PATTERN RECOGNITION
LECTURE 1
INTRODUCTION

LECTURE NOTES

02-01-2020

Text books

- Pattern Classification (2nd. Edition) by R. O. Duda, P. E. Hart and D. Stork, Wiley 2002
- Pattern Recognition and Machine Learning by C. Bishop, Springer 2006

Evaluation

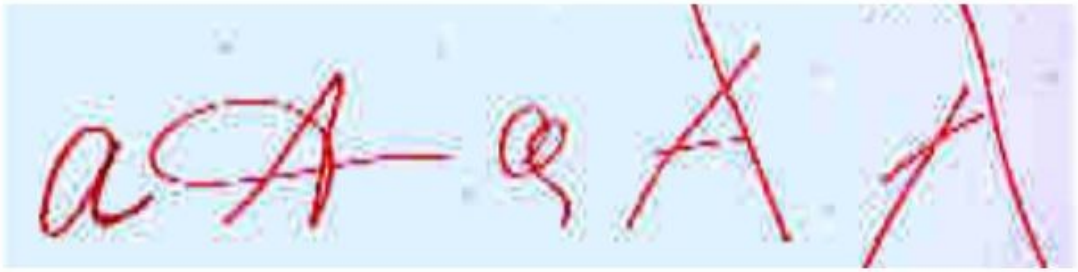
- Quiz 1 :15
- Quiz 2 :15
- End Sem : 40
- Assignment/project : 30

Pattern

- A pattern is an abstract object, such as a set of measurements (known as feature extraction) describing a physical object.
- **Feature extraction** measures object properties that are useful for classification.
- A pattern could be an object, an event or a process.
  - Biometric pattern corresponds to an object.
  - Hand gesture pattern corresponds to an event.

Examples of patterns

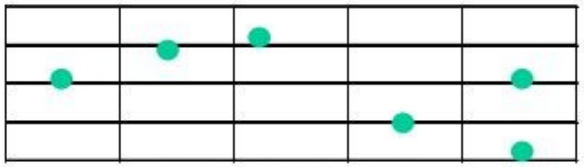
Handwritten Characters



UPC BarCode

Fingerprint

Animal Footprint

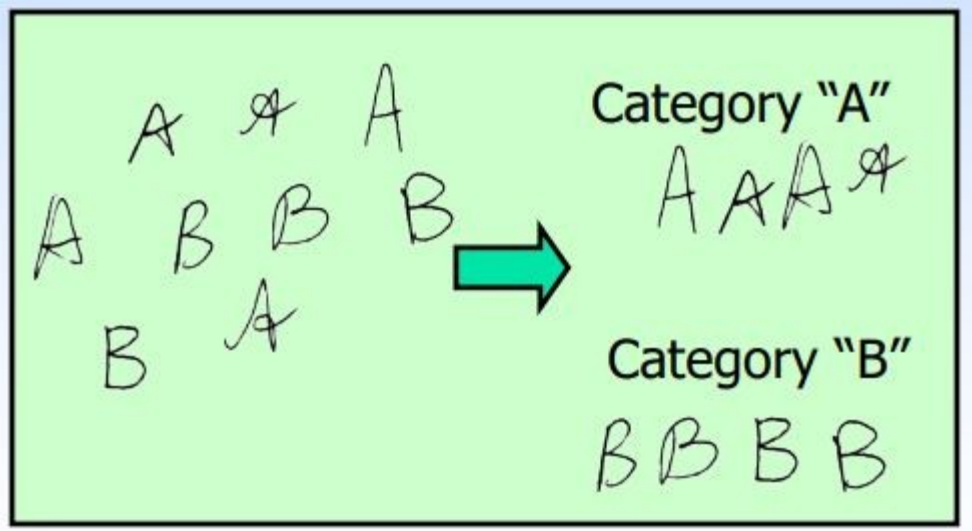


Postnet Bar Code

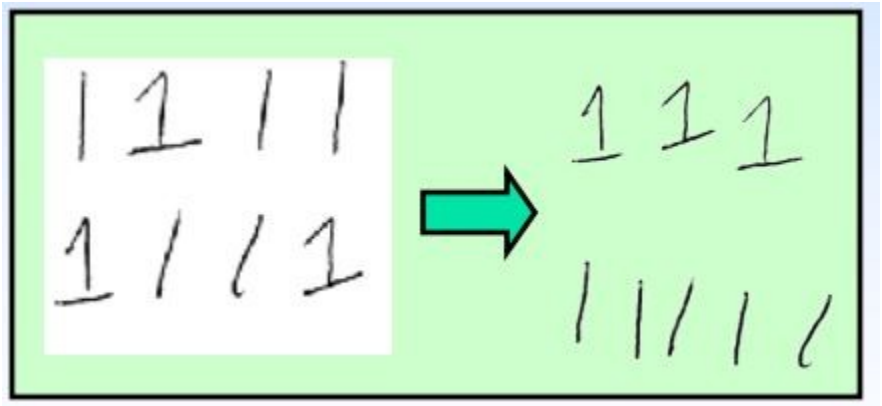
Data Trend

Recognition

- Identification of a pattern as a member of a category (class) we already know or we are familiar with.
  - Classification (known categories)



- Clustering (learning categories)



Pattern Recognition : Definition

- The act of taking as input sensed data (measurements) and taking an action based on the “category” or “class” of the pattern.
- Theory, algorithms, systems to put patterns into categories.
- Classification of noisy or complex data.
- Relate perceived pattern to previously perceived patterns.
- Assign an unknown pattern to one of the several known categories(or classes).

- The real power of human thinking is based on recognizing patterns. The better computers get at ‘pattern recognition’, the more human like they will come.

Outline of the course

- Distance measures
- Baye's decision theory
  - Minimum error rate classification
- Parametric and non parametric estimation
  - MLE
- Dimensionality reduction
  - PCA, LDA
- Linear Discriminant Function
  - Perceptorn, SVM
- Artificial Neural networks
  - Multilayer Perceptorn, feed forward NN

THANK YOU