|  |  |  |  |
| --- | --- | --- | --- |
| **Systemy inteligentne 2** | | | |
| **Temat: Projekt neuronowego klasyfikatora dla danych liniowo separowalnych** | | | |
| **Numer komputera: 3** | | **Numer projektu: 1** | |
| **Data: 30.10.2017 r.** | **Autor: Bartłomiej Osak** | | **Grupa: 3ID13B** |

1. **Cel projektu.**

Celem projektu było przygotowanie unikalnego zestawu odpowiednich danych uczących, testowych, weryfikujących oraz przeprowadzenie eksperymentów mających na celu uzyskanie najlepszego systemu.

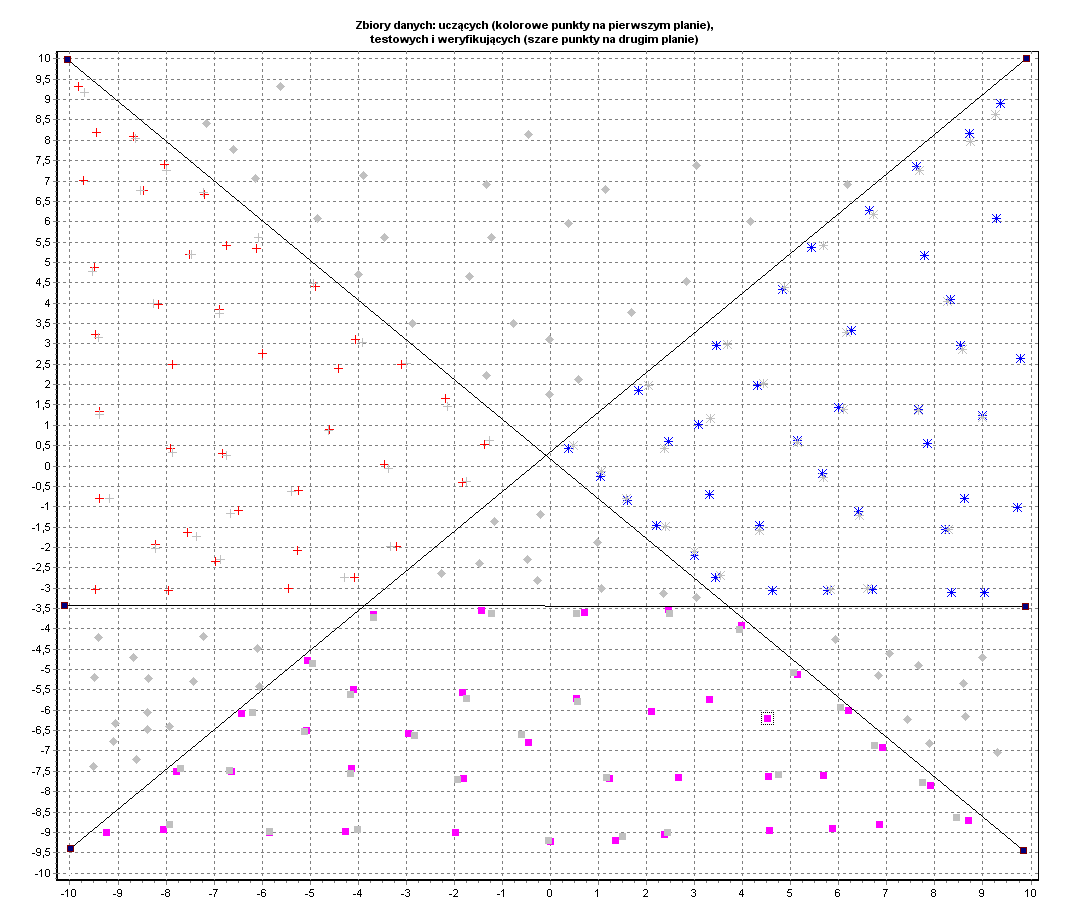
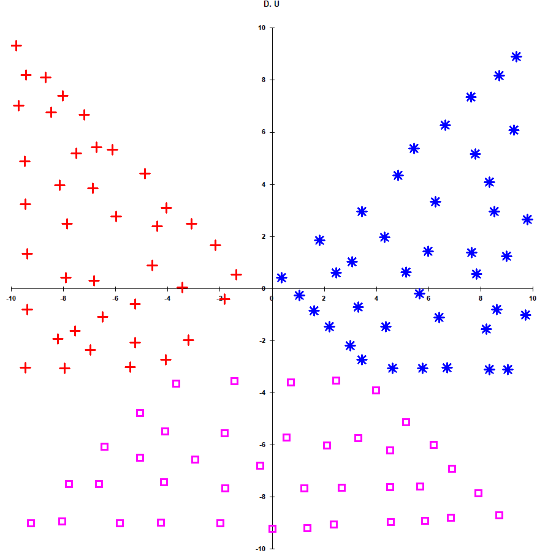
1. **Dane uczące.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Lp. | we | we | wy | wy | wy |
|  | x1 | x2 | klasa1 | klasa2 | klasa3 |
| 1. | -9,822 | 9,322 | 1 | 0 | 0 |
| 2. | -8,678 | 8,094 | 1 | 0 | 0 |
| 3. | -7,2 | 6,669 | 1 | 0 | 0 |
| 4. | -6,118 | 5,343 | 1 | 0 | 0 |
| 5. | -4,89 | 4,409 | 1 | 0 | 0 |
| 6. | -4,058 | 3,107 | 1 | 0 | 0 |
| 7. | -3,101 | 2,493 | 1 | 0 | 0 |
| 8. | -2,185 | 1,658 | 1 | 0 | 0 |
| 9. | -1,373 | 0,528 | 1 | 0 | 0 |
| 10. | -1,831 | -0,405 | 1 | 0 | 0 |
| 11. | -3,205 | -1,977 | 1 | 0 | 0 |
| 12. | -4,079 | -2,739 | 1 | 0 | 0 |
| 13. | -5,452 | -3,009 | 1 | 0 | 0 |
| 14. | -7,949 | -3,058 | 1 | 0 | 0 |
| 15. | -9,469 | -3,034 | 1 | 0 | 0 |
| 16. | -9,385 | -0,798 | 1 | 0 | 0 |
| 17. | -9,385 | 1,339 | 1 | 0 | 0 |
| 18. | -9,469 | 3,23 | 1 | 0 | 0 |
| 19. | -9,489 | 4,876 | 1 | 0 | 0 |
| 20. | -9,718 | 7,013 | 1 | 0 | 0 |
| 21. | -7,512 | 5,195 | 1 | 0 | 0 |
| 22. | -5,993 | 2,763 | 1 | 0 | 0 |
| 23. | -4,599 | 0,897 | 1 | 0 | 0 |
| 24. | -5,244 | -0,602 | 1 | 0 | 0 |
| 25. | -6,493 | -1,093 | 1 | 0 | 0 |
