

# MACHINE LEARNING- UNSUPERVISED LEARNING

B.Sc. 5<sup>th</sup> Sem (Paper Code: DSE2)

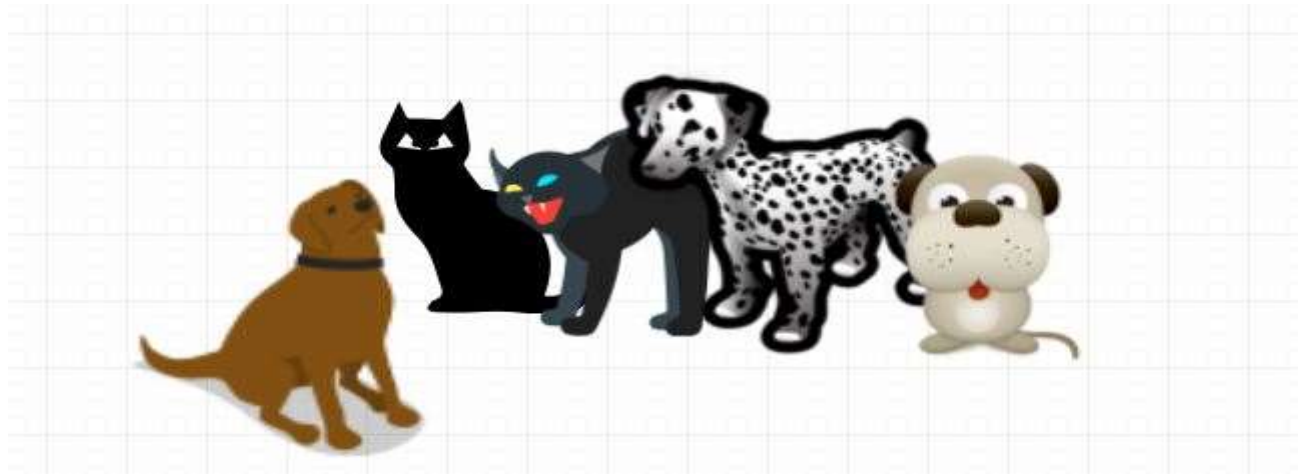
Paulami Basu Ray

Assistant Professor, Department of Computer Science and Applications

Prabhat Kumar College, Contai

# UNSUPERVISED LEARNING

- Unsupervised learning is the training of machine using information that is neither classified nor labeled and allowing the algorithm to act on that information without guidance. Here the task of machine is to group unsorted information according to similarities, patterns and differences without any prior training of data.
- **For instance**, suppose it is given an image having both dogs and cats which have not seen ever.



Thus the machine has no idea about the features of dogs and cat so we can't categorize it in dogs and cats. But it can categorize them according to their similarities, patterns, and differences i.e., we can easily categorize the above picture into two parts.

First part may contain all pics having **dogs** in it and second part may contain all pics having **cats** in it. Here you didn't learn anything before, means no training data or examples.

# EXAMPLES OF UNSUPERVISED LEARNING

- ◉ Unsupervised learning classified into two categories of algorithms:
- ◉ **Clustering:** A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behavior.
- ◉ **Association:** An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y

