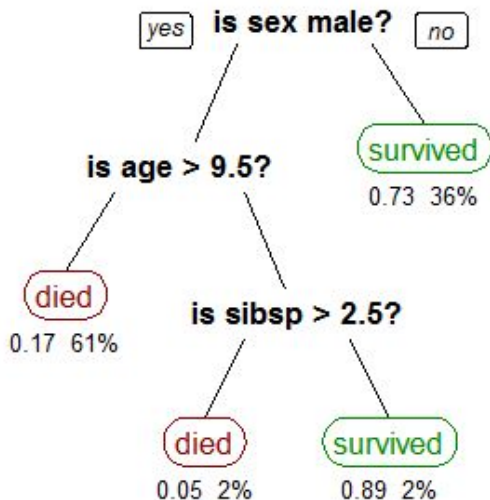


Decision Tree

A tree has many analogies in real life, and turns out that it has influenced a wide area of **machine learning**, covering both **classification and regression**. In decision analysis, a decision tree can be used to visually and explicitly represent decisions and decision making. As the name goes, it uses a tree-like model of decisions. Though a commonly used tool in data mining for deriving a strategy to reach a particular goal, its also widely used in machine learning, which will be the main focus of this article.

How can an algorithm be represented as a tree?

For this let's consider a very basic example that uses titanic data set for predicting whether a passenger will survive or not. Below model uses 3 features/attributes/columns from the data set, namely sex, age and sibsp (number of spouses or children along).



A decision tree is drawn upside down with its root at the top. In the image on the left, the bold text in black represents a condition/**internal node**, based on which the tree splits into branches/**edges**. The end of the branch that doesn't split anymore is the decision/**leaf**, in this case, whether the passenger died or survived, represented as red and green text respectively.

Although, a real dataset will have a lot more features and this will just be a branch in a much bigger tree, but you can't ignore the simplicity of this algorithm. The **feature importance is clear** and relations can be viewed easily. This methodology is more commonly known as the learning **decision tree from data** and the above tree is called the Classification **tree** as the target is to classify passengers as survived or died. **Regression trees** are represented in the same

manner, just they predict continuous values like the price of a house. In general, Decision Tree algorithms are referred to as CART or Classification and Regression Trees.