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FACULTY OF EGINEERING AND TECHNOLOGY

Soft Computing

LECTURE -05

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OUTLINE

- Back propagation network
- Mathematical Model of unsupervised Learning
- Why used unsupervised learning
- Types of Unsupervised learning
- Advantages and Disadvantages of Unsupervised Learning
- Multiple Choice Question

FEATURES OF BACK PROPAGATION

Back Propagation

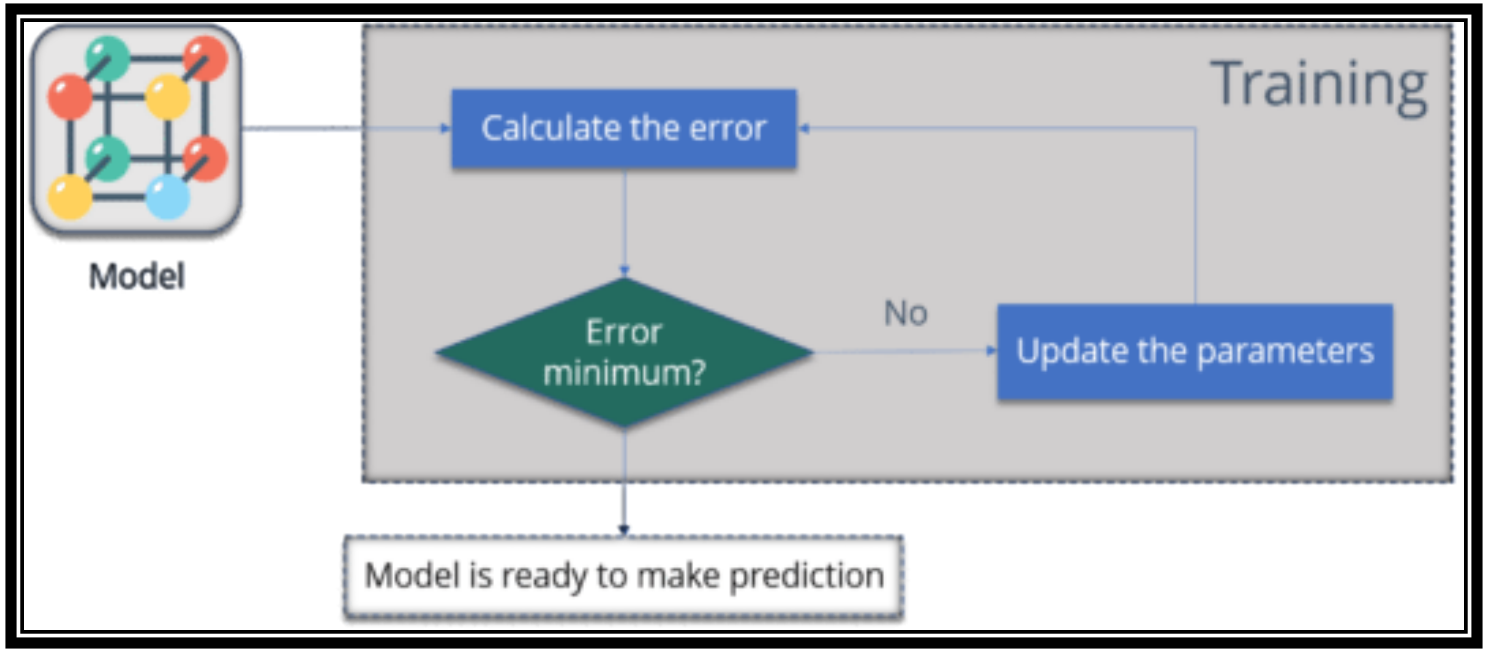
❑ Back propagation is a supervised learning algorithm, for training Multi-layer Perceptions (Artificial Neural Networks).

Why We Need Back propagation?

