A
Course on
PATTERN RECOGNITION

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CHAPTER 1 – INTRODUCTION

- Typical application areas of pattern recognition
  - Machine vision
  - Character recognition (OCR)
  - Computer aided diagnosis
  - Speech recognition
  - Face recognition
  - Biometrics
  - Image Data Base retrieval
  - Data mining
  - Bionformatics

- The task: Assign unknown objects – patterns – into the correct class. This is known as classification.

❖ Features: These are measurable quantities obtained from the patterns, and the classification task is based on their respective values.

❖Feature vectors: A number of features

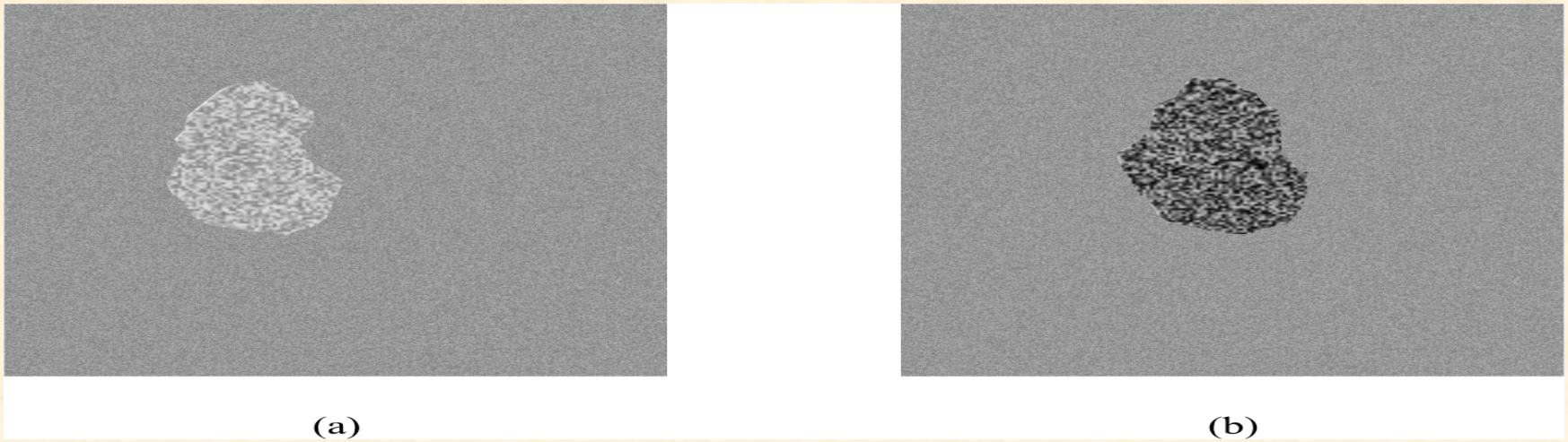
$$x_1, \ldots, x_l,$$

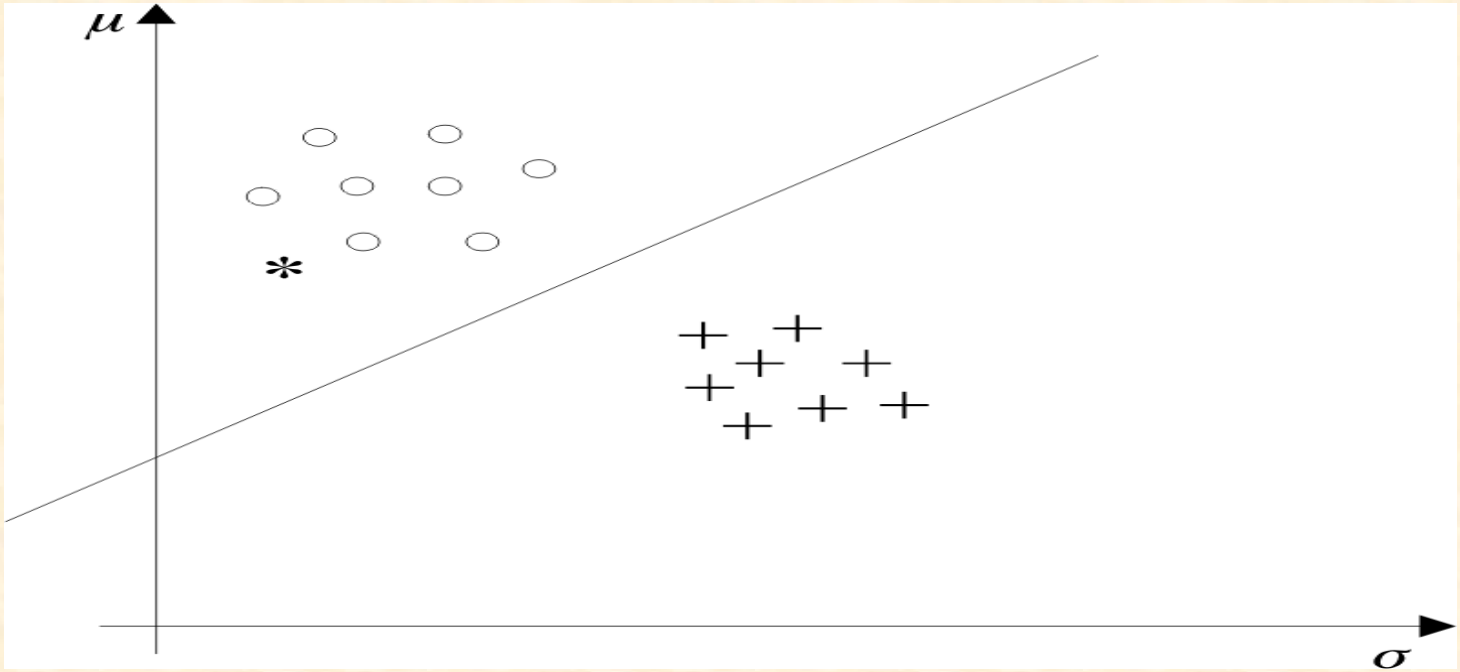
constitute the feature vector