| 26. | -7,908 | 0,43 | 1 | 0 | 0 |
| 27. | -7,866 | 2,493 | 1 | 0 | 0 |
| 28. | -8,157 | 3,967 | 1 | 0 | 0 |
| 29. | -6,888 | 3,844 | 1 | 0 | 0 |
| 30. | -6,826 | 0,307 | 1 | 0 | 0 |
| 31. | -3,454 | 0,037 | 1 | 0 | 0 |
| 32. | -5,265 | -2,076 | 1 | 0 | 0 |
| 33. | -6,971 | -2,346 | 1 | 0 | 0 |
| 34. | -7,554 | -1,634 | 1 | 0 | 0 |
| 35. | -8,22 | -1,928 | 1 | 0 | 0 |
| 36. | -8,47 | 6,767 | 1 | 0 | 0 |
| 37. | -9,448 | 8,192 | 1 | 0 | 0 |
| 38. | -8,033 | 7,406 | 1 | 0 | 0 |
| 39. | -6,742 | 5,416 | 1 | 0 | 0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 40. | -4,412 | 2,395 | 1 | 0 | 0 |
| 41. | 0,375 | 0,43 | 0 | 1 | 0 |
| 42. | 1,832 | 1,855 | 0 | 1 | 0 |
| 43. | 3,455 | 2,96 | 0 | 1 | 0 |
| 44. | 4,828 | 4,336 | 0 | 1 | 0 |
| 45. | 5,432 | 5,367 | 0 | 1 | 0 |
| 46. | 6,639 | 6,276 | 0 | 1 | 0 |
| 47. | 7,617 | 7,357 | 0 | 1 | 0 |
| 48. | 8,72 | 8,168 | 0 | 1 | 0 |
| 49. | 9,365 | 8,905 | 0 | 1 | 0 |
| 50. | 1,041 | -0,258 | 0 | 1 | 0 |
| 51. | 1,603 | -0,847 | 0 | 1 | 0 |
| 52. | 2,206 | -1,462 | 0 | 1 | 0 |
| 53. | 2,997 | -2,199 | 0 | 1 | 0 |
| 54. | 3,434 | -2,739 | 0 | 1 | 0 |
| 55. | 4,62 | -3,058 | 0 | 1 | 0 |
| 56. | 5,765 | -3,058 | 0 | 1 | 0 |
| 57. | 6,701 | -3,034 | 0 | 1 | 0 |
| 58. | 8,345 | -3,107 | 0 | 1 | 0 |
| 59. | 9,032 | -3,107 | 0 | 1 | 0 |
| 60. | 2,456 | 0,602 | 0 | 1 | 0 |
| 61. | 3,309 | -0,7 | 0 | 1 | 0 |
| 62. | 4,35 | -1,462 | 0 | 1 | 0 |
| 63. | 4,308 | 1,977 | 0 | 1 | 0 |
| 64. | 5,14 | 0,626 | 0 | 1 | 0 |
| 65. | 5,661 | -0,184 | 0 | 1 | 0 |
| 66. | 6,41 | -1,118 | 0 | 1 | 0 |
| 67. | 6,264 | 3,328 | 0 | 1 | 0 |
| 68. | 7,658 | 1,388 | 0 | 1 | 0 |
| 69. | 7,846 | 0,553 | 0 | 1 | 0 |
| 70. | 8,616 | -0,798 | 0 | 1 | 0 |