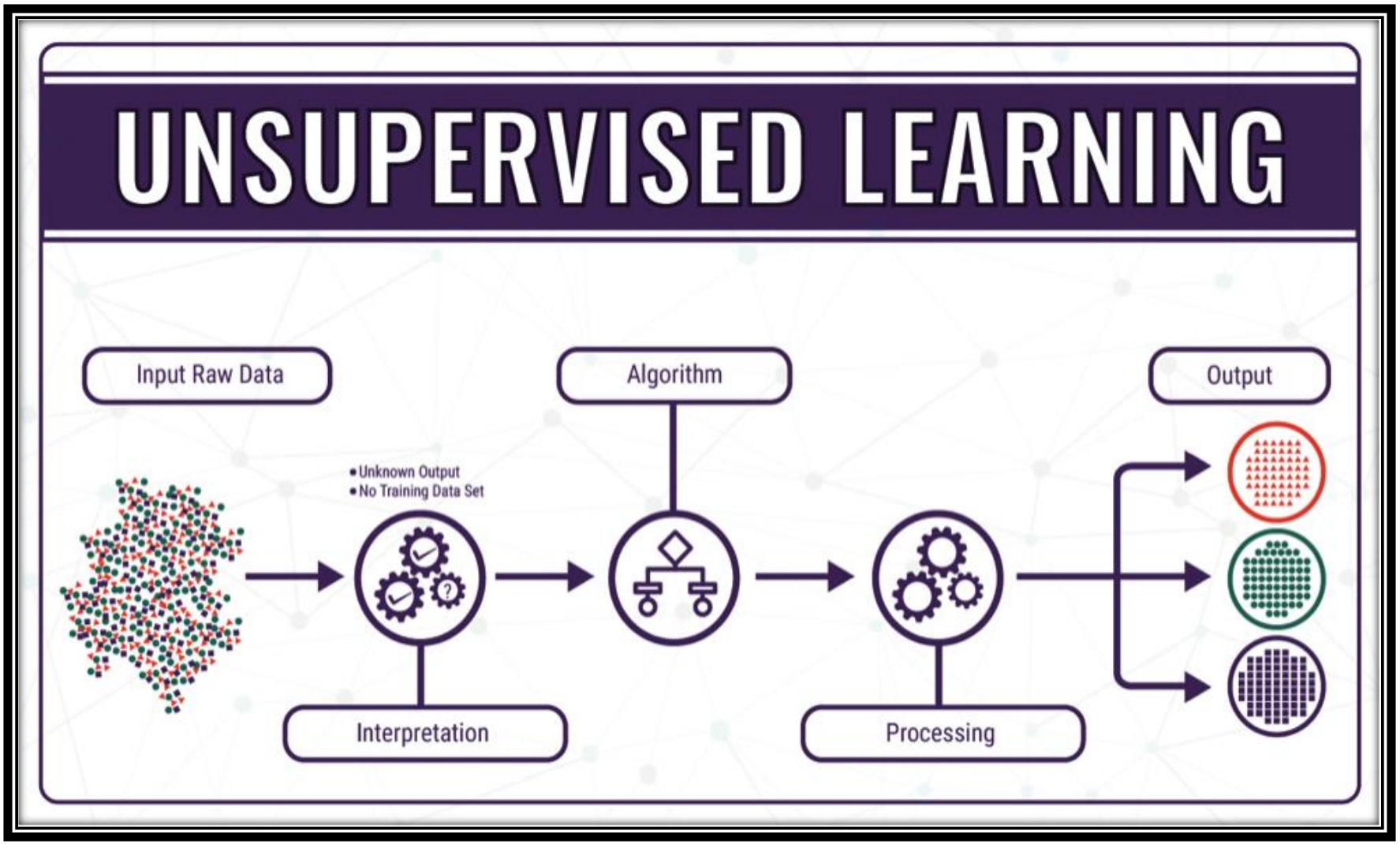
❑ While designing a Neural Network, in the beginning, we initialize weights with some random values or any variable for that fact.

❑ Now obviously, we are not *superhuman.* So, it's not necessary that whatever weight values we have selected will be correct, or it fits our model the best.

