

# **Computational Intelligence & Adversarial Machine Learning:**

Assignment #4: Probing via an EC

# Assignment #4

(Due 11/15/2018)

## Assignment #4

- Given your best machine learning technique developed in Homework #3 and your Evolutionary Computations (ECs):

- A Steady-State GA
- An Elitist GA
- An Estimation of Distribution Algorithm

Develop a real-coded variant of these in an effort to probe your machine learning technique. Your group will need to plot the on-line performance of your three EC Probers. Your objective is to evolve a population of feature vectors such that you can probe your machine learning to determine what type of feature vectors will cause:

- a. exactly one author to will be selected as being associated with that feature vector
  - b. exactly two authors to be associated with a feature vector
  - c. exactly three authors to be associated with a particular feature vector
- The evaluation function should be one that allows you to do a, b, c (we'll go over this in class).

# Assignment #3

(Due 11/15/2018)

## Assignment #3 (Grading)

- [60pts] For the on-line plots of the three Evolutionary Probers on the three probing problems.
- [10pts] What did you learn from Dr. King's Lecture
- [30pts] Develop the paper.

# Assignment #4

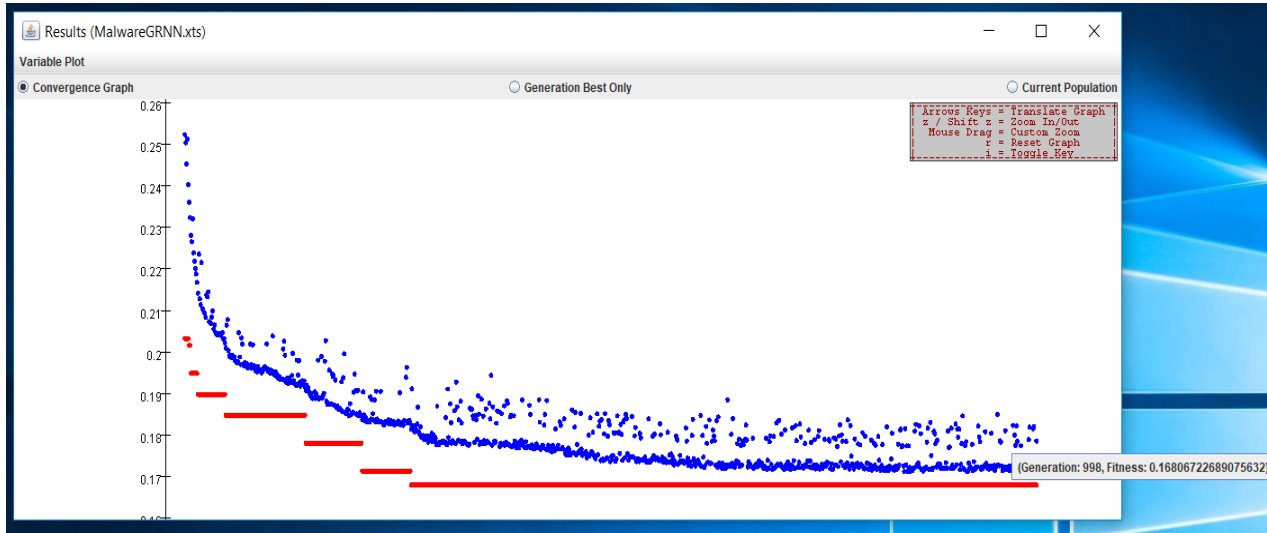
(Due 11/15/2018)

## Assignment #3 (cont.)

- Write a paper using IEEE or AAAI format documenting your work:
  - I. Title
  - II. Authors
  - III. Abstract
  - IV. Introduction
  - V. Methodology
  - VI. Experiment
  - VII. Results
  - VIII. Breakdown of the Work
  - IX. References

# Assignment #4

## (Some Example Results)



Genetic & Evolutionary Computation Selector

Advanced Settings

Steady-state GA with BLX

Parameters:

- Population Size: 20
- Crossover Usage Rate: 1.0
- BLX-alpha: 0.0
- Mutation Usage Rate: 1.0
- Mutation Rate: 1.0
- Mutation Range: 0.2
- Total Evaluations: 1000
- Number of Runs: 1
- Number of Threads: 1
- Log File Name: nmt
- Log Interval: 1
- Memespace IP: localhost
- Memespace Port: 13100
- Migration Rate: 0.0
- Use One-Fifth Rule?: no

Description

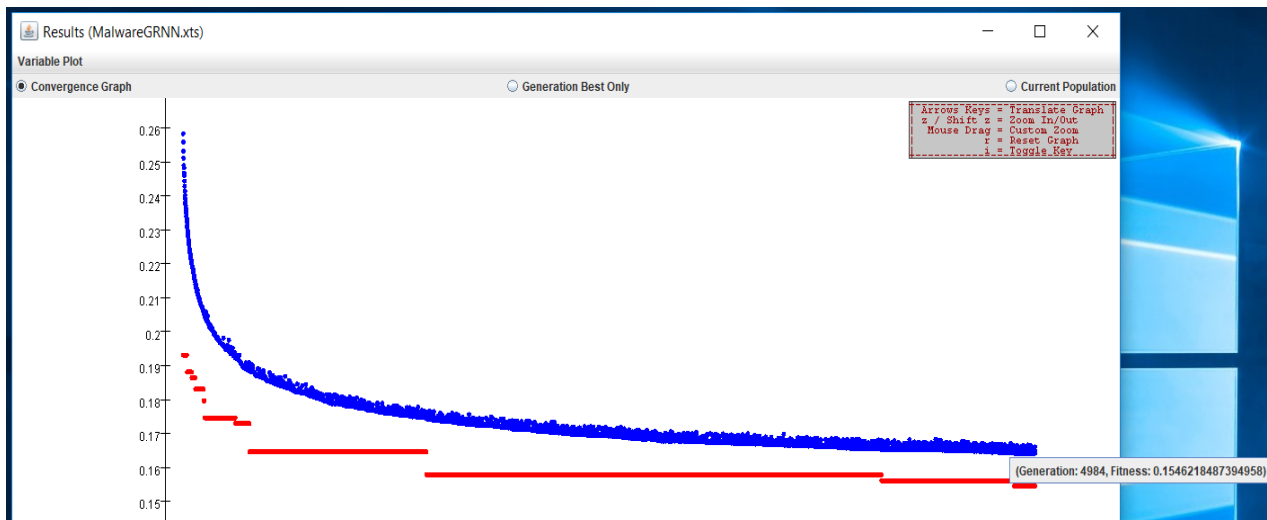
**Population Size:**

The number of individuals (candidate solutions) that exist in the population at any one time.

20

Set Value

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Genetic & Evolutionary Computation Selector

Advanced Settings

Steady-state GA with BLX

Parameters:

- Population Size: 100
- Crossover Usage Rate: 1.0
- BLX-alpha: 0.0
- Mutation Usage Rate: 1.0
- Mutation Rate: 1.0
- Mutation Range: 0.2
- Total Evaluations: 5000
- Number of Runs: 1
- Number of Threads: 1
- Log File Name: nmt
- Log Interval: 100
- Memespace IP: localhost
- Memespace Port: 13100
- Migration Rate: 0.0
- Use One-Fifth Rule?: no

Description

**Population Size:**

The number of individuals (candidate solutions) that exist in the population at any one time.

100

Set Value

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**Have a Great Day!!!**