

Course: BBA Part III

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Topic: Decision Tree and Advantages

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## Decision Tree and Advantages

A decision tree is a decision support tool that uses a tree-like graph or 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.

A decision tree is a flowchart-like structure in which each internal node represents a “test” on an attribute (e.g. whether a coin flip comes up heads or tails), each branch represents the outcome of the test, and each leaf node represents a class label (decision taken after computing all attributes). The paths from root to leaf represent classification rules.

Tree based learning algorithms are considered to be one of the best and mostly used supervised learning methods. Tree based methods empower predictive models with high accuracy, stability and ease of interpretation. Unlike linear models, they map non-linear relationships quite well

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Decision trees are commonly used in operations research, specifically in decision analysis, to help identify a strategy most likely to reach a goal, but are also a popular tool in machine learning.

Decision trees have a number of advantages as a practical, useful managerial tool.

### Comprehensive

A significant advantage of a decision tree is that it forces the consideration of all possible outcomes of a decision and traces each path to a conclusion. It creates a comprehensive analysis of the consequences along each branch and identifies decision nodes that need further analysis.

### Specific

Decision trees assign specific values to each problem, decision path and outcome. Using monetary values makes costs and benefits explicit. This approach identifies the relevant decision paths, reduces uncertainty, clears up ambiguity and clarifies the financial consequences of various courses of action.

When factual information is not available, decision trees use probabilities for conditions to keep choices in perspective with each other for easy comparisons.

### Easy to Use

Decision trees are easy to use and explain with simple math, no complex formulas. They present visually all of the decision alternatives for quick comparisons in a format that is easy to understand with only brief explanations.

They are intuitive and follow the same pattern of thinking that humans use when making decisions.

### Versatile

A multitude of business problems can be analyzed and solved by decision trees. They are useful tools for business managers, technicians, engineers, medical staff and anyone else who has to make decisions under uncertain conditions.

The algorithm of a decision tree can be integrated with other management analysis tools such as Net Present Value and Project Evaluation Review Technique (PERT).

Simple decision trees can be manually constructed or used with computer programs for more complicated diagrams.

Decision trees are a common-sense technique to find the best solutions to problems with uncertainty