0.1 decision tree

Decision Tree is shown in Fig 1
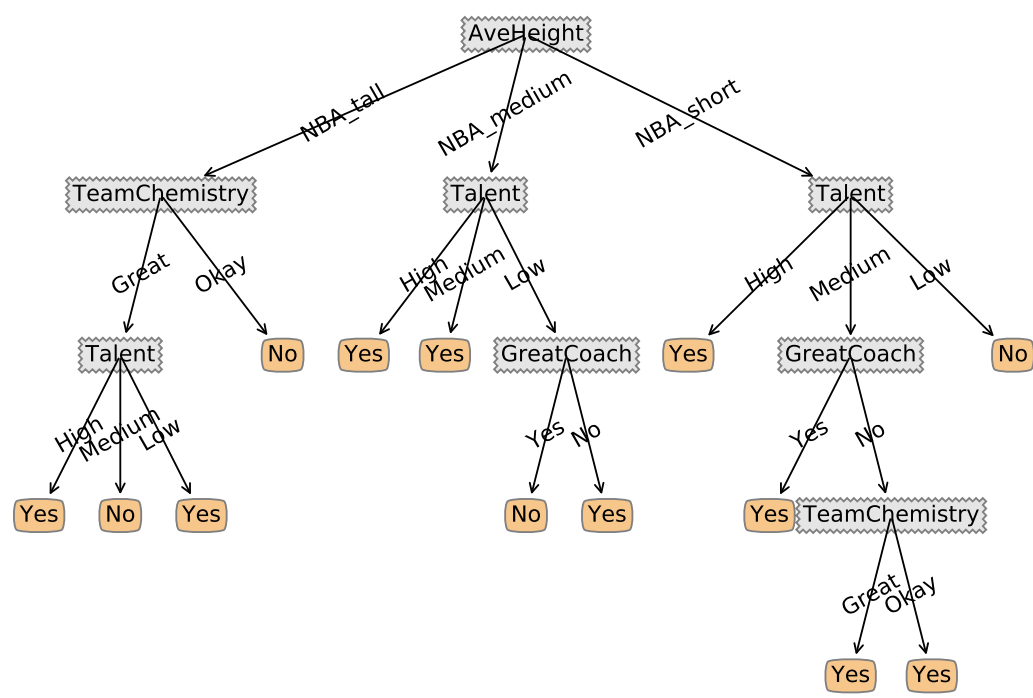

Figure 1: Decision Tree

0.2 Decision making

Below I show how decision is made (Depth first traverse)

```
========================================================
root
--------------------------------------------------------
Talent impurity
High  0.721928094887
Medium  0.970950594455
Low  0.918295834054
information Gain  0.115313880099
Total impurity  0.87338552819
```

AveHeight impurity
NBA_tall 0.970950594455
NBA_medium 0.650022421648
NBA_short 0.970950594455
information Gain 0.138096878636
Total impurity 0.850602529652

GreatCoach impurity
Yes 0.954434002925
No 1.0
information Gain 0.011482406826
Total impurity 0.977217001462

TeamChemistry impurity
Great 0.863120568567
Okay 0.991076059838
information Gain 0.0536038758816
Total impurity 0.935095532407

I choose AveHeight
==
root−>AveHeight=NBA_tall
_____

Talent impurity
High 1.0
Medium 0.0
Low 1.0
information Gain 0.170950594455
Total impurity 0.8

GreatCoach impurity
Yes 0.0
No 0.811278124459
information Gain 0.321928094887
Total impurity 0.649022499567

TeamChemistry impurity
Great 0.918295834054
Okay 0.0
information Gain 0.419973094022
Total impurity 0.550977500433

I choose TeamChemistry
==
root−>AveHeight=NBA_tall−>TeamChemistry=Great
_____

Talent impurity
High 0.0

Medium 0.0
Low 0.0
information Gain 0.918295834054
Total impurity 0.0

GreatCoach impurity
Yes 0.0
No 1.0
information Gain 0.251629167388
Total impurity 0.666666666667

I choose Talent
═══
root–>AveHeight=NBA_medium
───

Talent impurity
High 0.0
Medium 0.0
Low 1.0
information Gain 0.316689088315
Total impurity 0.333333333333

GreatCoach impurity
Yes 0.811278124459
No 0.0
information Gain 0.109170338676
Total impurity 0.540852082973

TeamChemistry impurity
Great 0.0
Okay 0.918295834054
information Gain 0.190874504621
Total impurity 0.459147917027

I choose Talent
═══
root–>AveHeight=NBA_medium–>Talent=Low
───
GreatCoach impurity
Yes 0.0
No 0.0
information Gain 1.0
Total impurity 0.0

TeamChemistry impurity
Great 0.0
Okay 0.0
information Gain 1.0
Total impurity 0.0

I choose GreatCoach
==
root−>AveHeight=NBA_short
_____

Talent impurity
Medium 0.918295834054
Low 0.0
information Gain 0.419973094022
Total impurity 0.550977500433

GreatCoach impurity
Yes 0.918295834054
No 1.0
information Gain 0.019973094022
Total impurity 0.950977500433

TeamChemistry impurity
Great 0.0
Okay 1.0
information Gain 0.170950594455
Total impurity 0.8

I choose Talent
==
root−>AveHeight=NBA_short−>Talent=Medium
_____

GreatCoach impurity
Yes 0.0
No 1.0
information Gain 0.251629167388
Total impurity 0.666666666667

TeamChemistry impurity
Okay 0.918295834054
information Gain 0.0
Total impurity 0.918295834054

I choose GreatCoach
==
root−>AveHeight=NBA_short−>Talent=Medium−>GreatCoach=No
_____

TeamChemistry impurity
Okay 1.0
information Gain 0.0
Total impurity 1.0

I choose TeamChemistry
[2 5 2 6 1 2 5 2 4 2 3 3 6]

0.3 Evaluation

These are incorrectly classified exmaples. Also error rate.

```
train.xlsx
    Talent   AveHeight GreatCoach TeamChemistry WinTitle?
15  Medium   NBA_short         No         Okay        No
error rate 0.0625
HW3 − Test data set 1.xlsx
    Talent   AveHeight GreatCoach TeamChemistry WinTitle?
1      Low   NBA_medium       Yes        Great       Yes
2      Low   NBA_short        Yes        Great       Yes
3   Medium   NBA_short        Yes         Okay        No
4   Medium    NBA_tall        Yes        Great       Yes
7      Low    NBA_tall        Yes        Great        No
8      Low   NBA_medium       Yes         Okay       Yes
10  Medium    NBA_tall        Yes         Okay       Yes
16  Medium   NBA_short         No         Okay        No
20     Low    NBA_tall         No        Great        No
error rate 0.45
HW3 − Test data set 2.xlsx
    Talent   AveHeight GreatCoach TeamChemistry WinTitle?
2      Low   NBA_short        Yes        Great       Yes
7     High   NBA_short        Yes         Okay        No
10  Medium   NBA_medium        No         Okay        No
13  Medium    NBA_tall         No        Great       Yes
15     Low   NBA_medium       Yes        Great       Yes
18     Low    NBA_tall         No        Great        No
error rate 0.3
```