Assignment 2

Self-Organizing Maps

Filename = L30fft16.out

Number of good motors in the file = 34

Number of bad motors in the file = 19

Combination: 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 0.9 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft16 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 28 | 18 |  |  |  |  |  |  |
| 2 | 32 | 17 |  |  |  |  |  |  |
| 3 | 31 | 18 |  |  |  |  |  |  |
| 4 | 30 | 18 |  |  |  |  |  |  |
| 5 | 31 | 18 |  |  |  |  |  |  |
| 6 | 32 | 18 |  |  |  |  |  |  |
| 7 | 31 | 18 |  |  |  |  |  |  |
| 8 | 30 | 18 |  |  |  |  |  |  |
| 9 | 28 | 18 |  |  |  |  |  |  |
| 10 | 30 | 19 |  |  |  |  |  |  |
| averages | 30.3 /34 = 89% | 18/19 = 94% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 3 |  |  |  |  |  |  |
| 2 | 4 | 3 |  |  |  |  |  |  |
| 3 | 4 | 1 |  |  |  |  |  |  |
| 4 | 5 | 2 |  |  |  |  |  |  |
| 5 | 4 | 2 |  |  |  |  |  |  |

Combination: 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 3.4 | Learning Rate decay = 133.33 | T = 800 | Any other parameters | Data file L30fft16 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 32 | 19 |  |  |  |  |  |  |
| 2 | 31 | 18 |  |  |  |  |  |  |
| 3 | 31 | 18 |  |  |  |  |  |  |
| 4 | 33 | 19 |  |  |  |  |  |  |
| 5 | 33 | 18 |  |  |  |  |  |  |
| 6 | 31 | 18 |  |  |  |  |  |  |
| 7 | 31 | 19 |  |  |  |  |  |  |
| 8 | 31 | 19 |  |  |  |  |  |  |
| 9 | 32 | 19 |  |  |  |  |  |  |
| 10 | 31 | 19 |  |  |  |  |  |  |
| averages | 31/34 = 91% | 18/19= 98% |  |  |  |  |  |  |
| Method | ======== | ======= | Hold out | ===== | ======== | ======= | ===== | === |
| 1 | 4 | 2 |  |  |  |  |  |  |
| 2 | 6 | 1 |  |  |  |  |  |  |
| 3 | 4 | 1 |  |  |  |  |  |  |
| 4 | 3 | 2 |  |  |  |  |  |  |
| 5 | 6 | 0 |  |  |  |  |  |  |

Combination: 3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mexican Hat Curve | Gaussian decay rate = 133.33 | Learning Rate = 3.4 | Learning Rate decay = 133.33 | T = 55 | Any other parameters | Data file L30fft16 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 3 | 1 |  |  |  |  |  |  |
| 2 | 3 | 0 |  |  |  |  |  |  |
| 3 | 2 | 1 |  |  |  |  |  |  |
| 4 | 5 | 2 |  |  |  |  |  |  |
| 5 | 4 | 2 |  |  |  |  |  |  |
| 6 | 4 | 2 |  |  |  |  |  |  |
| 7 | 2 | 0 |  |  |  |  |  |  |
| 8 | 4 | 0 |  |  |  |  |  |  |
| 9 | 1 | 2 |  |  |  |  |  |  |
| 10 | 3 | 1 |  |  |  |  |  |  |
| averages | 3.1/34 = 0.1% | 1.1/19 = 0.05% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ===== | ======== | ======= | ===== | === |
| 1 | 2 | 1 |  |  |  |  |  |  |
| 2 | 1 | 0 |  |  |  |  |  |  |
| 3 | 1 | 0 |  |  |  |  |  |  |

Filename = L30fft25.out

Number of good motors in the file = 34

Number of bad motors in the file = 19

Combination: 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 1.7 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft25 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 31 | 18 |  |  |  |  |  |  |
| 2 | 32 | 17 |  |  |  |  |  |  |
| 3 | 31 | 18 |  |  |  |  |  |  |
| 4 | 33 | 16 |  |  |  |  |  |  |
| 5 | 31 | 18 |  |  |  |  |  |  |
| 6 | 32 | 17 |  |  |  |  |  |  |
| 7 | 33 | 16 |  |  |  |  |  |  |
| 8 | 32 | 17 |  |  |  |  |  |  |
| 9 | 31 | 17 |  |  |  |  |  |  |
| 10 | 30 | 19 |  |  |  |  |  |  |
| averages | 31.6/34 = 93% | 17.3/19=91% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 1 |  |  |  |  |  |  |
| 2 | 4 | 0 |  |  |  |  |  |  |
| 3 | 3 | 1 |  |  |  |  |  |  |
| 4 | 4 | 1 |  |  |  |  |  |  |
| 5 | 4 | 2 |  |  |  |  |  |  |

