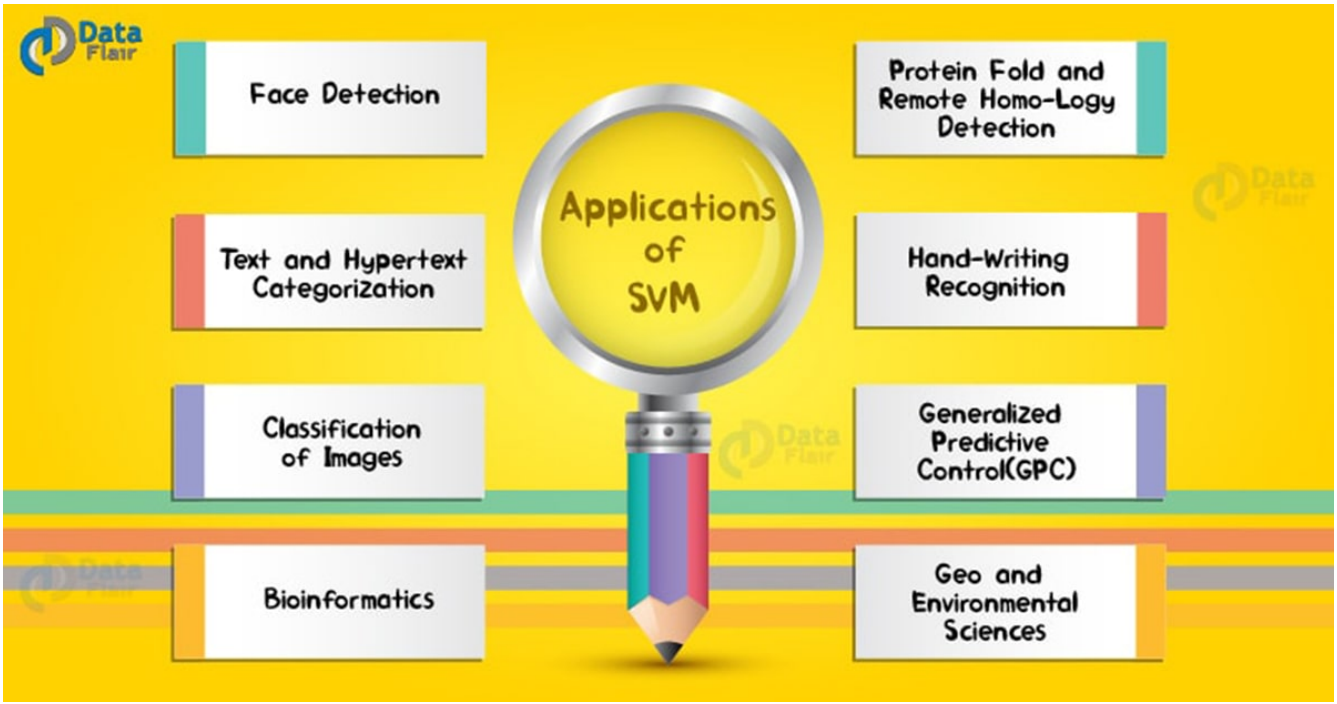
Real life applications of SVM (Support Vector Machines)

1. Objective

We are going to cover the real life applications of SVM such as face detection, handwriting recognition, image classification, Bioinformatics etc.



2. Applications of SVM in Real World

SVM depends on supervised learning algorithms.

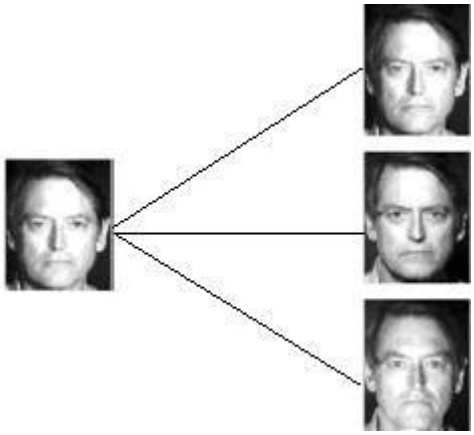
- The aim of using SVM is to correctly classify unseen data.
- SVMs have number of applications in several fields.