| 71. | 7,783 | 5,171 | 0 | 1 | 0 |
| 72. | 8,324 | 4,09 | 0 | 1 | 0 |
| 73. | 8,532 | 2,96 | 0 | 1 | 0 |
| 74. | 8,99 | 1,241 | 0 | 1 | 0 |
| 75. | 9,282 | 6,08 | 0 | 1 | 0 |
| 76. | 9,781 | 2,641 | 0 | 1 | 0 |
| 77. | 9,719 | -1,019 | 0 | 1 | 0 |
| 78. | 8,22 | -1,56 | 0 | 1 | 0 |
| 79. | 5,994 | 1,437 | 0 | 1 | 0 |
| 80. | 3,08 | 1,019 | 0 | 1 | 0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 81. | -9,24 | -9,003 | 0 | 0 | 1 |
| 82. | -7,783 | -7,504 | 0 | 0 | 1 |
| 83. | -6,43 | -6,08 | 0 | 0 | 1 |
| 84. | -5,057 | -4,778 | 0 | 0 | 1 |
| 85. | -3,683 | -3,648 | 0 | 0 | 1 |
| 86. | -1,436 | -3,55 | 0 | 0 | 1 |
| 87. | 0,708 | -3,599 | 0 | 0 | 1 |
| 88. | 2,456 | -3,525 | 0 | 0 | 1 |
| 89. | 3,975 | -3,918 | 0 | 0 | 1 |
| 90. | 5,14 | -5,122 | 0 | 0 | 1 |
| 91. | 6,202 | -6,006 | 0 | 0 | 1 |
| 92. | 6,909 | -6,915 | 0 | 0 | 1 |
| 93. | 7,908 | -7,848 | 0 | 0 | 1 |
| 94. | 8,699 | -8,708 | 0 | 0 | 1 |
| 95. | -4,099 | -5,49 | 0 | 0 | 1 |
| 96. | -1,831 | -5,564 | 0 | 0 | 1 |
| 97. | 0,541 | -5,711 | 0 | 0 | 1 |
| 98. | 3,309 | -5,736 | 0 | 0 | 1 |
| 99. | -6,638 | -7,504 | 0 | 0 | 1 |
| 100. | -4,141 | -7,431 | 0 | 0 | 1 |
| 101. | -1,81 | -7,676 | 0 | 0 | 1 |
| 102. | 1,228 | -7,676 | 0 | 0 | 1 |
| 103. | 2,664 | -7,652 | 0 | 0 | 1 |
| 104. | 4,537 | -7,627 | 0 | 0 | 1 |
| 105. | 5,681 | -7,603 | 0 | 0 | 1 |
| 106. | -8,053 | -8,929 | 0 | 0 | 1 |
| 107. | -5,848 | -9,003 | 0 | 0 | 1 |
| 108. | -4,266 | -8,978 | 0 | 0 | 1 |
| 109. | -1,977 | -9,003 | 0 | 0 | 1 |
| 110. | 0 | -9,224 | 0 | 0 | 1 |
| 111. | 1,353 | -9,199 | 0 | 0 | 1 |
| 112. | 2,373 | -9,052 | 0 | 0 | 1 |
| 113. | 4,558 | -8,954 | 0 | 0 | 1 |
| 114. | 5,869 | -8,905 | 0 | 0 | 1 |