Combination: 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 2.5 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft25 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 31 | 18 |  |  |  |  |  |  |
| 2 | 33 | 17 |  |  |  |  |  |  |
| 3 | 31 | 19 |  |  |  |  |  |  |
| 4 | 33 | 17 |  |  |  |  |  |  |
| 5 | 31 | 19 |  |  |  |  |  |  |
| 6 | 31 | 16 |  |  |  |  |  |  |
| 7 | 31 | 19 |  |  |  |  |  |  |
| 8 | 31 | 19 |  |  |  |  |  |  |
| 9 | 31 | 19 |  |  |  |  |  |  |
| 10 | 31 | 19 |  |  |  |  |  |  |
| averages | 31.4/34 = 92% | 18.2/19=95% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 2 |  |  |  |  |  |  |
| 2 | 4 | 1 |  |  |  |  |  |  |
| 3 | 4 | 2 |  |  |  |  |  |  |
| 4 | 6 | 0 |  |  |  |  |  |  |
| 5 | 5 | 1 |  |  |  |  |  |  |

Combination: 3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mexican Hat Curve | Gaussian decay rate = 133.33 | Learning Rate = 3.5 | Learning Rate decay = 133.33 | T = 55 | Any other parameters | Data file L30fft25 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 2 | 1 |  |  |  |  |  |  |
| 2 | 1 | 1 |  |  |  |  |  |  |
| 3 | 4 | 1 |  |  |  |  |  |  |
| 4 | 2 | 1 |  |  |  |  |  |  |
| 5 | 2 | 2 |  |  |  |  |  |  |
| 6 | 1 | 2 |  |  |  |  |  |  |
| 7 | 3 | 2 |  |  |  |  |  |  |
| 8 | 1 | 2 |  |  |  |  |  |  |
| 9 | 3 | 2 |  |  |  |  |  |  |
| 10 | 0 | 4 |  |  |  |  |  |  |
| averages | 2/34=0.06% | 2/19=0.1% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 0 | 1 |  |  |  |  |  |  |
| 2 | 4 | 0 |  |  |  |  |  |  |
| 3 | 2 | 0 |  |  |  |  |  |  |

Filename = L30fft\_32.out

Number of good motors in the file = 34

Number of bad motors in the file = 19

Combination: 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 1.8 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft\_32 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 32 | 14 |  |  |  |  |  |  |
| 2 | 32 | 14 |  |  |  |  |  |  |
| 3 | 32 | 14 |  |  |  |  |  |  |
| 4 | 33 | 14 |  |  |  |  |  |  |
| 5 | 31 | 16 |  |  |  |  |  |  |
| 6 | 29 | 19 |  |  |  |  |  |  |
| 7 | 32 | 15 |  |  |  |  |  |  |
| 8 | 31 | 16 |  |  |  |  |  |  |
| 9 | 31 | 16 |  |  |  |  |  |  |
| 10 | 29 | 19 |  |  |  |  |  |  |
| averages | 31.2/34 = 91% | 15.2/19=82% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 5 | 2 |  |  |  |  |  |  |
| 2 | 5 | 2 |  |  |  |  |  |  |
| 3 | 5 | 0 |  |  |  |  |  |  |
| 4 | 6 | 0 |  |  |  |  |  |  |
| 5 | 1 | 5 |  |  |  |  |  |  |

Combination: 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 3.6 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft\_32 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 31 | 16 |  |  |  |  |  |  |
| 2 | 31 | 16 |  |  |  |  |  |  |
| 3 | 33 | 14 |  |  |  |  |  |  |
| 4 | 32 | 15 |  |  |  |  |  |  |
| 5 | 28 | 19 |  |  |  |  |  |  |
| 6 | 31 | 18 |  |  |  |  |  |  |
| 7 | 30 | 17 |  |  |  |  |  |  |
| 8 | 31 | 18 |  |  |  |  |  |  |
| 9 | 30 | 18 |  |  |  |  |  |  |
| 10 | 32 | 15 |  |  |  |  |  |  |
| averages | 30.9/34 = 90% | 16.6/19=87% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 2 | 5 |  |  |  |  |  |  |
| 2 | 5 | 1 |  |  |  |  |  |  |
| 3 | 3 | 2 |  |  |  |  |  |  |
| 4 | 5 | 1 |  |  |  |  |  |  |
| 5 | 5 | 2 |  |  |  |  |  |  |