Let us see some of them in detail.

2.1 Face Detection

It classifies the parts of the image as face and non-face. It contains training data of n*n pixels with a two-class face(+1) and non-face(-1). Then it extracts features from each pixel as face or non-face.

Creates a square boundary around faces on the basis of pixel brightness and classifies each image by using the same process.



2.2. Text and Hypertext Categorization

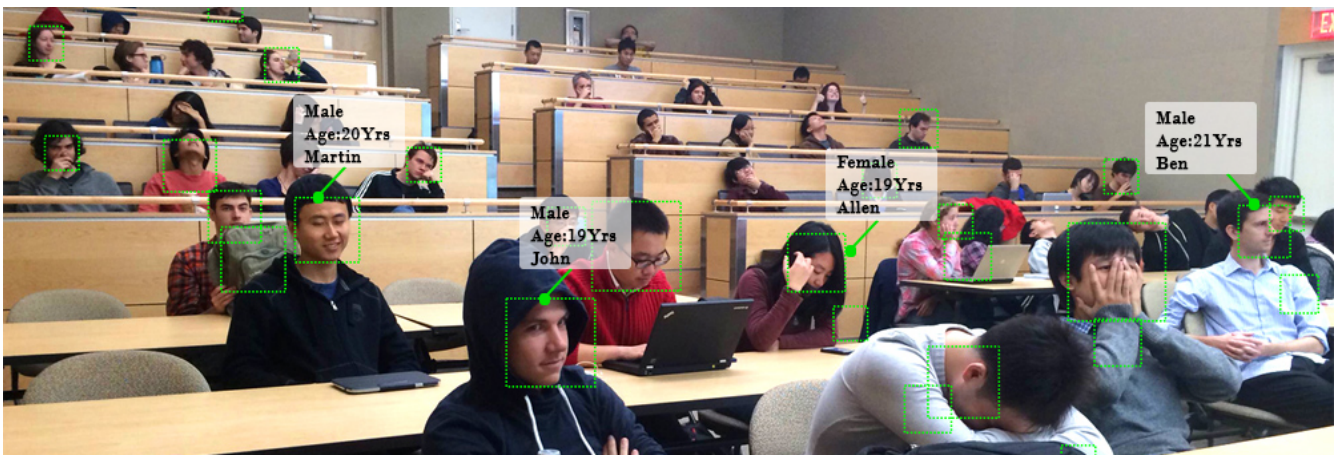
Allows text and hypertext categorization for both types of models; inductive and transductive. It Uses training data to classify documents into different categories such as news articles, e-mails, and web pages **Examples:**

- Classification of news articles into “business” and “Movies”
- Classification of web pages into personal home pages and others

For each document, calculate a score and compare it with a predefined threshold value. When the score of a document surpasses threshold value, then the document is classified into a definite category. If it does not surpass threshold value then consider it as a general document. Classify new instances by computing score for each document and comparing it with the learned threshold.