FEATURES OF BACK PROPAGATION



MATHEMATICAL MODEL OF UNSUPERVISED LEARNING



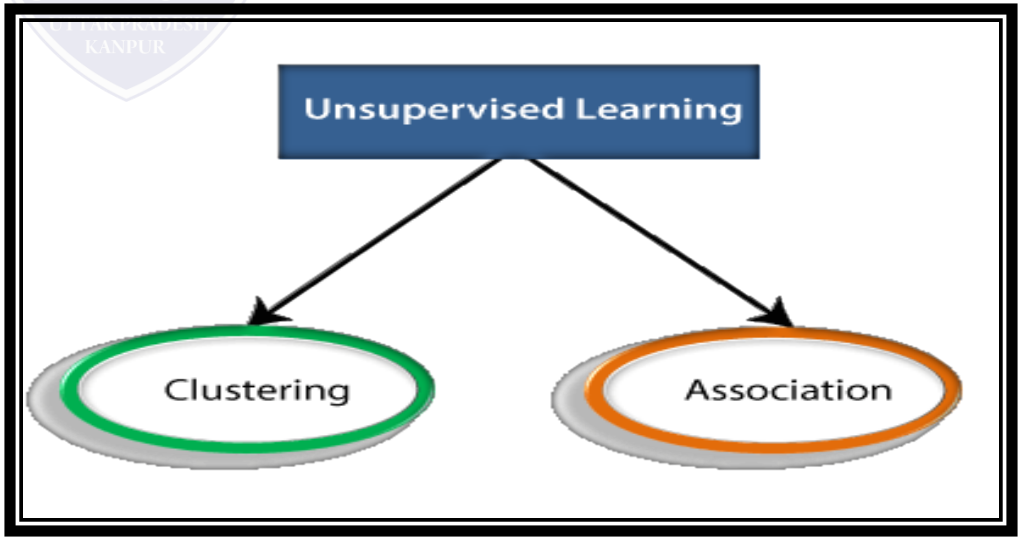
FEATURES OF SUPERVISED LEARNING

Why use Unsupervised Learning?

Below are some main reasons which describe the importance of Unsupervised Learning:

- ❑ Unsupervised learning is helpful for finding useful insights from the data.
- ❑ it works as human brain like brain learn for its past experience.
- ❑ Unsupervised learning works on unlabeled and uncategorized data which make unsupervised learning more important.
- ❑ In real-world, we do not always have input data with the corresponding output so to solve such cases, we need unsupervised learning.

Types of Unsupervised Learning



TYPES OF UNSUPERVISED LEARNING

Clustering:

Clustering is a method of grouping the objects into clusters such that objects with most similarities remains into a group and has less or no similarities with the objects of another group. Cluster analysis finds the commonalities between the data objects and categorizes them as per the presence and absence of those commonalities.

Association:

An association rule is an unsupervised learning method which is used for finding the relationships between variables in the large database. It determines the set of items that occurs together in the dataset. Association rule makes marketing strategy more effective. Such as people who buy X item (suppose a bread) are also tend to purchase Y (Butter/Jam) item. A typical example of Association rule is Market Basket Analysis.

ALGORITHM OF UNSUPERVISED LEARNING

- K-means clustering
- KNN (k-nearest neighbors)
- Hierarchal clustering
- Anomaly detection
- Neural Networks
- Principle Component Analysis
- Independent Component Analysis
- Apriori algorithm
- Singular value decomposition

PRONS AND CONS OF UNSUPERVISED LEARNING

Advantages of Unsupervised Learning

- Because of unlabeled data set unsupervised learning is used for solving more complex problem.
- Unsupervised learning is preferable as it is easy to get unlabeled data in comparison to labeled data.

Disadvantages of Unsupervised Learning

- Unsupervised learning is intrinsically more difficult than supervised learning due to absence of output.
- The result of the unsupervised learning algorithm might be less accurate as input data is not labeled, and algorithms do not know the exact output in advance so that error prediction is difficult as compare to supervised learning.

MCQ

6. If a hypothesis says it should be positive, but in fact, it is negative, we call it _____

a) A consistent hypothesis

b) A false negative hypothesis

c) A false positive hypothesis

d) A specialized hypothesis

7. Neural Networks are complex _____with many parameters.

a) Linear Functions

b) Nonlinear Functions

c) Discrete Functions

d) Exponential Functions

8. A perceptron is a _____

a) Feed-forward neural network

b) Backpropagation algorithm

c) Backtracking algorithm

d) Feed Forward-backward algorithm

9. Which of the following statement is true?

a) Not all formal languages are context-free

b) All formal languages are Context free

c) All formal languages are like natural language

d) Natural languages are context-oriented free

10. Which of the following statement is not true?

a) The union and concatenation of two context-free languages is context-free

b) The reverse of a context-free language is context-free, but the complement need not be

c) Every regular language is context-free because it can be described by a regular grammar

d) The intersection two context-free languages is context-free

REFERENCES

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