CS-482 Machine Learning

Tree Based Learning

Homework Questions

1. How many unique, perfect binary trees of depth 3 can be drawn if we have 5 attributes?

By depth, we mean depth of the splits, not including the nodes that only contain a label. So a tree that checks just one attribute is a depth 1 tree. By perfect binary tree, we mean every node has either 0 or 2 children, and every leaf is at the same depth. Note also that a tree with the same attributes but organized at different depths are considered unique". Do not include trees that test the same attribute along the same path in the tree.

2. Consider the following dataset for this problem. Given the five attributes on the left, we want to predict if the student got an A in the course.

Early	Finished hmk	Senior	Likes Coffee	Liked The Last Jedi	A
1	1	0	0	1	1
1	1	1	0	1	1
0	0	1	0	0	0
0	1	1	0	1	0
0	1	1	0	0	1
0	0	1	1	1	1
1	0	0	0	1	0
0	1	0	1	1	1
0	0	1	0	1	1
1	0	0	0	0	0
1	1	1	0	0	1
0	1	1	1	1	0
0	0	0	0	1	0
1	0	0	1	0	1

Create a decision tree of depth 2. Randomly choose features at each depth.