| 115. | 6,847 | -8,806 | 0 | 0 | 1 |
| 116. | -0,458 | -6,792 | 0 | 0 | 1 |
| 117. | -2,955 | -6,571 | 0 | 0 | 1 |
| 118. | -5,078 | -6,497 | 0 | 0 | 1 |
| 119. | 2,102 | -6,031 | 0 | 0 | 1 |
| 120. | 4,516 | -6,203 | 0 | 0 | 1 |

**Graficzna postać danych uczących z programu Neuronix 4.0 oraz z edytora danych 2D:**

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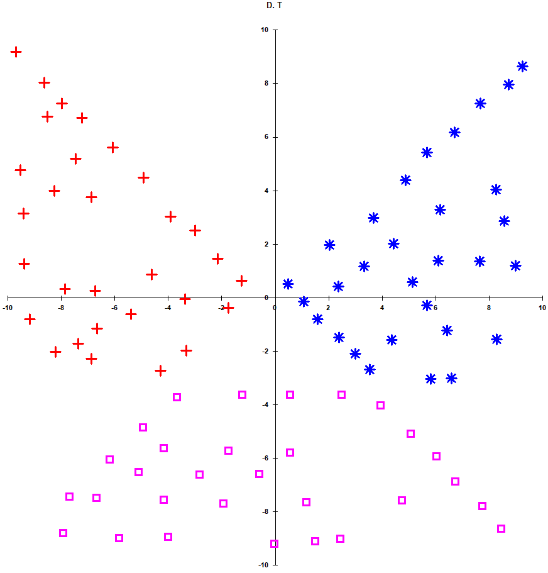
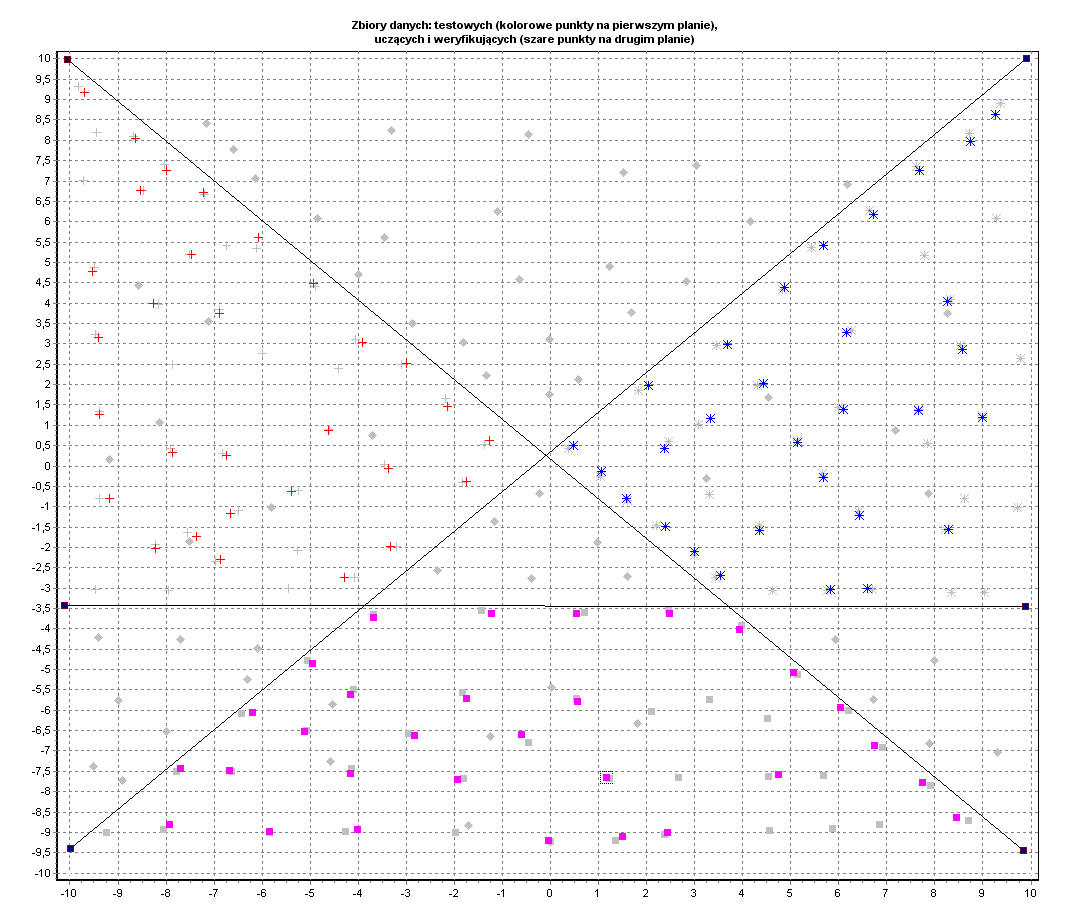
1. **Dane testowe.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Lp. | we | we | wy | wy | wy |
|  | x1 | x2 | klasa1 | klasa2 | klasa3 |
| 1. | -9,697 | 9,175 | 1 | 0 | 0 |
| 2. | -8,636 | 8,045 | 1 | 0 | 0 |
| 3. | -7,991 | 7,259 | 1 | 0 | 0 |
| 4. | -7,221 | 6,718 | 1 | 0 | 0 |
| 5. | -6,076 | 5,613 | 1 | 0 | 0 |
| 6. | -4,932 | 4,483 | 1 | 0 | 0 |
| 7. | -3,912 | 3,034 | 1 | 0 | 0 |
| 8. | -2,996 | 2,518 | 1 | 0 | 0 |
| 9. | -2,143 | 1,462 | 1 | 0 | 0 |
| 10. | -1,269 | 0,626 | 1 | 0 | 0 |
| 11. | -1,748 | -0,381 | 1 | 0 | 0 |
| 12. | -3,371 | -0,061 | 1 | 0 | 0 |
| 13. | -4,62 | 0,872 | 1 | 0 | 0 |
| 14. | -6,888 | 3,746 | 1 | 0 | 0 |
| 15. | -8,262 | 3,992 | 1 | 0 | 0 |
| 16. | -9,406 | 3,157 | 1 | 0 | 0 |
| 17. | -9,385 | 1,265 | 1 | 0 | 0 |
| 18. | -6,742 | 0,258 | 1 | 0 | 0 |
| 19. | -7,866 | 0,332 | 1 | 0 | 0 |
| 20. | -8,22 | -2,027 | 1 | 0 | 0 |
| 21. | -7,367 | -1,732 | 1 | 0 | 0 |
| 22. | -6,659 | -1,167 | 1 | 0 | 0 |
| 23. | -5,39 | -0,626 | 1 | 0 | 0 |
| 24. | -4,287 | -2,739 | 1 | 0 | 0 |
| 25. | -3,329 | -1,977 | 1 | 0 | 0 |
| 26. | -6,867 | -2,297 | 1 | 0 | 0 |
| 27. | -9,177 | -0,798 | 1 | 0 | 0 |
| 28. | -7,471 | 5,195 | 1 | 0 | 0 |
| 29. | -8,532 | 6,767 | 1 | 0 | 0 |