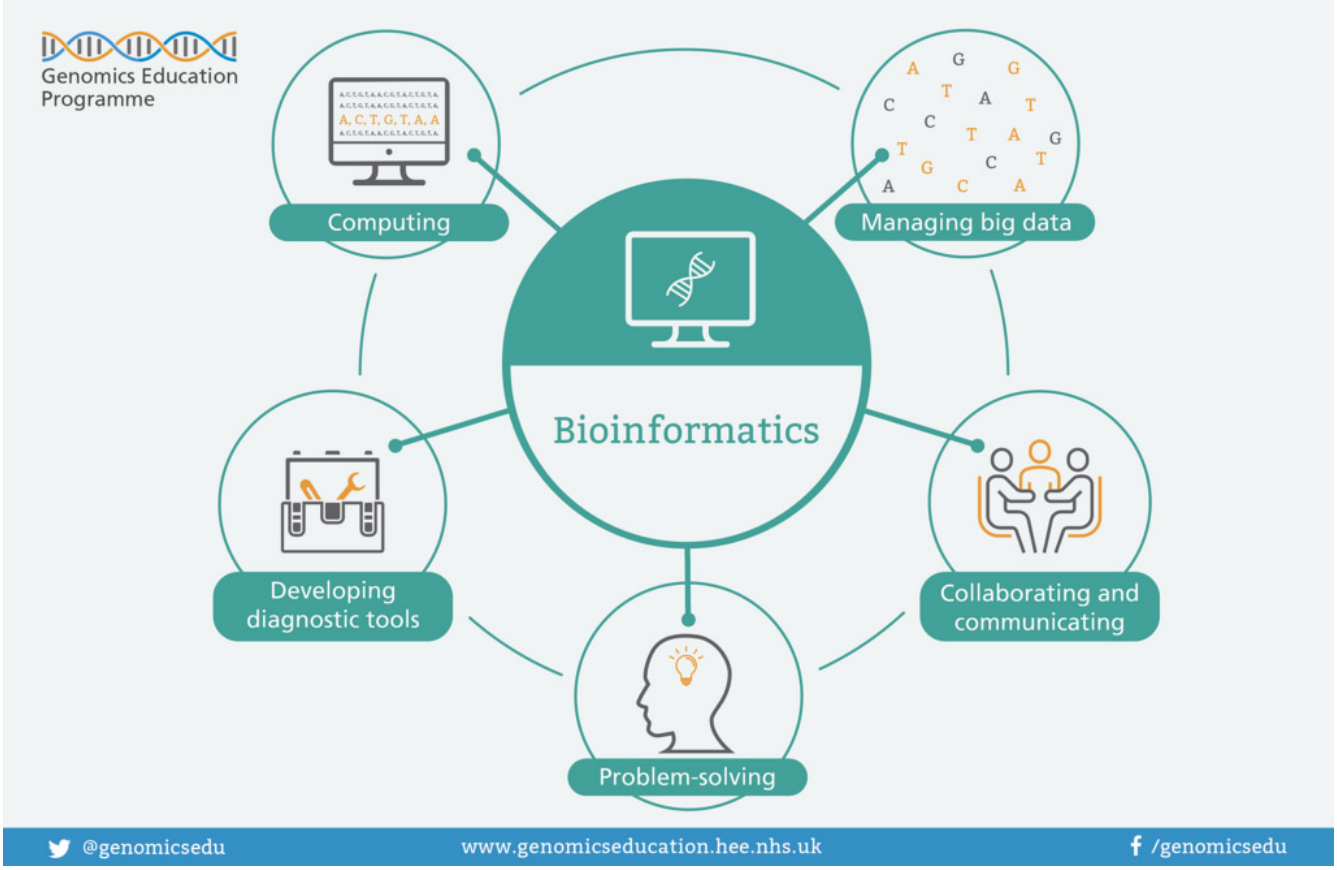
2.3 Classification of Images

SVMs can classify images with higher search accuracy. Its accuracy is higher than traditional query-based refinement schemes.



2.4. Bioinformatics

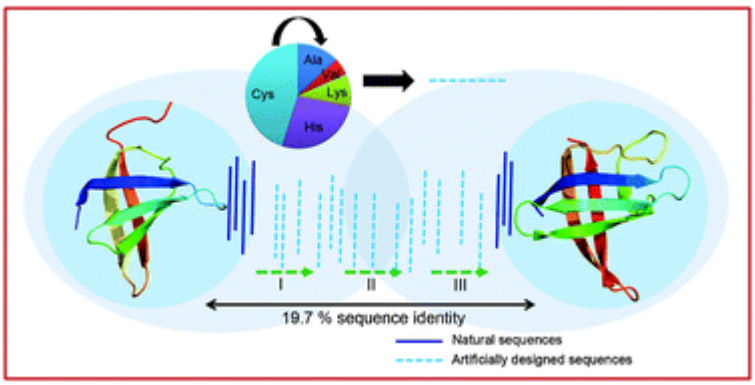
In the field of computational biology, the protein remote homology detection is a common problem. The most effective method to solve this problem is using SVM. In last few years, SVM algorithms have been extensively applied for protein remote homology detection. These algorithms have been widely used for identifying among biological sequences.



