**WIX3001 SOFT COMPUTING**

**ASSIGNMENT 1: MATLAB PROGRAMMING**

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Q1. The dataset

1. clean\_seed\_dataset.csv

[UCI Machine Learning Repository: seeds Data Set](https://archive.ics.uci.edu/ml/datasets/seeds)

* Samples: 210
* Features: 7
* Classes: 3

1. clean\_raisin\_dataset.csv

[UCI Machine Learning Repository: Raisin Dataset Data Set](https://archive.ics.uci.edu/ml/datasets/Raisin+Dataset)

* Samples: 900
* Features: 6
* Classes: 2

1. Clean\_yeast\_data.csv

[UCI Machine Learning Repository: Yeast Data Set](https://archive.ics.uci.edu/ml/datasets/Yeast)

* Samples: 1484
* Features: 8
* Classes: 10

**EXERCISE 2**

**Seed Dataset**

Input layer units: 7

Hidden layer: 2

Hidden layer units: [8, 6]

Output layer units: 3

Population size: 100

Generations Max: 1000

Selection rate: 0.5

Mutation rate: 0.5

Convergence rate: 10



Average Fitness Score: 0.50257

Best Fitness Score: 0.79048

**Raisin Dataset**

Input layer units: 6

Hidden layer: 2

Hidden layer units: [8, 6]

Output layer units: 2

Population size: 100

Generations Max: 1000

Selection rate: 0.5

Mutation rate: 0.5

Convergence rate: 10

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Average Fitness Score: 0.62404

Best Fitness Score: 0.84556

**Yeast Dataset**

Input layer units: 8

Hidden layer: 2

Hidden layer units: [8, 6]

Output layer units: 10

Population size: 100

Generations Max: 1000

Selection rate: 0.5

Mutation rate: 0.5

Convergence rate: 10

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Average Fitness Score: 0. 30249

Best Fitness Score: 0. 34434

**EXERCISE 3 & 4**

Population size: 50

Generations Max: 250

Selection rate: 0.5

Mutation rate: 0.5

Convergence rate: 10

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Generation = 1 | | Generation = Last Generation | | | |
|  | Seed | Avg  Fitness | Max  Fitness | Avg  Fitness | Max  Fitness | Number of Layers  \*Based on top three | Number of Units for Each Layer  \*Based on top three |
| Seed | 17 | 0.32362 | 0.61429 | 0.67295 | 0.94286 | 1  Mean(1,2,3) = 2  Std(1,2,3) = 1 | [13]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 13 |  |  |  |  |  | |  | 7 | 10 |  |  |  |  | |  | 11 | 7 | 5 |  |  |  | |  |  |  |  |  |  |  | | Avg | 10.3333 | 8.5000 | 5.0000 |  |  |  | | StDev | 3.0551 | 2.1213 |  |  |  |  | |

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|  | 20 | 0.32933 | 0.60000 | 0.70886 | 0.83333 | 1  Mean(1,2,3) = 2  Std(1,2,3) = 1 | [10]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 10 |  |  |  |  |  | |  | 18 | 9 |  |  |  |  | |  | 9 | 13 | 8 |  |  |  | |  |  |  |  |  |  |  | | Avg | 12.3333 | 11.0000 | 8.0000 |  |  |  | | StDev | 4.9329 | 2.8284 |  |  |  |  | |
| 18 | 0.34276 | 0.64762 | 0.85305 | 0.90952 | 1  Mean(1,2,4) = 2.3333  Std(1,2,4) = 1.5275 | [13]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 13 |  |  |  |  |  | |  | 7 | 14 |  |  |  |  | |  | 9 | 13 | 14 | 4 |  |  | |  |  |  |  |  |  |  | | Avg | 9.6667 | 13.5000 | 14.0000 | 4.0000 |  |  | | StDev | 3.0551 | 0.7071 |  |  |  |  | |

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| Raisin | 19 | 0.51011 | 0.76667 | 0.86349 | 0.87444 | 1  Mean(1,2,5) = 2.6667  Std(1,2,5) = 2.0817 | [20]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 20 |  |  |  |  |  | |  | 9 | 7 |  |  |  |  | |  | 10 | 10 | 10 | 14 | 11 |  | |  |  |  |  |  |  |  | | Avg | 13.0000 | 8.5000 | 10.0000 | 14.0000 | 11.0000 |  | | StDev | 6.0828 | 2.1213 |  |  |  |  | |
|  | 09 | 0.48633 | 0.82222 | 0.75829 | 0.87222 | 2  Mean(1,2,4) = 2.6667  Std(1,2,4) = 1.5275 | [10, 11]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 19 |  |  |  |  |  | |  | 10 | 11 |  |  |  |  | |  | 16 | 11 | 15 | 9 |  |  | |  |  |  |  |  |  |  | | Avg | 15.0000 | 11.0000 | 15.0000 | 9.0000 |  |  | | StDev | 4.5826 | 0.0000 |  |  |  |  | |

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|  | 16 | 0.49069 | 0.60222 | 0.86944 | 0.87444 | 1  Mean(1,2,4) = 2.6667  Std(1,2,4) = 1.5275 | [15]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 15 |  |  |  |  |  | |  | 12 | 16 |  |  |  |  | |  | 19 | 9 | 17 | 12 |  |  | |  |  |  |  |  |  |  | | Avg | 15.3333 | 12.5000 | 17.0000 | 12.0000 |  |  | | StDev | 3.5119 | 4.9497 |  |  |  |  | |
| Yeast | 02 | 0.09535 | 0.31334 | 0.37469 | 0.37803 | 1  Mean(1,5,6) = 4.0000  Std(1,5,6) = 2.6458 | [18]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 18 |  |  |  |  |  | |  | 11 | 9 | 10 | 6 | 8 |  | |  | 7 | 5 | 12 | 13 | 10 | 12 | |  |  |  |  |  |  |  | | Avg | 12.0000 | 7.0000 | 11.0000 | 9.5000 | 9.0000 | 12.0000 | | StDev | 5.5678 | 2.8284 | 1.4142 | 4.9497 | 1.4142 |  | |

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|  | 06 | 0.11678 | 0.36253 | 0.31322 | 0.36253 | 4  Mean(1,2,4) = 2.6667  Std(1,2,4) = 1.5275 | [14, 10, 11, 9]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 13 |  |  |  |  |  | |  | 11 | 9 |  |  |  |  | |  | 14 | 10 | 11 | 9 |  |  | |  |  |  |  |  |  |  | | Avg | 12.6667 | 9.5000 | 11.0000 | 9.0000 |  |  | | StDev | 1.5275 | 0.7071 |  |  |  |  | |
|  | 69 | 0.087776 | 0.31199 | 0.38637 | 0.38949 | 1  Mean(1,2,3) = 2.0000  Std(1,2,3) = 1.0000 | [4]   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 4 |  |  |  |  |  | |  | 11 | 18 |  |  |  |  | |  | 12 | 10 | 8 |  |  |  | |  |  |  |  |  |  |  | | Avg | 9.0000 | 14.0000 | 8.0000 |  |  |  | | StDev | 4.3589 | 5.6569 |  |  |  |  | |