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this article is all about what decision trees are how they work their advantages and disadvantages and their applications what is a decision tree a decision tree is a flowchart like structure used to make decisions or predictions it consists of nodes representing decisions or tests on attributes branches representing the outcome of these 1 supervised learning 1 10 decision trees decision trees dts are a non parametric supervised learning method used for classification and regression the goal is to create a model that predicts the value of a target variable by learning simple decision rules inferred from the data features this article is made for complete beginners in machine learning who want to understand one of the simplest algorithm yet one of the most important because of its interpretability power of prediction and use in different variants like random forest or gradient boosting trees a decision tree is a hierarchical model used in decision support that depicts decisions and their potential outcomes incorporating chance events resource expenses and utility this algorithmic model utilizes conditional control statements and is non parametric supervised learning useful for both classification and regression tasks this chapter introduces the basic concepts of classification describes some ofthekeyissuessuchasmodeloverfitting andpresentsmethodsforevaluating and comparing the performance of a classification technique while it focuses mainly on a technique known as decision tree induction most of the discussion a decision tree is a graphical representation of all possible solutions to a decision based on certain conditions on each step or node of a decision tree used for classification we try to form a condition on the features to separate all the labels or classes contained in the dataset to the fullest purity let s see how the idea works a decision tree is a non parametric supervised learning algorithm which is utilized for both classification and regression tasks it has a hierarchical tree structure which consists of a root node branches internal nodes and leaf nodes a decision tree is a type of supervised machine learning used to categorize or make predictions based on how a previous set of questions were answered the model is a form of supervised learning meaning that the model is trained and tested on a set of data that contains the desired categorization a decision tree is a model composed of a collection of questions organized hierarchically in the shape of a tree the questions are usually called a condition a split or a test 1 mention explore all metrics abstract decision tree techniques have been widely used to build classification models as such models closely resemble human reasoning and are easy to understand this paper describes basic decision tree issues and current research points a decision tree is a key data analysis concept to understand we outline a definition and some key concepts associated with decision trees we also describe the importance of decision trees we help you to understand the different types of decision trees and their role in data science what is decision tree how to construct an roc curve use classifier that produces posterior probability for each test instance p a sort the instances according to p a in decreasing order apply threshold at each unique value of p a count the number of tp fp tn fn at each threshold 0 9399 13 effect of multiple comparison procedure many algorithms employ the following greedy strategy initial model m alternative model m m γ where γ is a component to be added to the model e g a test condition of a decision tree keep m if improvement Δ m m α definition model does a good job of correctly predicting class labels of previously unseen samples generalization is typically evaluated using a test set of data that was not involved in the training process evaluating generalization requires correct labels for test set are known apply model learn model tid attrib1 attrib2 attrib3 class 1 yes large 125k no 2 no medium 100k no 3 no small 70k no 4 yes medium 120k predicting tumor cells as benign or malignant classifying credit card transactions as legitimate or fraudulent classifying secondary structures of protein as alpha helix beta sheet or random coil categorizing news stories as finance weather entertainment sports etc a decision tree is a type of flowchart you can use to visualize a decision making process decision trees help you map out different courses of action and their potential outcomes decision rules that are generated by the decision tree are mutually exclusive the decision rules also provide a complete rule set such that a corresponding rule exists for any combination of the predictor values in the data also available is the overall decision tree predictive strength that provides relative improvement over the basic model decision trees are one of the best known supervised learning method used for both classification and regression the goal is to create a model that predicts the value of a target variable by learning simple decision rules inferred from the data features a decision tree can be seen a piecewise constant approximation

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how to construct an roc curve use classifier that produces posterior probability for each test instance p a sort the instances according to p a in decreasing order apply threshold at each unique value of p a count the number of tp fp tn fn at each threshold

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0 9399 13 effect of multiple comparison procedure many algorithms employ the following greedy strategy initial model m alternative model m m γ where γ is a component to be added to the model e g a test condition of a decision tree keep m if improvement Δ m m α

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predicting tumor cells as benign or malignant classifying credit card transactions as legitimate or fraudulent classifying secondary structures of protein as alpha helix beta sheet or random coil categorizing news stories as finance weather entertainment sports etc

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