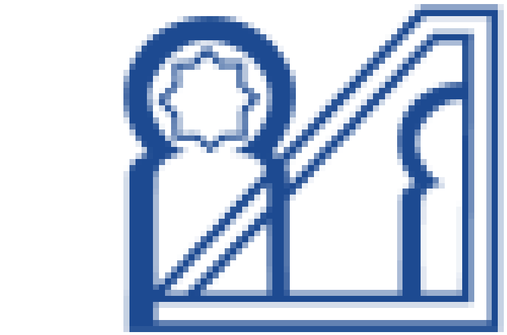

Machine Learning

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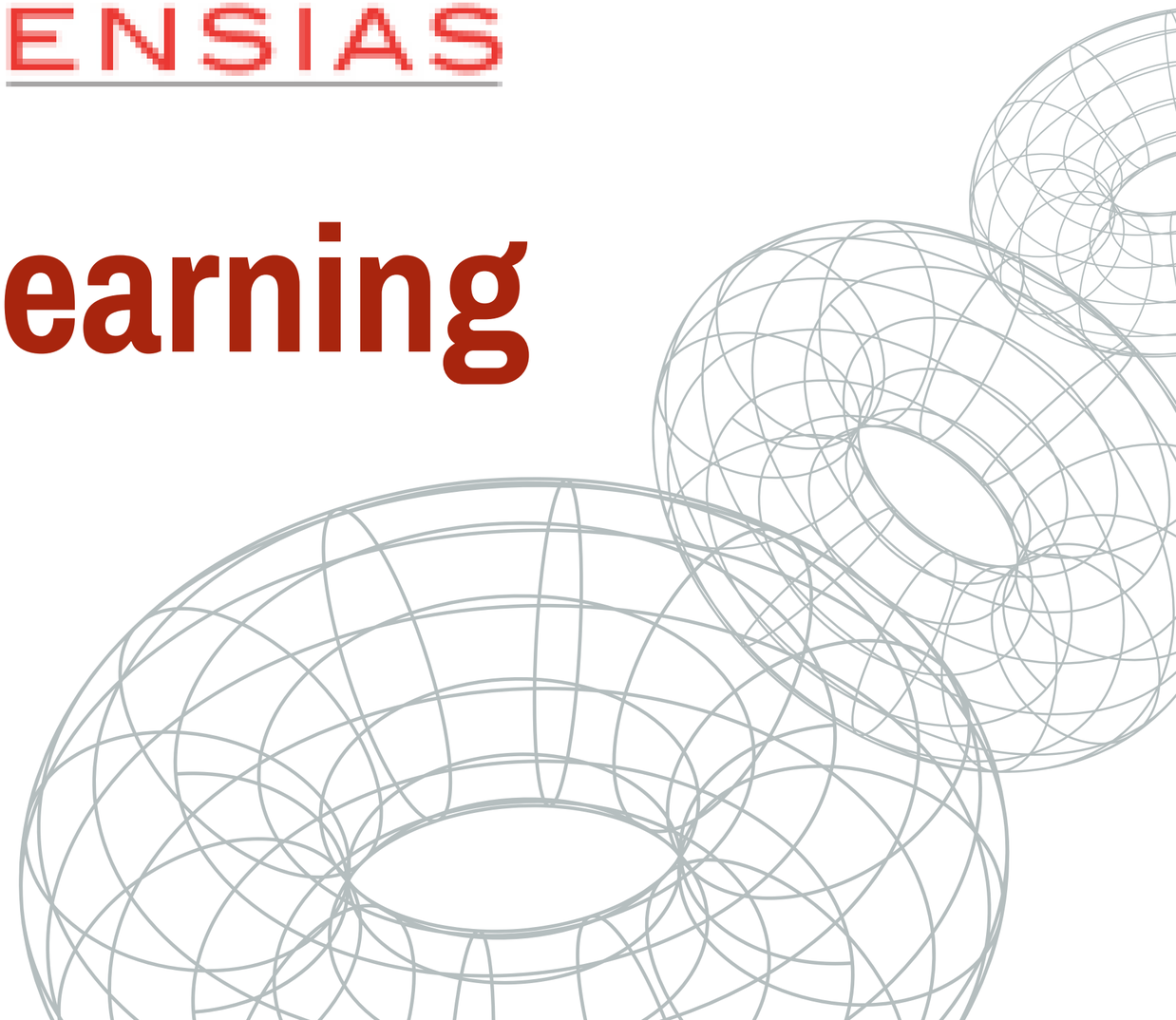


summary

- Introduction
- Support Vector Machines
- Kernel Principal Components Analysis
- Conclusion

Introduction

- Data is the lifeblood of all business.
- Machine learning is a powerful the key to unlocking the value of corporate and customer data and enacting decisions that keep a company ahead of the competition.

Support Vector Machines (SVM)

Definition

Powerful and versatile Machine Learning model, capable of performing linear or nonlinear classification, regression, and even outlier detection.

principle

Support-vector machine constructs a hyperplane or set of hyperplanes in a high- or infinite-dimensional space, which can be used for classification, regression, or other tasks like outliers detection.

The hyper-plane aims to creates a boundary between the types of data.

