

## **Artificial Intelligence (CS 411) Assignment 2 – 02/10/18**

### **DECISION TREES**

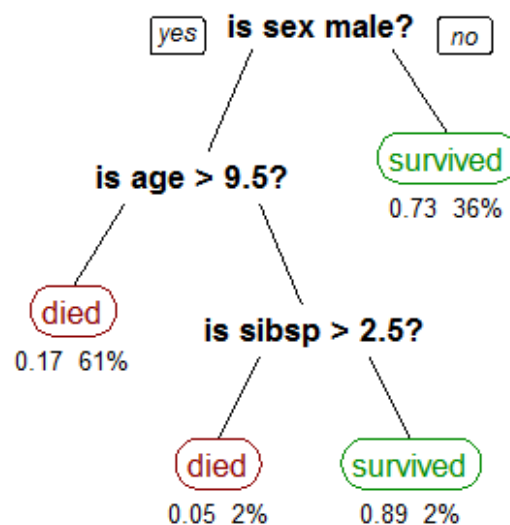
#### **TEAM**

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## INTRODUCTION

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.

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.



**Implementation details :**

We chose to use Python programming language considering the ease of implementation of the algorithm. All the tests were run on a MacBook Pro with 2.7 GHz Intel Core i5, 8 GB 1867 MHz DDR3, macOS Mojave operating system.

**RESULTS:****1. Bank Note Authentication (BNA) Dataset**

- I. Single  
Max\_depth = 5  
Scores: [96.865889212828]  
Accuracy: 96.866%
- II. K-fold  
Max\_depth = 5  
K-fold = [2,7]  
Accuracy: 94.46064139941691,  
94.74835886214443,  
92.4198250728863,  
93.06569343065694,  
92.10526315789474,  
96.42857142857143
- III. K-fold  
Max\_depth = [3,7]  
K-fold = 2  
Accuracy: 84.8396501457726,  
89.21282798833819,  
90.52478134110787,  
96.6472303206997,  
95.04373177842565

**2. Sensorless Drive Diagnosis ( SDD ) Dataset**

This dataset is very computationally heavy on personal computers, although we tried to wait for more than an hour, there were no results. Also, the method we chose to use was 'Greedy Approach', other methods can be utilized to see if they are more effective.