| 30. | -9,531 | 4,778 | 1 | 0 | 0 |
| 31. | 6,722 | 6,178 | 0 | 1 | 0 |
| 32. | 7,679 | 7,259 | 0 | 1 | 0 |
| 33. | 8,741 | 7,971 | 0 | 1 | 0 |
| 34. | 9,261 | 8,634 | 0 | 1 | 0 |
| 35. | 5,681 | 5,416 | 0 | 1 | 0 |
| 36. | 4,87 | 4,385 | 0 | 1 | 0 |
| 37. | 3,684 | 2,985 | 0 | 1 | 0 |
| 38. | 2,04 | 1,977 | 0 | 1 | 0 |
| 39. | 0,479 | 0,504 | 0 | 1 | 0 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 40. | 1,062 | -0,135 | 0 | 1 | 0 |
| 41. | 1,582 | -0,798 | 0 | 1 | 0 |
| 42. | 2,393 | -1,486 | 0 | 1 | 0 |
| 43. | 2,997 | -2,1 | 0 | 1 | 0 |
| 44. | 3,538 | -2,69 | 0 | 1 | 0 |
| 45. | 4,35 | -1,584 | 0 | 1 | 0 |
| 46. | 5,681 | -0,282 | 0 | 1 | 0 |
| 47. | 5,14 | 0,577 | 0 | 1 | 0 |
| 48. | 6,098 | 1,388 | 0 | 1 | 0 |
| 49. | 7,658 | 1,363 | 0 | 1 | 0 |
| 50. | 8,99 | 1,191 | 0 | 1 | 0 |
| 51. | 8,574 | 2,862 | 0 | 1 | 0 |
| 52. | 8,262 | 4,041 | 0 | 1 | 0 |
| 53. | 6,16 | 3,279 | 0 | 1 | 0 |
| 54. | 4,433 | 2,027 | 0 | 1 | 0 |
| 55. | 3,33 | 1,167 | 0 | 1 | 0 |
| 56. | 2,373 | 0,43 | 0 | 1 | 0 |
| 57. | 5,827 | -3,034 | 0 | 1 | 0 |
| 58. | 6,597 | -3,009 | 0 | 1 | 0 |
| 59. | 6,431 | -1,216 | 0 | 1 | 0 |
| 60. | 8,283 | -1,56 | 0 | 1 | 0 |
| 61. | -4,953 | -4,851 | 0 | 0 | 1 |
| 62. | -3,683 | -3,722 | 0 | 0 | 1 |
| 63. | -1,228 | -3,623 | 0 | 0 | 1 |
| 64. | 0,541 | -3,623 | 0 | 0 | 1 |
| 65. | 2,477 | -3,623 | 0 | 0 | 1 |
| 66. | 3,933 | -4,016 | 0 | 0 | 1 |
| 67. | 5,057 | -5,073 | 0 | 0 | 1 |
| 68. | 6,035 | -5,932 | 0 | 0 | 1 |
| 69. | 6,743 | -6,866 | 0 | 0 | 1 |
| 70. | 7,742 | -7,775 | 0 | 0 | 1 |
| 71. | 8,449 | -8,634 | 0 | 0 | 1 |
| 72. | 0,562 | -5,785 | 0 | 0 | 1 |
| 73. | -1,748 | -5,711 | 0 | 0 | 1 |
| 74. | -0,603 | -6,596 | 0 | 0 | 1 |
