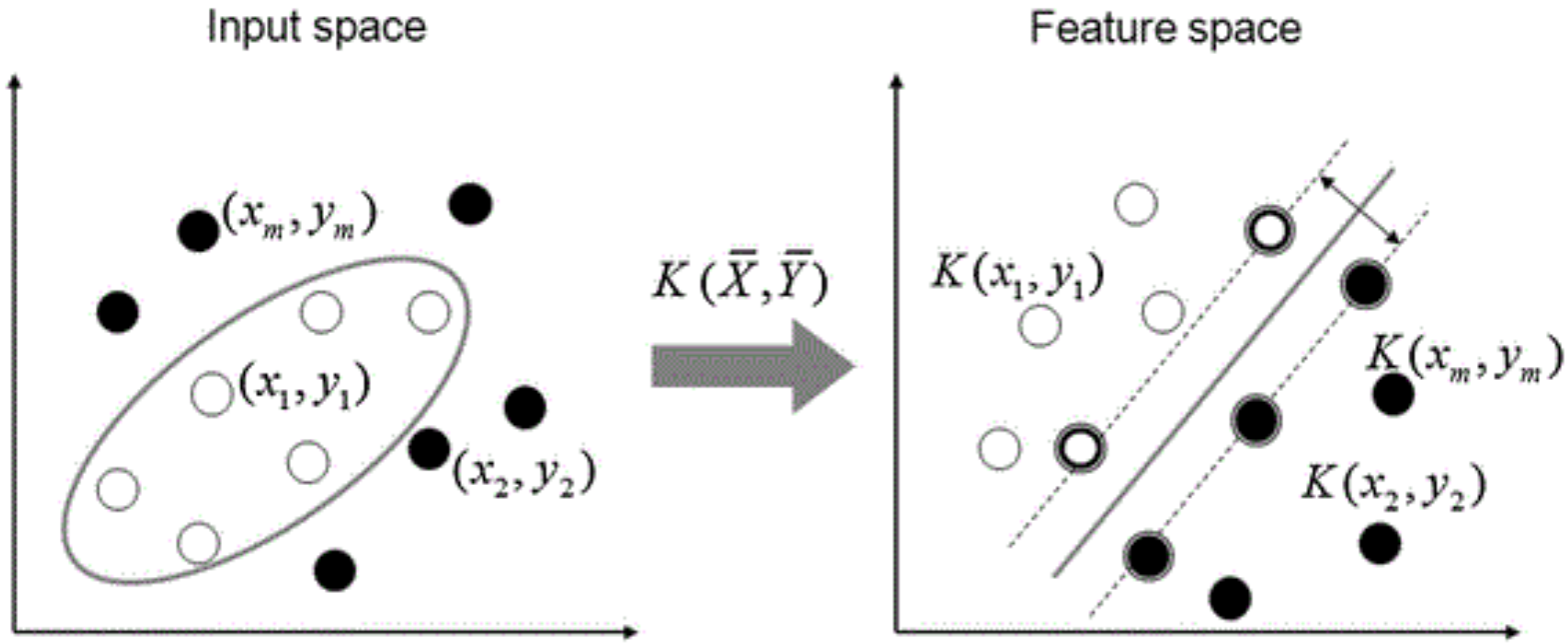

Figure: SVM Visualization

- Feature transformation is the process of transforming original attributes into a new feature space.

- Kernel functions can be of the following types
  - Linear
  - Polynomial
  - RBF
  - Sigmoid
- Customized kernels can also be used

Thank You