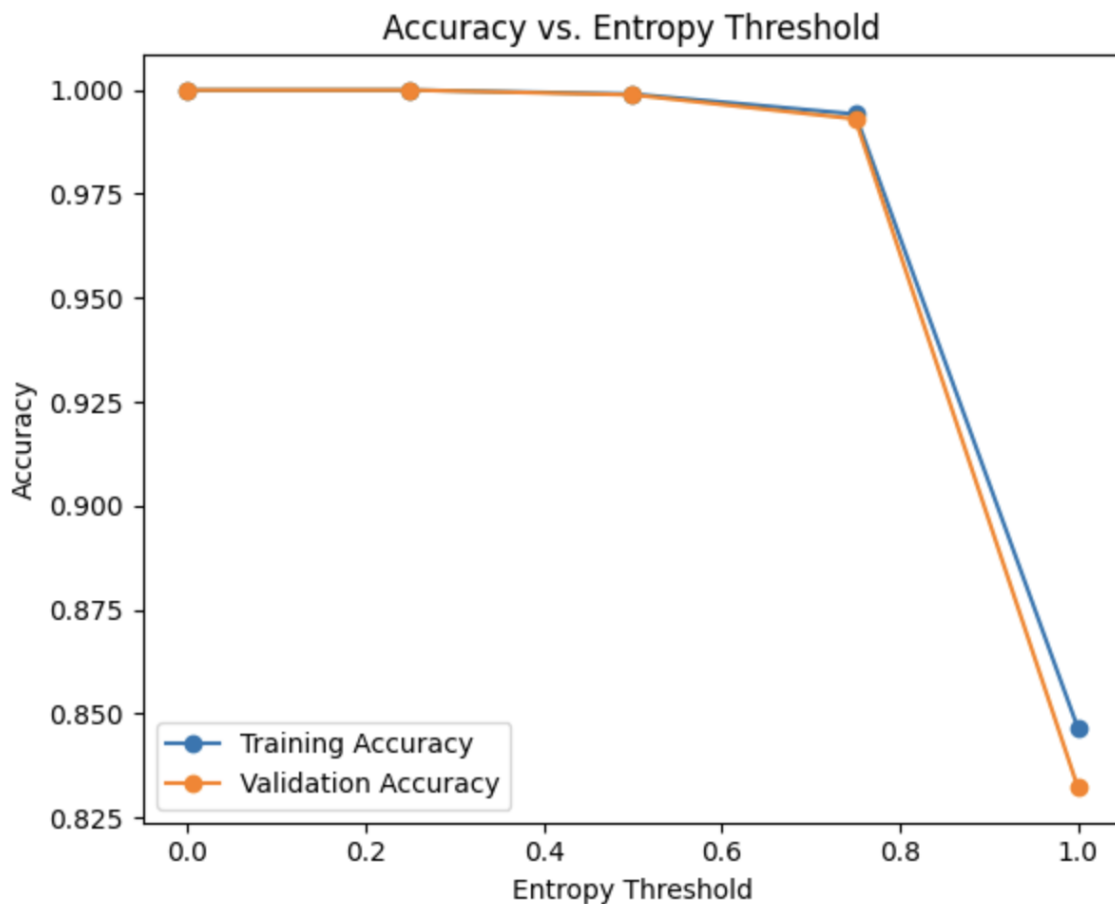# Assignment 4

MLFA LAB report

Submitted by

Gohil happy K.

