SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

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

COURSE NAME : **19SB701 PATTERN RECOGNITION TECHNIQUES IN CYBER CRIME**

IV YEAR / VII SEMESTER

Unit I- **INTRODUCTION**

Topic : Basics of Pattern Recognition

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.

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

✓ Cluster of patterns.

Classification:

✓ It is an appropriate **class label is assigned** to a pattern based on an abstraction that is generated using a **set of training patterns** or domain knowledge.

✓ Classification is used in **supervised learning**.

Basics of pattern recognition / 19SB701 PATTERN RECOGNITION TECHNIQUES IN CYBER CRIME /Mr.R.Kamalakkannan/CSE-IOT/SNSCE

Clustering:

Generated a partition of the data which helps **decision making**, the specific decision-making activity of interest to us.

Clustering is used in **unsupervised learning.**

Example:

consider our face then eyes, ears, nose, etc are features of the face.

A set of features that are taken together, forms the features vector.

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 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,**

Other that is used in testing the model after training, i.e. **Testing set.**

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.

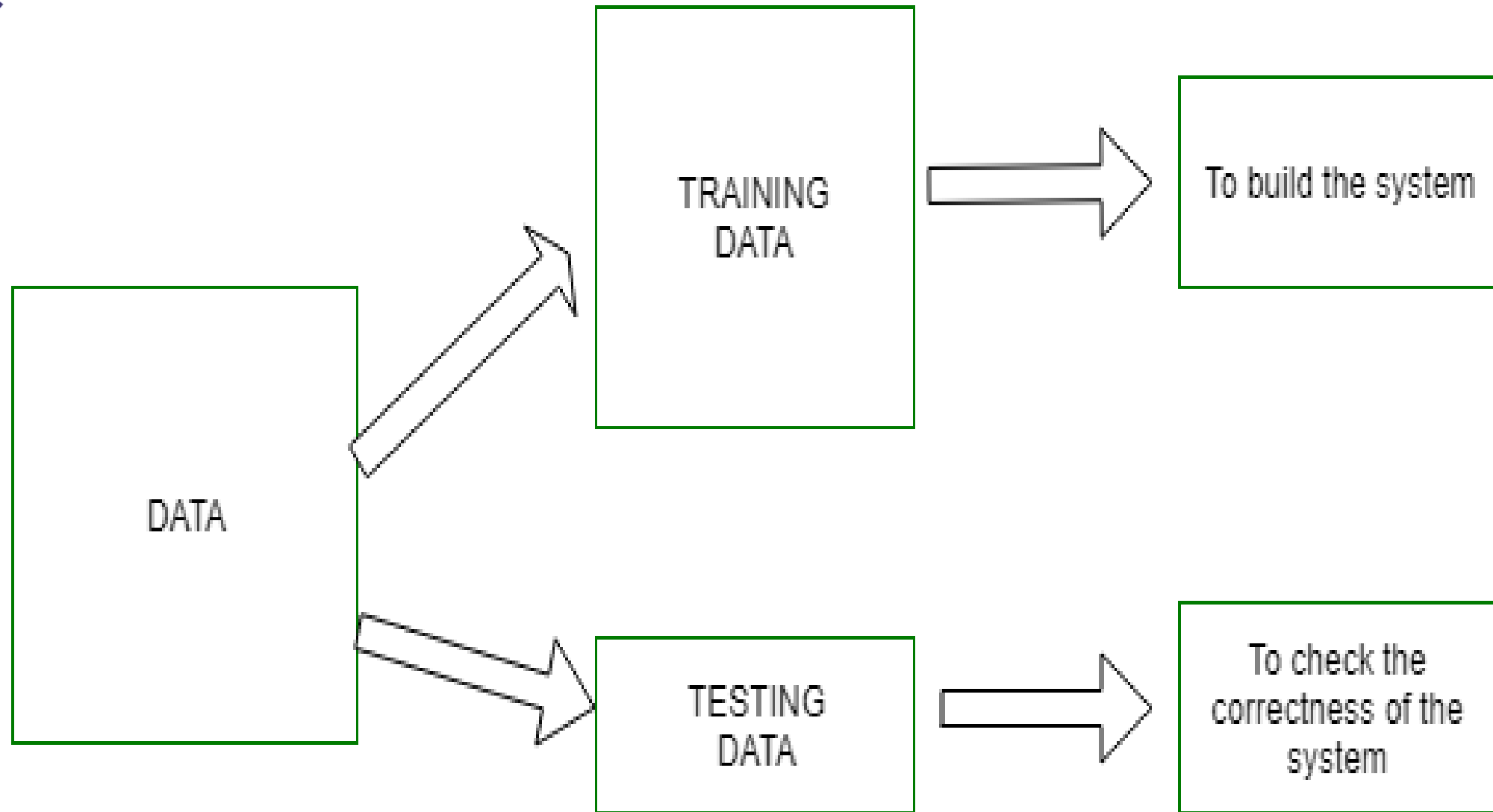Generally, 80% of the data of the dataset is taken for training data.

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 %

Basics of pattern recognition / 19SB701 PATTERN RECOGNITION TECHNIQUES IN CYBER CRIME /Mr.R.Kamalakkannan/CSE-IOT/SNSCE

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

Computer vision

Seismic analysis

Radar signal classification/analysis

Speech recognition

Fingerprint identification

Any Query????

Thank you……