HW 5 Report

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CS 156 Intro to AI

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Results

Below is a chart of 8 trial runs of a reporting program I used to determine success rates.

Rounds: The number of times new training sets were created and new test sets were created.
TSet Size: The size of the training set
QSet Size: The size of the set of graphs to test
Avg Successes: The average of the successes per round
Avg Failures: The average of the failures per round
Success Rate: The overall success rate of all the rounds

Trial #	Rounds	TSet Size	QSet Size	Avg Successes	Avg Failures	Success Rate
1	10	1	1	1	0	100%
2	10	10	10	7.9	2.1	79%
3	10	100	10	7.3	2.7	73%
4	10	10	100	7.0	3.0	70%
5	10	100	100	7.3	2.7	73%
6	10	1000	10	7.8	2.2	78%
7	10	10000	100	7.1	2.9	71%
8	10	10000	10	7.7	2.3	77%
						Weighted Avg: 72%

An example of the report that I used for determining the above entries can be seen on the last page of this document.

Attributes Used

I used a set of attributes that were determined using matrix classification.

Lower Triangular Ratio: The ratio of occupied spaces in the lower triangle of the matrix
Upper Triangular Ratio: The ratio of occupied spaces in the upper triangle of the matrix
Diagonal Ratio: The ratio of spaces occupying the diagonal of the matrix
Change Ratio: The rate of change from one element to another (horizontally; interestingly, the vertical change was the same).

Bucketizing

I bucketized all attribute values into 5 buckets.

Decision Tree trained with 10 Examples:

```
root:lower_tri_ratio
branch:
        val:0.900000
        subtree:
                root:horizontal_change
                branch:
                        val:0.600000
                        subtree:
                                root:upper_tri_ratio
                                branch:
                                        val:0.600000
                                        leaf:True
                                branch:
                                        val:0.400000
                                        leaf:False
branch:
        val:0.600000
        subtree:
                root:horizontal_change
                branch:
                        val:0.900000
                        leaf:True
                branch:
                        val:0.600000
                        subtree:
                                root:upper_tri_ratio
                                branch:
                                        val:0.600000
                                        subtree:
                                                root:diag_ratio
                                                branch:
                                                        val:0.000000
                                                        leaf:False
                                                branch:
                                                        val:0.200000
                                                        leaf:False
                branch:
                        val:0.400000
                        leaf:False
```

Example Report from my test program generated after each round:

```
C:\Users\jaronhalt\school\cs156\Hw5>cat report1418248403.644000.txt
Time: 2014-12-10 13:53:23
Training Set File: rt_training_set.txt
Query Set File:rt_query_set.txt

Testing 10 examples using attributes: ['horizontal_change',
'lower_tri_ratio', 'upper_tri_ratio', 'diag_ratio']
==========================
Query #1 Map:
O O O O O
O O O O O
O X O O O
O O O X X
O O O O O
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.900000
lower_tri_ratio:0.600000

Path:
horizontal_change
Success!
==========================
Query #2 Map:
O X O O X
X O O O O
O O O O O
O O X O O
O O X O O
DISCONNECTED
DISCONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.600000

Path:
horizontal_change
Failure!
==========================
Query #3 Map:
X X O O O
X X O O O
O O O O O
O O O X O
```

```
X O X X O
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.600000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.400000

Path:
horizontal_change
Success!
==========================
Query #4 Map:
O X O O O
X O O O O
O O O O O
X O O O O
O X O O O
DISCONNECTED
DISCONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.600000

Path:
horizontal_change
Failure!
==========================
Query #5 Map:
X X X O O
O O X O X
O O X O O
O O O O O
X X O X O
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.600000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.600000

Path:
horizontal_change
Success!
==========================
Query #6 Map:
```

```
O O O O O
O X O O X
O X O O O
O O O O O
O O O O O
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.900000
lower_tri_ratio:0.600000

Path:
horizontal_change
Success!
==========================
Query #7 Map:
O O O O O
X X O O O
O X O O X
O O O O O
O O O O O
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.900000
lower_tri_ratio:0.600000

Path:
horizontal_change
Success!
==========================
Query #8 Map:
O O O O O
O X X O O
X X O O O
X O O O X
O O O O X
CONNECTED
CONNECTED
upper_tri_ratio:0.600000
count_ratio:0.900000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.600000

Path:
```

```
horizontal_change
Success!
==========================
Query #9 Map:
O O O O O
O O X X O
O X O X O
X O X O X
O O X X O
DISCONNECTED
DISCONNECTED
upper_tri_ratio:0.600000
count_ratio:0.600000
diag_ratio:0.400000
horizontal_change:0.400000
lower_tri_ratio:0.600000

Path:
horizontal_change
Success!
==========================
Query #10 Map:
O X X X O
O O X X O
O O X O O
O O O X O
O O X O O
DISCONNECTED
DISCONNECTED
upper_tri_ratio:0.400000
count_ratio:0.600000
diag_ratio:0.200000
horizontal_change:0.600000
lower_tri_ratio:0.900000

Path:
horizontal_change
Success!


Successes: 8
Failures: 2
Success rate: 0.800000
```