| 75. | -2,83 | -6,62 | 0 | 0 | 1 |
| 76. | -4,162 | -5,613 | 0 | 0 | 1 |
| 77. | -5,119 | -6,522 | 0 | 0 | 1 |
| 78. | -4,162 | -7,554 | 0 | 0 | 1 |
| 79. | -6,68 | -7,48 | 0 | 0 | 1 |
| 80. | -7,7 | -7,431 | 0 | 0 | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 81. | -0,041 | -9,199 | 0 | 0 | 1 |
| 82. | 1,499 | -9,101 | 0 | 0 | 1 |
| 83. | 2,435 | -9,003 | 0 | 0 | 1 |
| 84. | 4,745 | -7,578 | 0 | 0 | 1 |
| 85. | -7,929 | -8,806 | 0 | 0 | 1 |
| 86. | -5,848 | -8,978 | 0 | 0 | 1 |
| 87. | -4,016 | -8,929 | 0 | 0 | 1 |
| 88. | -1,935 | -7,701 | 0 | 0 | 1 |
| 89. | -6,201 | -6,055 | 0 | 0 | 1 |
| 90. | 1,166 | -7,652 | 0 | 0 | 1 |

**Graficzna postać danych testowych z programu Neuronix 4.0 oraz z edytora danych 2D:**

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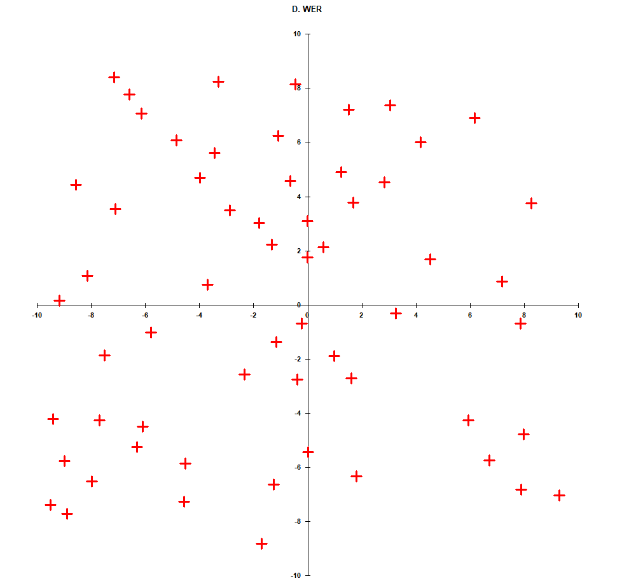
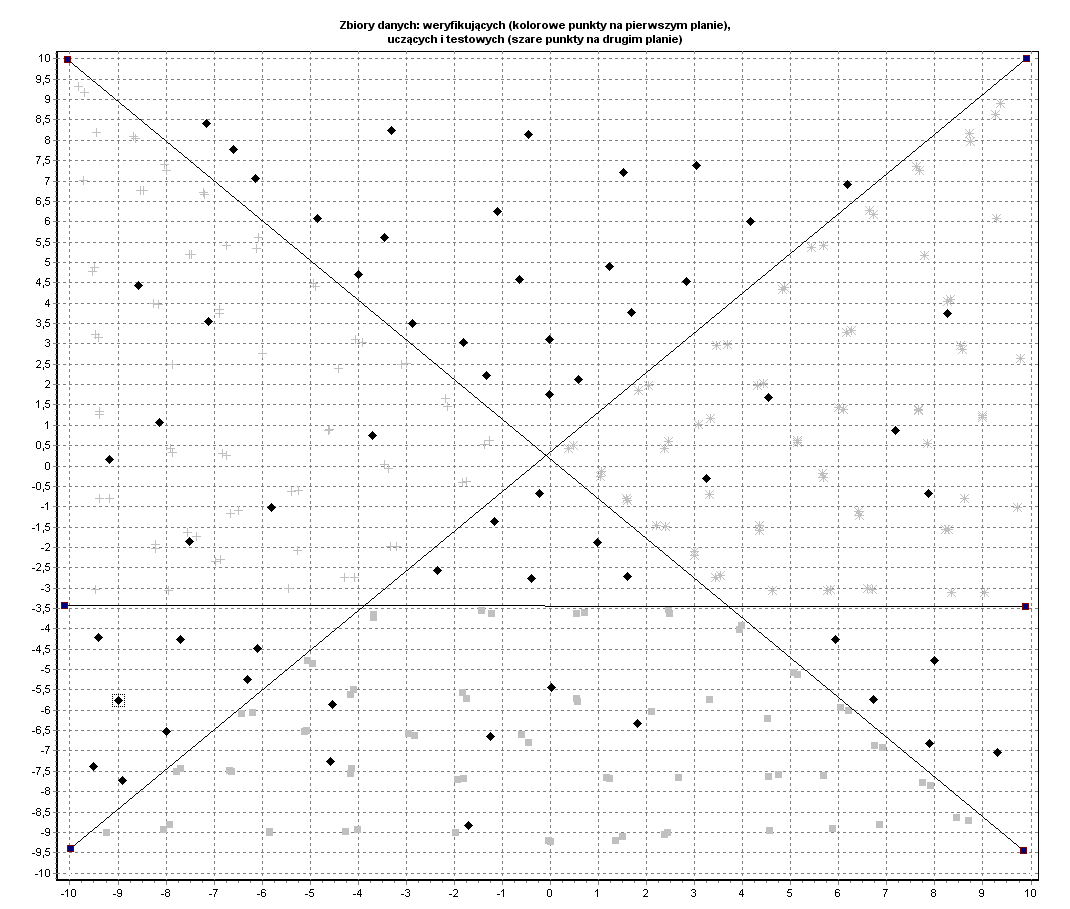
1. **Dane weryfikujące.**

|  |  |  |
| --- | --- | --- |
| Lp. | we | we |
|  | x1 | x2 |
| 1. | -1,165 | -1,363 |
| 2. | -0,229 | -0,676 |
| 3. | 0,978 | -1,879 |
| 4. | -1,706 | -8,831 |
| 5. | -2,351 | -2,567 |
| 6. | -5,806 | -1,019 |
| 7. | -0,395 | -2,763 |
| 8. | 0,021 | -5,441 |
| 9. | -3,704 | 0,749 |
| 10. | 1,603 | -2,714 |
| 11. | -0,021 | 1,756 |
| 12. | -1,332 | 2,223 |
| 13. | -2,872 | 3,5 |
| 14. | -3,995 | 4,704 |
| 15. | -4,849 | 6,08 |
| 16. | -0,645 | 4,581 |
| 17. | 2,83 | 4,532 |
| 18. | 1,686 | 3,771 |
| 19. | -7,117 | 3,55 |

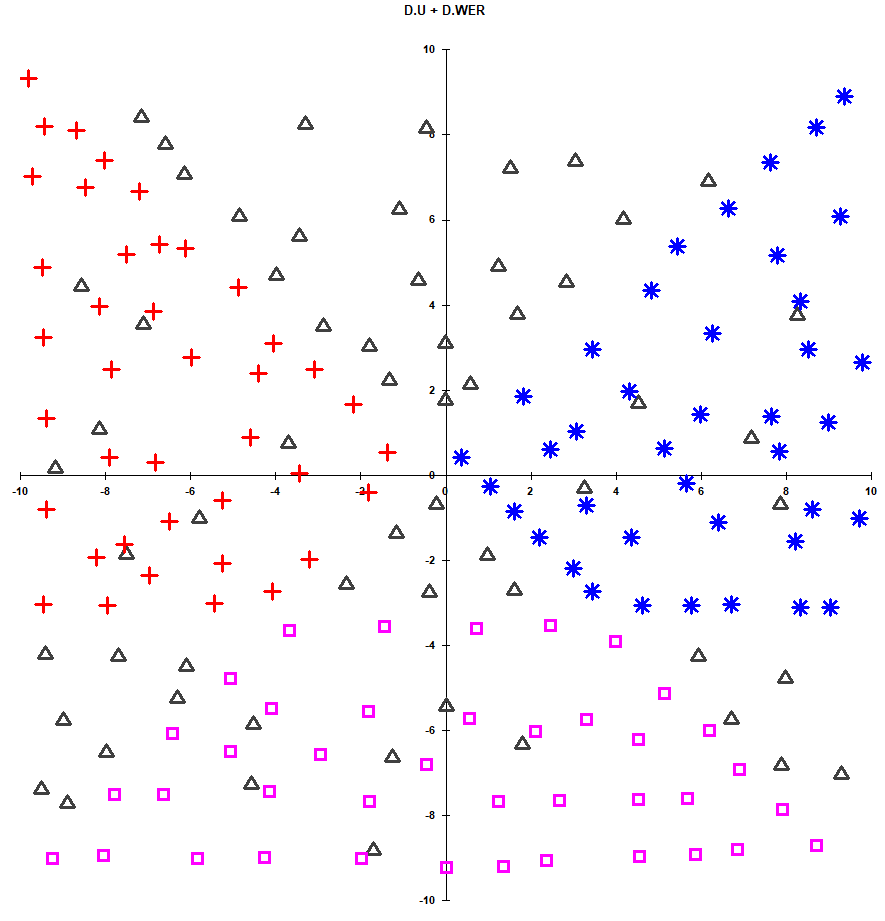
|  |  |  |
| --- | --- | --- |
| 20. | -0,021 | 3,107 |
| 21. | 0,583 | 2,125 |
| 22. | 6,181 | 6,915 |
| 23. | 4,162 | 6,006 |
| 24. | 1,228 | 4,901 |
| 25. | -3,309 | 8,241 |
| 26. | -3,454 | 5,613 |