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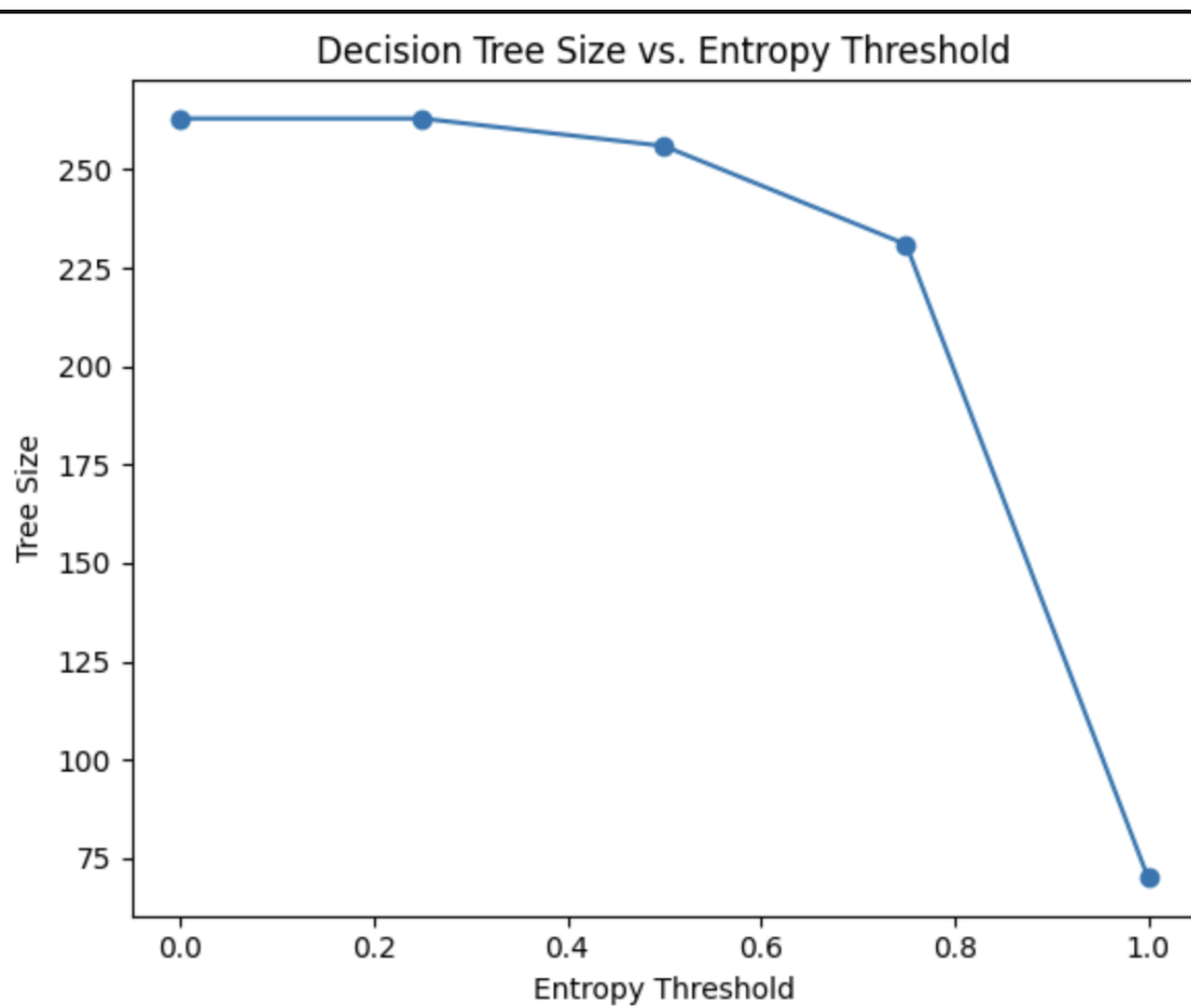
Experiment-1

(a) Bar-chart that shows percentage Accuracy vs threshold parameters (on training and validation data),

(b). Size of decision tree vs threshold parameters.