For example classification of genes, patients on the basis of their genes, and many other biological problems.

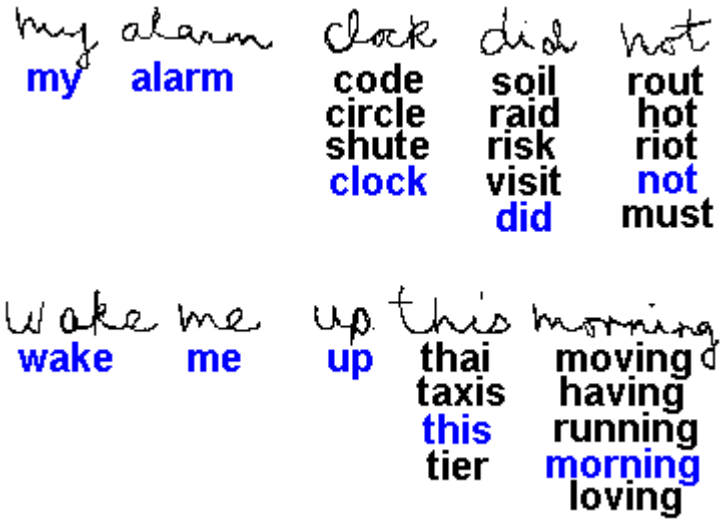
2.5. Protein Fold and Remote Homology Detection

Protein remote homology detection is a key problem in computational biology. **Supervised learning algorithms** on SVMs are one of the most effective methods for remote homology detection. The performance of these methods depends on how the protein sequences modeled. The method used to compute the kernel function between them.