# supervised learning

Input data



Annotations

These are apples



Model



Prediction

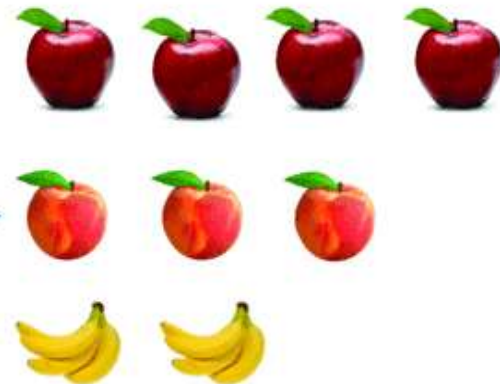


# unsupervised learning

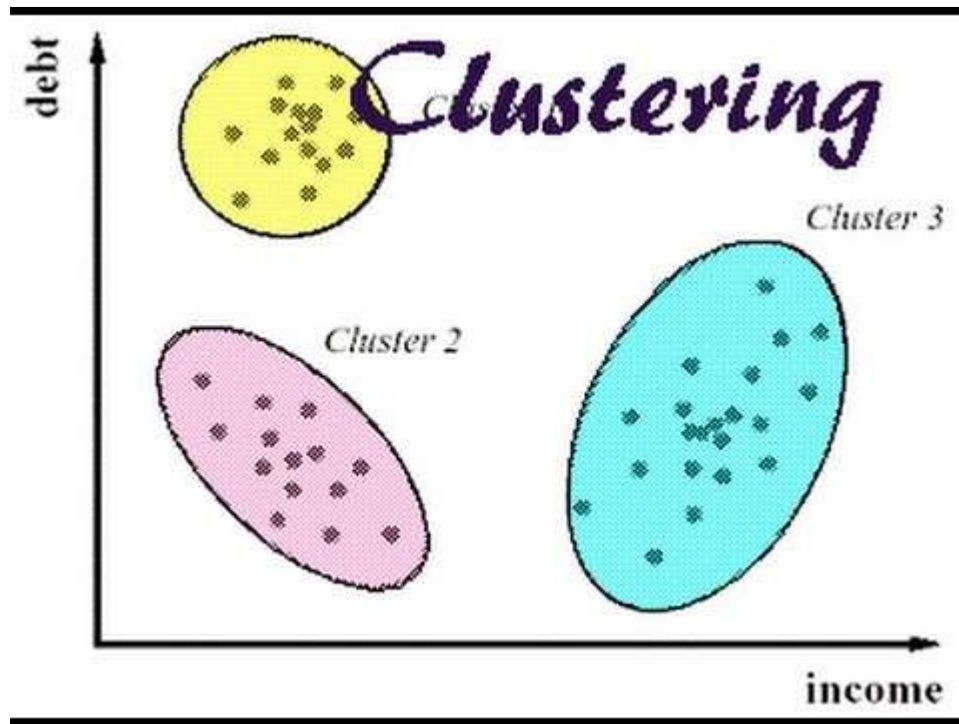
Input data



Model



# CLUSTERING



# Introduction to Clustering



I can see a pattern



Input



Model



Output



## Machine Learning: Clustering



By color



By shape



By size



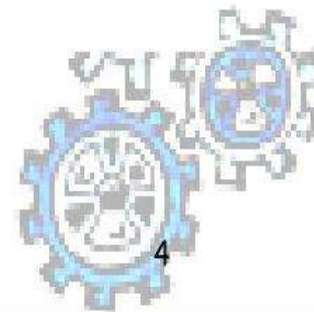
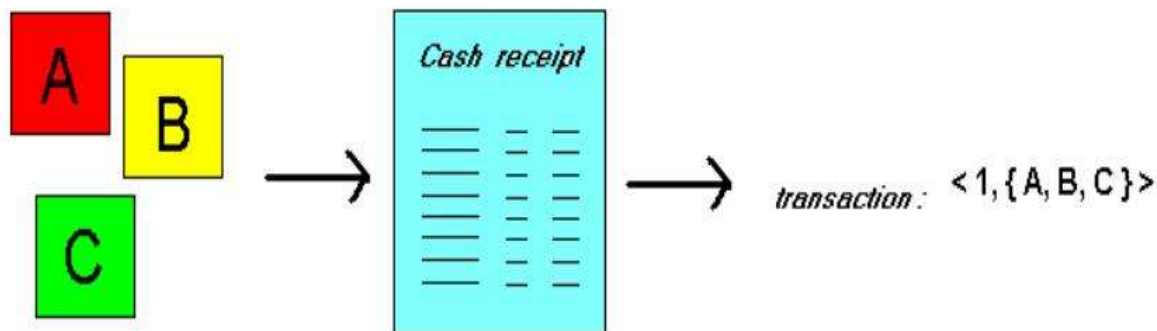
etc...



# Market Basket Analysis: the context

Given: a database of customer **transactions**, where each transaction is a **set of items**

- Find groups of items which are **frequently purchased together**



# MARKET BASKET ANALYSIS



# SUPERVISED VS UNSUPERVISED

## ◉ Supervised Learning

- Have training examples with labels
- Trying to predict a specific quantity
- Can measure accuracy directly

## ◉ Unsupervised Learning

- Trying to “understand” the data
- Looking for structures or unusual patterns
- Not looking for something specific (supervised)
- Does not require labelled data
- Evaluation usually indirect or qualitative