| 27. | -7,7 | -4,262 |
| 28. | -8,99 | -5,76 |
| 29. | -8,907 | -7,726 |
| 30. | -6,305 | -5,245 |
| 31. | -6,097 | -4,483 |
| 32. | -7,991 | -6,522 |
| 33. | -9,406 | -4,213 |
| 34. | -4,536 | -5,859 |
| 35. | -4,578 | -7,259 |
| 36. | 7,18 | 0,872 |
| 37. | 6,722 | -5,736 |
| 38. | 4,537 | 1,683 |
| 39. | 7,991 | -4,778 |
| 40. | 7,887 | -6,817 |

|  |  |  |
| --- | --- | --- |
| 41. | 7,867 | -0,676 |
| 42. | 8,262 | 3,746 |
| 43. | 3,247 | -0,307 |
| 44. | 9,302 | -7,038 |
| 45. | 5,931 | -4,262 |
| 46. | -7,512 | -1,855 |
| 47. | -8,137 | 1,069 |
| 48. | -1,248 | -6,645 |
| 49. | 1,811 | -6,325 |
| 50. | -9,51 | -7,382 |
| 51. | -9,177 | 0,16 |
| 52. | -1,81 | 3,034 |
| 53. | -6,597 | 7,775 |
| 54. | -7,159 | 8,413 |
| 55. | -6,139 | 7,062 |
| 56. | -8,574 | 4,434 |
| 57. | -1,103 | 6,252 |
| 58. | -0,458 | 8,143 |
| 59. | 3,039 | 7,382 |
| 60. | 1,519 | 7,21 |

**Graficzna postać danych weryfikujących z programu Neuronix 4.0 oraz z edytora danych 2D:**

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**Graficzna postać danych wejściowych i weryfikujących z programu Neuronix 4.0:**



1. **Wyniki uczenia sieci.**
2. **dla TU = 0.4, TT = 0.4, MW=WŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,4 | TT=0,4 |  | | | | | | | | |
| MW = WŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **50** | 100,00% | **50** | 100,00% |
| 60 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **60** | 100,00% | **60** | 100,00% |
| 70 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **70** | 100,00% | **70** | 100,00% |
| 80 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **80** | 100,00% | **80** | 100,00% |
