

## Assignment No :- 02

## • Aim :-

Implement decision tree classification.

## • Problem statement :-

A dataset collected in a cosmetic shop showing details of customers and whether or not they responded to a special offer to buy a new lip-stick is shown in table below. Use this dataset to build a decision tree, with buys as the target variable, to help in buying lip-sticks in the future. Find the root node of decision tree. According to the decision tree you have made from previous training dataset, what is the decision for the test data [Age < 21, Income = Low, Gender = Female, Marital status = Married] ?

ID	Age	Income	Gender	Marital status	buys
1	<21	High	Male	Single	NO
2	<21	High	Male	Married	NO
3	21-35	High	Male	Single	yes
4	>35	Medium	Male	Single	yes
5	>35	Low	Female	Single	yes
6	>35	Low	Female	Married	NO
7	21-35	Low	Female	Married	yes
8	<21	Medium	Male	single	NO
9	<21	Low	Female	Married	yes
10	>35	Medium	Female	Single	yes
11	<21	Medium	Male	Married	yes
12	21-35	Medium	Male	Married	yes
13	21-35	High	Female	single	yes
14	>35	Medium	Male	Married	NO

## • Input :- CSV Dataset.

## • Theory :-

### Decision Tree :-

It is a decision-making tool that use a flowchart like tree structure or is a model of decisions and all of their possible results, including outcomes, input costs and utility.

Decision-tree algorithm falls the category of supervised learning algorithm. It works for both continuous as well as categorical output variable.

### Advantages :-

- Decision trees are powerful and popular tool for classification and prediction.
- Simple and easy use.
- They are able to handle both numerical and categorical attributes.
- Easy to understand.

### Disadvantages :-

- Easy tree is "unique" sequence of tests, so little common structure.
- Perform poorly with many class and small data.
- Need as many example as possible.
- Higher CPU cost but much higher.

### Applications :-

- Medical diagnosis.
- Credit risk analysis.
- Library book use.

## • Conclusion :-

In this assignment we learn how to create decision tree based on given decision, find the root node of the tree using decision tree classifier successfully.