(c) Mention the optimal parameter based on the percentage accuracy (on test data)

```
✓  0.2s

Optimal Entropy Threshold: 0.75
Test Accuracy with Optimal Threshold: 0.9189814814814815
Train Accuracy with optimal Threshold: 0.9942084942084942
```
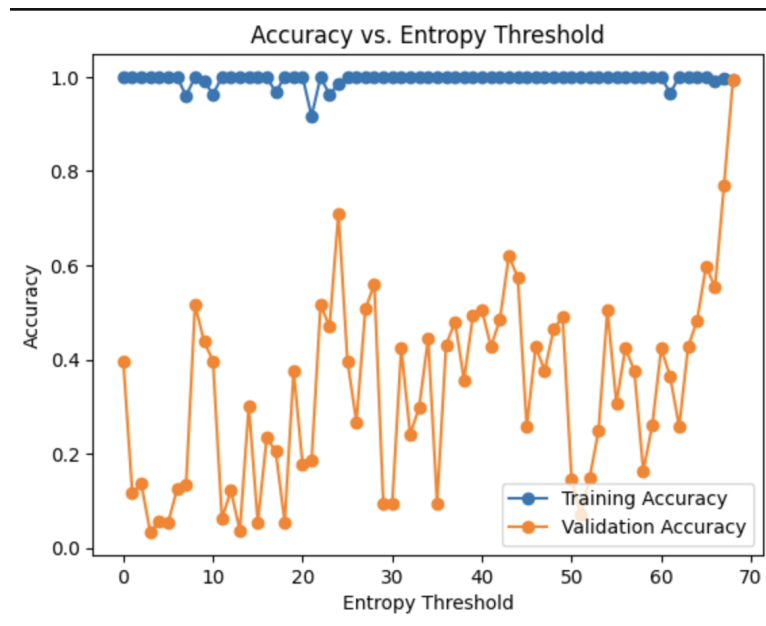
Experiment-2

1) Plot of Percentage accuracy on train and validation data for each branch generation step

2) Mention the total number of odes which correspond to the case when validation percentage starts to decrease

```
✓  0.2s

Best Validation Accuracy: 0.8901734104046243
Testing Accuracy with Early Stopping: 0.8872832369942196
```

Observation and analysis: compared to 2(a) testing accuracy is not improved rather it has decreased for the optimal hyper-parameter value 0.75

Experiment-3

```
IF AND safety=0 AND persons=0 => THEN 2
IF AND safety=0 AND persons=1 AND price_B=0 AND price_M=0 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=0 AND price_M=1 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=0 AND price_M=2 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=0 AND price_M=3 => THEN 2
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=0 AND lug_boot=0 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=0 AND lug_boot=1 AND doors=0 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=0 AND lug_boot=1 AND doors=1 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=0 AND lug_boot=1 AND doors=3 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=0 AND lug_boot=2 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=1 AND lug_boot=0 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=1 AND lug_boot=1 AND doors=1 => THEN 1
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=1 AND lug_boot=1 AND doors=2 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=1 AND lug_boot=1 AND doors=3 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=1 AND lug_boot=2 => THEN 1
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=2 AND lug_boot=0 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=2 AND lug_boot=1 => THEN 1
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=2 AND lug_boot=2 => THEN 1
IF AND safety=0 AND persons=1 AND price_B=1 AND price_M=3 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=2 AND price_M=0 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=2 AND price_M=1 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=2 AND price_M=2 => THEN 3
IF AND safety=0 AND persons=1 AND price_B=2 AND price_M=3 => THEN 0
IF AND safety=0 AND persons=1 AND price_B=3 AND price_M=0 => THEN 2
IF AND safety=0 AND persons=1 AND price_B=3 AND price_M=1 => THEN 0
...
IF AND safety=2 AND persons=2 AND price_M=3 AND price_B=2 AND doors=1 => THEN 0
IF AND safety=2 AND persons=2 AND price_M=3 AND price_B=2 AND doors=2 => THEN 2
IF AND safety=2 AND persons=2 AND price_M=3 AND price_B=2 AND doors=3 => THEN 0
IF AND safety=2 AND persons=2 AND price_M=3 AND price_B=3 => THEN 2
```

For full view of output for : txt file link