Support Vector Machines (SVM)

Kernelized SVM

SVM works very well for linearly separable data, for non-lineary separable data we use Kernelized SVM.

For any non-linearly separable data in any dimension, we can just map the data to a higher dimension and then make it linearly separable.

Support Vector Machines (SVM)

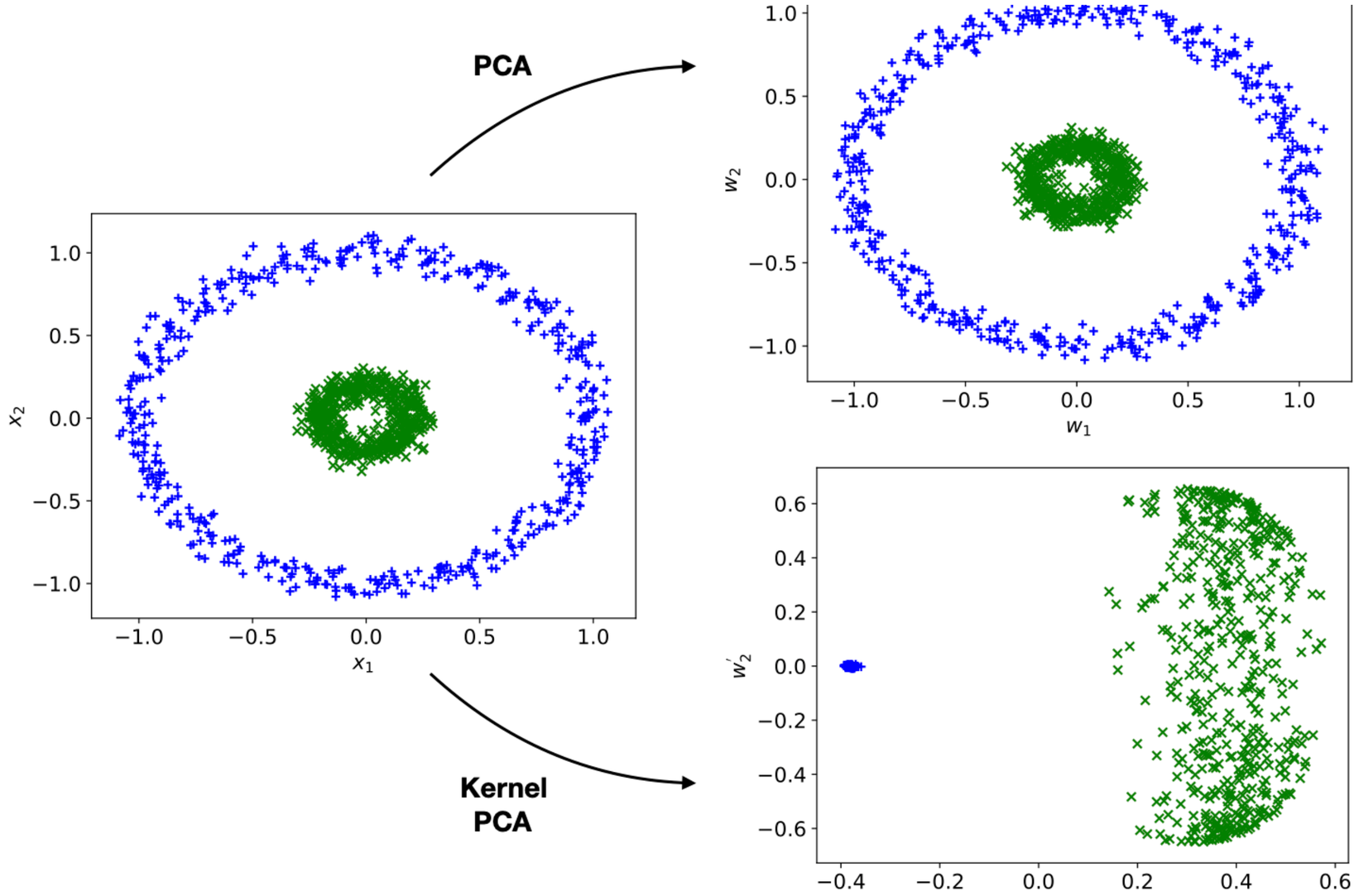
kernel function

In a kernelized SVM, kernel function tells you, that given two data points in the original feature space, what the similarity is between the points in the newly transformed feature space.

There are two popular kernel functions:

- **Radial Basis Function Kernel (RBF)**
- **Polynomial Kernel**

Kernel Principal Component Analysis



Kernel Principal Component Analysis

Kernel method

kernel trick,is a mathematical technique that implicitly maps instances into a very high-dimensional space (called the feature space).

Definition

kPCA is an extension of Principal Component Analysis using techniques of kernel methods.

Kernel Principal Component Analysis

Utility of KPCA

PCA is a linear method,so if we use it to non-linear datasets, we might get a result which may not be the optimal dimensionality reduction.

Kernel PCA uses a kernel function to project dataset into a higher dimensional feature space, where it is linearly separable. It is similar to the idea of Support Vector Machines.

Conclusion

Machine learning now being behind many technologies, from Netflix’s recommendation algorithm to self-driving cars.

Moreover, healthcare industry generates massive amounts of data. Applying machine learning techniques can greatly contribute to better predictions and treatments.