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a Learning Curves

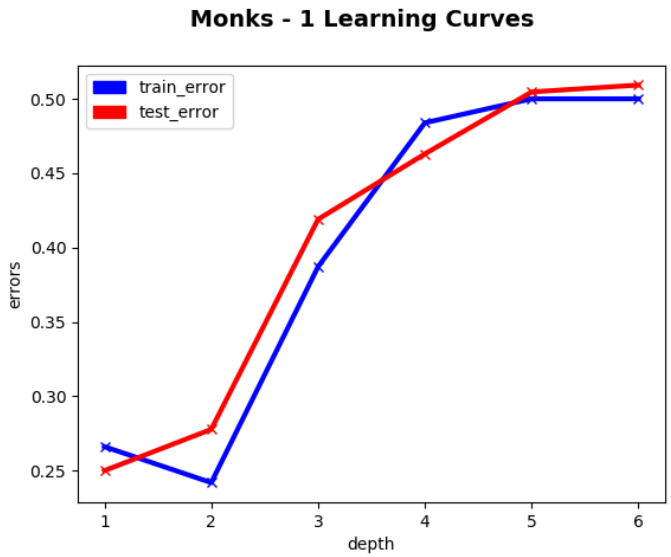

Figure 1: Learning Curve for Monk 1 problem set

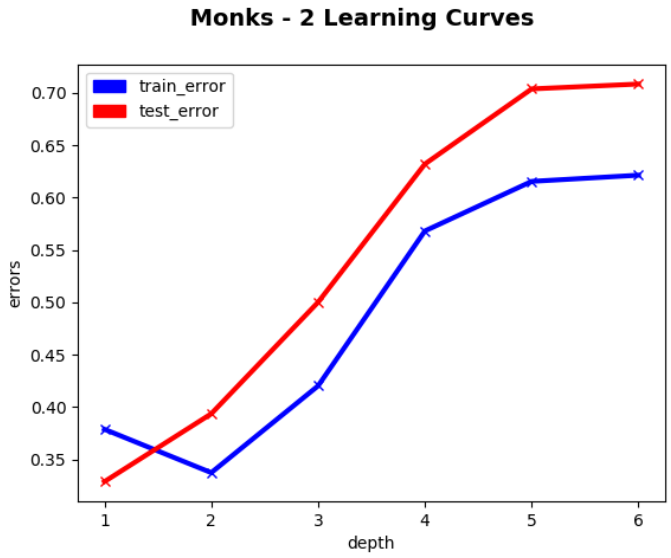

Figure 2: Learning Curve for Monk 2 problem set

Discussed with Sai Ram Chappidi

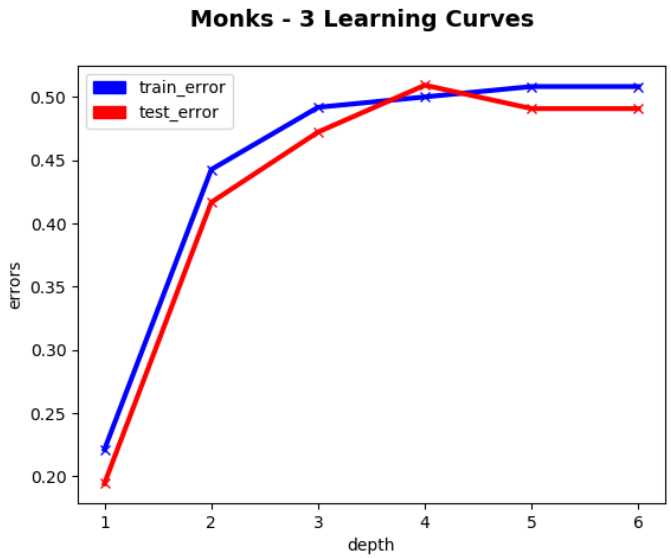

Figure 3: Learning Curve for Monk 3 problem set

b Weak Learners

b.1 depth = 2

```
TREE
+-- [SPLIT: x4 = 1]
|       +-- [LABEL = 1]
+-- [SPLIT: x4 = 2]
|       +-- [SPLIT: x3 = 1]
|       |       +-- [LABEL = 0]
|       +-- [SPLIT: x3 = 2]
|       |       +-- [LABEL = 0]
|       +-- [SPLIT: x3 = 3]
|       |       +-- [LABEL = 0]
+-- [SPLIT: x4 = 3]
|       +-- [SPLIT: x5 = 1]
|       |       +-- [LABEL = 0]
|       +-- [SPLIT: x5 = 2]
|       |       +-- [LABEL = 0]
+-- [SPLIT: x4 = 4]
|       +-- [SPLIT: x0 = 1]
|       |       +-- [LABEL = 0]
|       +-- [SPLIT: x0 = 2]
|       |       +-- [LABEL = 0]
|       +-- [SPLIT: x0 = 3]
|       |       +-- [LABEL = 1]
```

```
CONFUSION MARTIX
[   +ve  -ve
+ve [120.  96.]
-ve [ 24. 192.]]
```

b.2 depth = 1

```
TREE
+-- [SPLIT: x4 = 1]
|       +-- [LABEL = 1]
+-- [SPLIT: x4 = 2]
|       +-- [LABEL = 0]
+-- [SPLIT: x4 = 3]
|       +-- [LABEL = 0]
+-- [SPLIT: x4 = 4]
|       +-- [LABEL = 0]

CONFUSION MATRIX
[   +ve  -ve
+ve [108. 108.]
-ve [  0. 216.]]
```

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c scikit-learn

Visualized decision tree and the confusion matrix on the test set for monks - 1 using scikit-learn

```
CONFUSION MATRIX
[  +ve  -ve
+ve[192  24]
-ve[  0 216]]
```

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d Other Data Sets

Used the Iris flower dataset. https://archive.ics.uci.edu/ml/datasets/iris
This data sets consists of 3 different types of irises' (Setosa, Versicolour, and Virginica) petal and sepal length. Applying our algorithm and also using scikit-learns's default decision tree algorithm the obtained confusion matrices are:

d.1 using weak learners

```
CONFUSION MATRIX
[ se  ve  vi
se[14  0  0]
ve[ 0 12  0]
vi[ 0  1 11]]
```

d.2 scikit-learn

```
CONFUSION MATRIX
[ se  ve  vi
se[13  0  0]
ve[ 0 14  0]
vi[ 0  0 11]]
```

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