Combination: 3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mexican  Hat Curve | Gaussian decay rate = 133.33 | Learning Rate = 4.5 | Learning Rate decay = 133.33 | T = 55 | Any other parameters | Data file L30fft\_32 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 33 | 9 |  |  |  |  |  |  |
| 2 | 33 | 0 |  |  |  |  |  |  |
| 3 | 33 | 5 |  |  |  |  |  |  |
| 4 | 18 | 16 |  |  |  |  |  |  |
| 5 | 33 | 6 |  |  |  |  |  |  |
| 6 | 33 | 0 |  |  |  |  |  |  |
| 7 | 33 | 0 |  |  |  |  |  |  |
| 8 | 32 | 11 |  |  |  |  |  |  |
| 9 | 32 | 1 |  |  |  |  |  |  |
| 10 | 14 | 16 |  |  |  |  |  |  |
| averages | 29.9/34 = 86% | 6.4/19=33% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 0 |  |  |  |  |  |  |
| 2 | 3 | 0 |  |  |  |  |  |  |
| 3 | 2 | 1 |  |  |  |  |  |  |
| 4 | 5 | 0 |  |  |  |  |  |  |
| 5 | 1 | 1 |  |  |  |  |  |  |

Filename = L30fft\_64.out

Number of good motors in the file = 34

Number of bad motors in the file = 19

Combination: 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 1.2 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft\_64 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 30 | 17 |  |  |  |  |  |  |
| 2 | 33 | 14 |  |  |  |  |  |  |
| 3 | 29 | 18 |  |  |  |  |  |  |
| 4 | 31 | 16 |  |  |  |  |  |  |
| 5 | 31 | 16 |  |  |  |  |  |  |
| 6 | 33 | 14 |  |  |  |  |  |  |
| 7 | 31 | 16 |  |  |  |  |  |  |
| 8 | 31 | 16 |  |  |  |  |  |  |
| 9 | 32 | 15 |  |  |  |  |  |  |
| 10 | 32 | 15 |  |  |  |  |  |  |
| averages | 31.3/34 = 92% | 15.7/19=82% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 3 |  |  |  |  |  |  |
| 2 | 4 | 1 |  |  |  |  |  |  |
| 3 | 4 | 0 |  |  |  |  |  |  |
| 4 | 1 | 3 |  |  |  |  |  |  |
| 5 | 1 | 2 |  |  |  |  |  |  |

Combination: 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gaussian Curve | Gaussian decay rate = 133.33 | Learning Rate = 2.1 | Learning Rate decay = 133.33 | T = 1000 | Any other parameters | Data file L30fft\_64 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 33 | 14 |  | 346 |  |  |  |  |
| 2 | 30 | 17 |  | 220 |  |  |  |  |
| 3 | 32 | 15 |  | 200 |  |  |  |  |
| 4 | 30 | 17 |  | 276 |  |  |  |  |
| 5 | 31 | 16 |  | 233 |  |  |  |  |
| 6 | 30 | 17 |  | 198 |  |  |  |  |
| 7 | 32 | 15 |  | 174 |  |  |  |  |
| 8 | 31 | 16 |  | 171 |  |  |  |  |
| 9 | 32 | 15 |  | 179 |  |  |  |  |
| 10 | 28 | 19 |  | 218 |  |  |  |  |
| averages | 30.9/34 = 90% | 16.1/19=84% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 4 | 1 |  |  |  |  |  |  |
| 2 | 5 | 1 |  |  |  |  |  |  |
| 3 | 5 | 1 |  |  |  |  |  |  |
| 4 | 4 | 3 |  |  |  |  |  |  |
| 5 | 4 | 1 |  |  |  |  |  |  |

Combination: 3

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mexican Hat Curve | Gaussian decay rate = 133.33 | Learning Rate = 4.0 | Learning Rate decay = 133.33 | T = 55 | Any other parameters | Data file L30fft\_64 |  |  |
| Run # | Correctly identified as Good | Correctly identified as Bad |  |  |  |  |  |  |
| 1 | 33 | 0 |  |  |  |  |  |  |
| 2 | 31 | 11 |  |  |  |  |  |  |
| 3 | 19 | 10 |  |  |  |  |  |  |
| 4 | 33 | 0 |  |  |  |  |  |  |
| 5 | 33 | 2 |  |  |  |  |  |  |
| 6 | 32 | 6 |  |  |  |  |  |  |
| 7 | 23 | 14 |  |  |  |  |  |  |
| 8 | 32 | 7 |  |  |  |  |  |  |
| 9 | 16 | 16 |  |  |  |  |  |  |
| 10 | 32 | 3 |  |  |  |  |  |  |
| averages | 28.4/34 = 83% | 6.9/19=36% |  |  |  |  |  |  |
| Method | ========= | ======= | Hold-out | ==== | ====== | ======= | ==== | ==== |
| 1 | 6 | 0 |  |  |  |  |  |  |
| 2 | 2 | 3 |  |  |  |  |  |  |
| 3 | 0 | 2 |  |  |  |  |  |  |
| 4 | 3 | 2 |  |  |  |  |  |  |
| 5 | 4 | 0 |  |  |  |  |  |  |