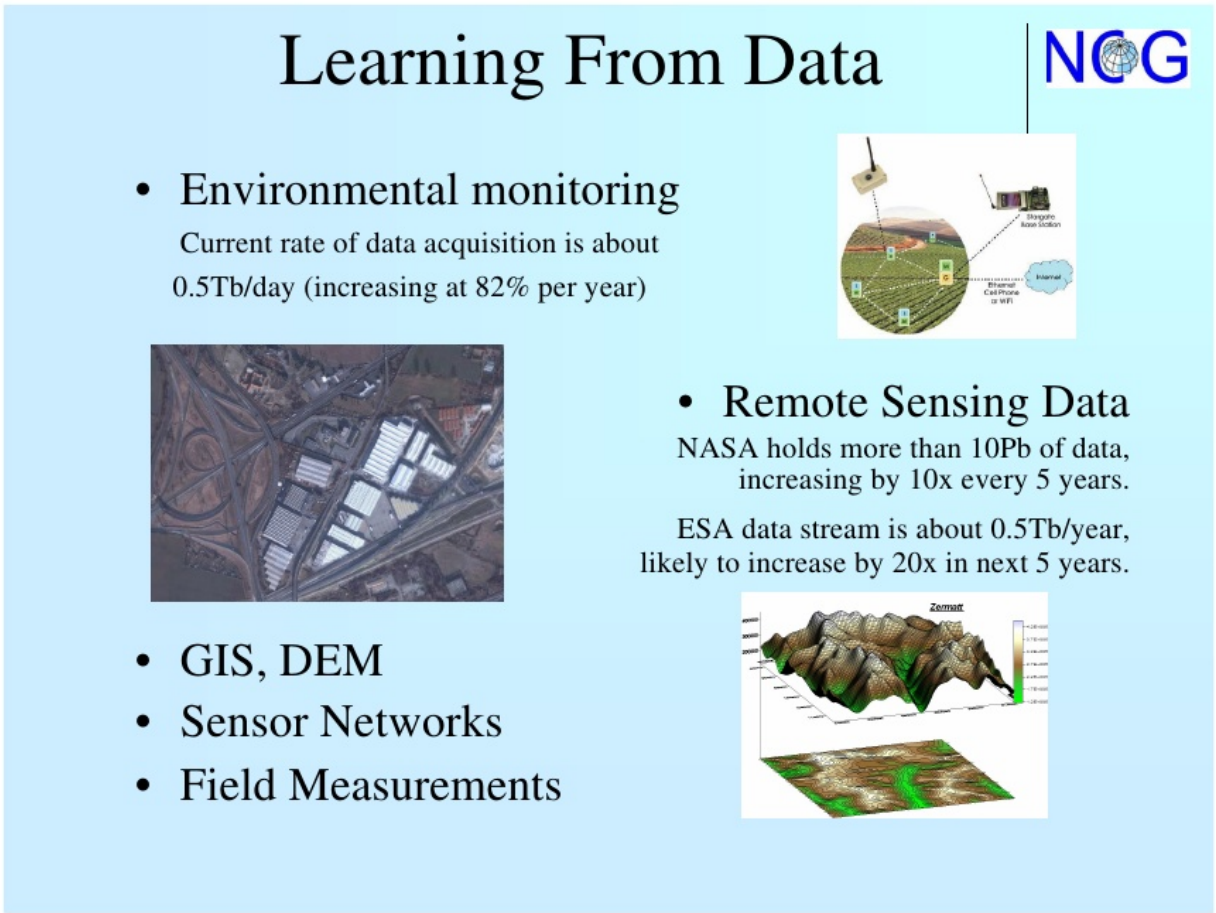
2.6. Handwriting Recognition

We can also use SVMs to recognize hand-written characters that use for data entry and validating signatures on documents.



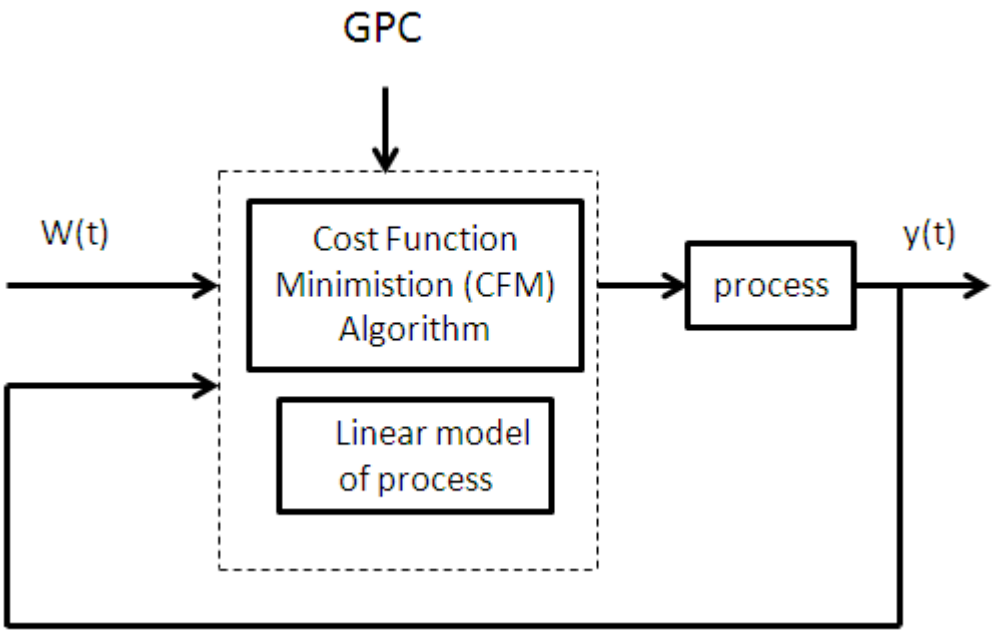
2.7. Geo and Environmental Sciences

We use SVMs for geo (spatial) and spatiotemporal environmental data analysis and modeling series.



2.8. Generalized Predictive Control

We use SVM-based GPC to control chaotic dynamics with useful parameters. It provides excellent performance in controlling the systems. The system follows chaotic dynamics with respect to the local stabilization of the target.



Using SVMs for controlling chaotic systems has the following advantages-

- Allows use of relatively small parameter algorithms to redirect a chaotic system to the target.
- Reduces waiting time for chaotic systems.
- Maintains the performance of systems.

Conclusion

Thus, we conclude that the SVMs can not only make the reliable prediction but also can reduce redundant information. The SVMs also obtained results comparable with those obtained by other approaches.