SNS COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IOT Including CS&BCT

COURSE NAME :19SB701 Pattern Recognition Techniques in Cyber Crime

IV YEAR / VII SEMESTER
Unit - INTRODUCTION
Topic : BASICS OF PATTERN RECOGNITION

BASICS OF PATTERN RECOGNITION

AGENDA

INTRODUCTION

TRAINING AND LEARNING IN PATTERN RECOGNITION

ADVANTAGES

DISADVANTAGES

APPLICATIONS

INTRO

What is Pattern Recognition?
Pattern recognition is the process of recognizing patterns by using a machine learning algorithm. Pattern recognition can be defined as the classification of data based on knowledge already gained or on statistical information extracted from patterns and/or their representation. One of the important aspects of pattern recognition is its application potential.
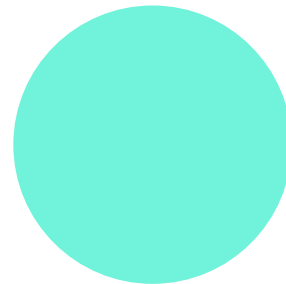
Examples: Speech recognition, speaker identification, multimedia document recognition (MDR), automatic medical diagnosis.

In a typical pattern recognition application, the raw data is processed and converted into a form that is amenable for a machine to use. Pattern recognition involves the classification and cluster of patterns.

Pattern recognition possesses the following features:

•Pattern recognition system should recognize familiar patterns quickly and accurate

•Recognize and classify unfamiliar objects

•Accurately recognize shapes and objects from different angles

•Identify patterns and objects even when partly hidden

•Recognize patterns quickly with ease, and with automaticity.

TRAINING AND LEARNING IN PATTERN RECOGNITION

- Learning is a phenomenon through which a system gets trained and becomes adaptable to give results in an accurate manner. Learning is the most important phase as to how well the system performs on the data provided to the system depends on which algorithms are used on the data. The entire dataset is divided into two categories, one which is used in training the model i.e. Training set, and the other that is used in testing the model after training, i.e. Testing set.

TRAINING AND LEARNING IN PATTERN RECOGNITION

- **Training set:**

    The training set is used to build a model. It consists of the set of images that are used to train the system. Training rules and algorithms are used to give relevant information on how to associate input data with output decisions. The system is trained by applying these algorithms to the dataset, all the relevant information is extracted from the data, and results are obtained. Generally, 80% of the data of the dataset is taken for training data.

- **Testing set:**

    Testing data is used to test the system. It is the set of data that is used to verify whether the system is producing the correct output after being trained or not. Generally, 20% of the data of the dataset is used for testing. Testing data is used to measure the accuracy of the system. For example, a system that identifies which category a particular flower belongs to is able to identify seven categories of flowers correctly out of ten and the rest of others wrong, then the accuracy is 70 %

ADVANTAGES

- Pattern recognition solves classification problems

- Pattern recognition solves the problem of fake biometric detection.

- It is useful for cloth pattern recognition for visually impaired blind people.

- It helps in speaker diarization.

- We can recognize particular objects from different angles.

DISADVANTAGES

- The syntactic pattern recognition approach is complex to implement and it is a very slow process.

- Sometimes to get better accuracy, a larger dataset is required.

- It cannot explain why a particular object is recognized.

- Example: my face vs my friend's face.

APPLICATIONS

- Image processing, segmentation, and analysis

- Pattern recognition is used to give human recognition intelligence to machines that are required in image processing.

- Computer vision

- Pattern recognition is used to extract meaningful features from given image/video samples and is used in computer vision for various applications like biological and biomedical imaging.

- Seismic analysis

- The pattern recognition approach is used for the discovery, imaging, and interpretation of temporal patterns in seismic array recordings. Statistical pattern recognition is implemented and used in different types of seismic analysis models.

- Radar signal classification/analysis

- Pattern recognition and signal processing methods are used in various applications of radar signal classifications like AP mine detection and identification.

APPLICATIONS

- Speech recognition

- The greatest success in speech recognition has been obtained using pattern recognition paradigms. It is used in various algorithms of speech recognition which tries to avoid the problems of using a phoneme level of description and treats larger units such as words as pattern

- Fingerprint identification

- Fingerprint recognition technology is a dominant technology in the biometric market. A number of recognition methods have been used to perform fingerprint matching out of which pattern recognition approaches are widely used.

THANK YOU