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']

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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