Final Report On Decision Tree

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***Abstract*—Decision tree is the most powerful and popular tool for classification and prediction. A Decision tree is a flowchart like tree structure, where each internal node denotes a test on an attribute, each branch represents an outcome of the test, and each leaf node holds a class label.**

***Index Terms*—Python**

I. Introduction

A decision tree is a graphical representation of all possible solutions to a decision. These days, tree-based algorithms are the most commonly used algorithms in the case of supervised learning scenarios.They are easier to interpret and visualize with great adaptability. Decision trees classify instances by sorting them down the tree from the root to some leaf node, which provides the classification of the instance.

Decision tree is a flowchart-like tree structure where an internal node represents feature, the branch represents a decision rule, and each leaf node represents the outcome.

II. Literature Review

Lertworaprachaya et al.,2014 [1] proposed a new model for compose decision trees using interval-valued fuzzy membership values.Most existing fuzzy decision trees do not consider the concerned associated with their membership values; however, precise values of fuzzy membership values are not always possible.Bahnsen et al. 2015 [2] proposed an example-reliant costsensitive decision tree algorithm, by incorporating the different example-reliant costs into a new cost-based impurity measure and new cost-based pruning criteria.Subsequently, using three different databases,credit scoringand direct marketing, the authors evaluated their proposed method.

III. Proposed Methodology

Decision trees are a simple classification tool capable of separating records of data into specific categories by proposing a series of questions.Decision trees are commonly used due to many factors, including their relatively small learning curve for interpretability. Kingsford and Salzberg note that decision trees are commonly more easily interpreted than other machine learning algorithms. The decision tree structure follows an intuitive tree shape that can be interpreted by following a series of questions at each level. The responses to each question in the tree can include either discrete values, a range, or a probability distribution.

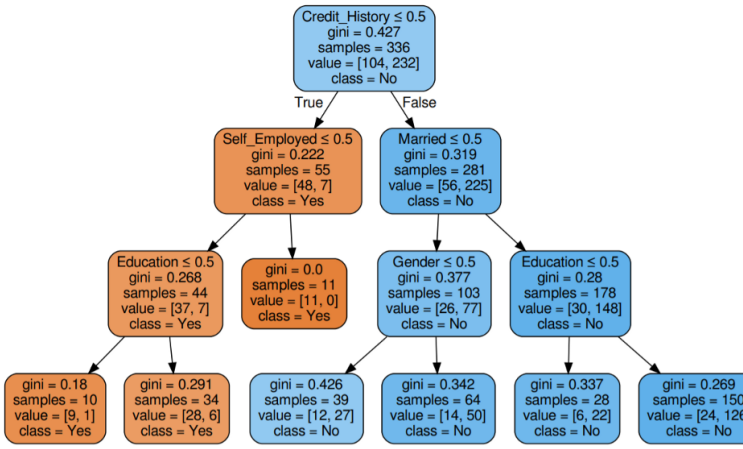

Fig. 1.

IV. Types Of Nodes

A decision tree consists of three types of nodes:

1. Decision nodes – typically represented by squares
2. Chance nodes – typically represented by circles
3. End nodes – typically represented by triangles

V. ADVANTAGES

1.Are simple to understand and interpret. People are able to understand decision tree models after a brief explanation.

2.Help determine worst, best and expected values for different scenarios.

3.Use a white box model. If a given result is provided by a model.

4.Can be combined with other decision techniques.

VI. DISADVANTAGES

1.They are unstable, meaning that a small change in the data can lead to a large change in the structure of the optimal decision tree.

2.They are often relatively inaccurate.

3.Calculations can get very complex, particularly if many values are uncertain and/or if many outcomes are linked.

VII. CODE

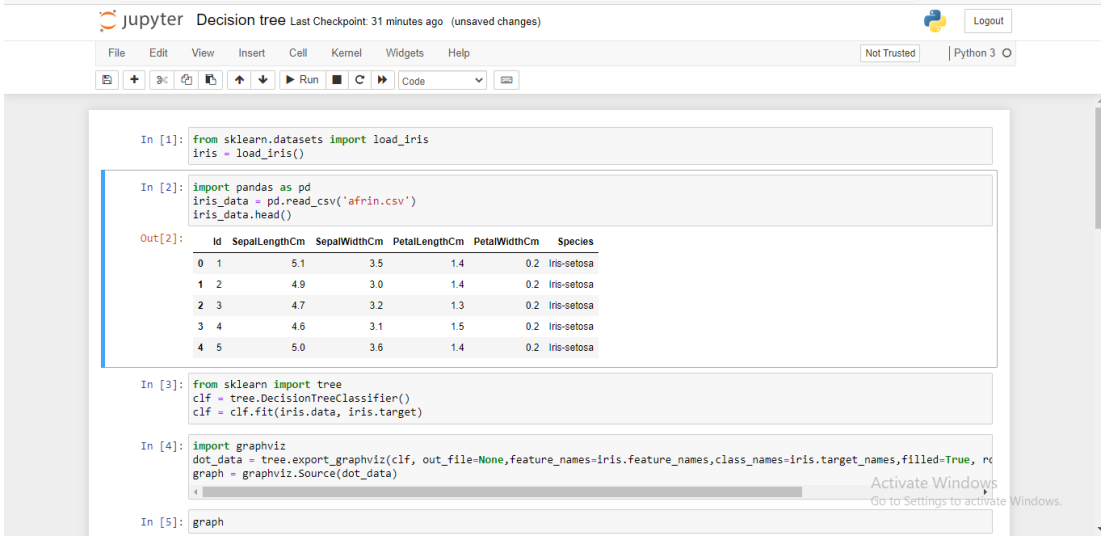

Fig. 2.

VIII. CONCLUSION

A decision tree is a decision support tool that uses a tree-like model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. It is one way to display an algorithm that only contains conditional control statements.

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