$$\underline{x} = \left[x_1, \ldots, x_l\right]^T \in R^l$$

Feature vectors are treated as random vectors.

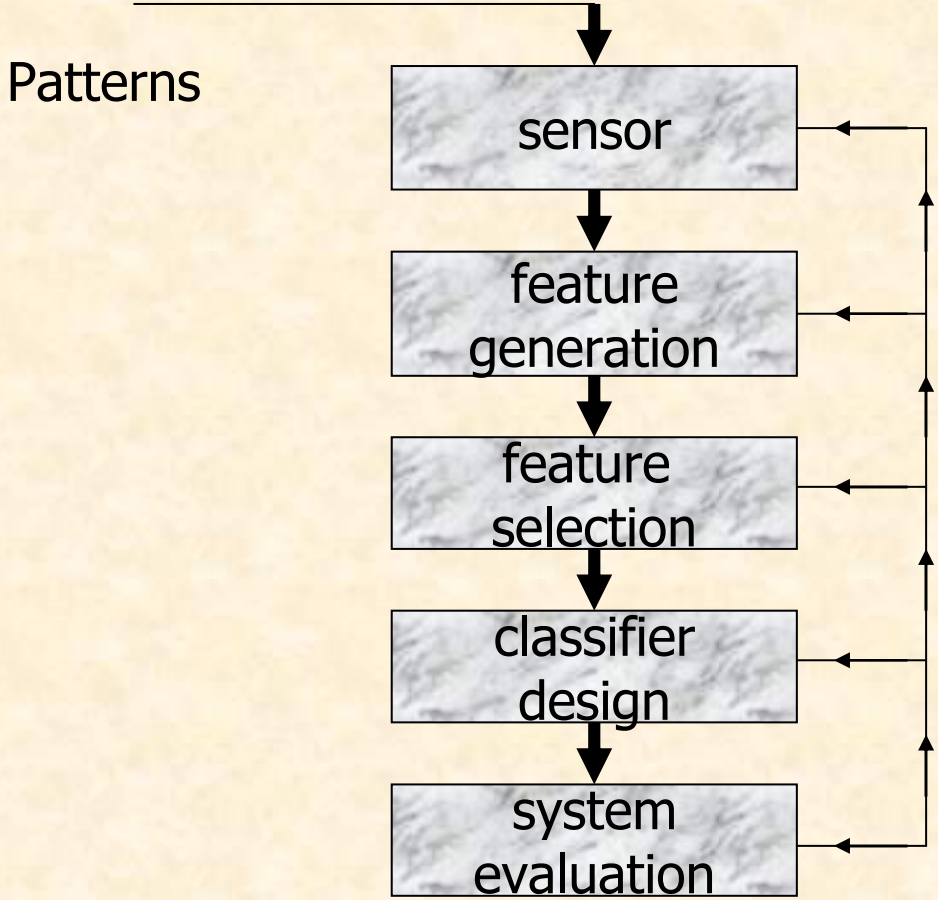
An example:





- The classifier consists of a set of functions, whose values, computed at $\underline{x}$, determine the class to which the corresponding pattern belongs

- Classification system overview



- Supervised – unsupervised – semisupervised pattern recognition:
  The major directions of learning are:
  - **Supervised**: Patterns whose class is known a-priori are used for training.
  - **Unsupervised**: The number of classes/groups is (in general) unknown and no training patterns are available.
  - **Semisupervised:** A mixed type of patterns is available. For some of them, their corresponding class is known and for the rest is not.