| 90 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **90** | 100,00% | **90** | 100,00% |
| 100 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **100** | 100,00% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.4, TT = 0.4, MW=WYŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,4 | TT=0,4 |  | | | | | | | | |
| MW = WYŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **50** | 100,00% | **50** | 100,00% |
| 60 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **60** | 100,00% | **60** | 100,00% |
| 70 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **70** | 100,00% | **70** | 100,00% |
| 80 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **80** | 100,00% | **80** | 100,00% |
| 90 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **90** | 100,00% | **90** | 100,00% |
| 100 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **100** | 100,00% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.3, TT = 0.3, MW=WŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,3 | TT=0,3 |  | | | | | | | | |
| MW = WŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 14 | 12 | 88,33% | 86,67% | **50** | 88,33% | **50** | 100,00% |
| 60 | 0,0,0 | 13 | 10 | 89,17% | 88,89% | **60** | 89,17% | **60** | 100,00% |
| 70 | 0,0,0 | 13 | 6 | 89,17% | 93,33% | **70** | 89,17% | **70** | 100,00% |
| 80 | 0,0,0 | 8 | 5 | 93,33% | 94,44% | **80** | 93,33% | **80** | 100,00% |
| 90 | 0,0,0 | 7 | 4 | 94,17% | 95,56% | **90** | 94,17% | **90** | 100,00% |
| 100 | 0,0,0 | 0 | 0 | 100,00% | 100,00% | **100** | 100,00% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.3, TT = 0.3, MW=WYŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,3 | TT=0,3 |  | | | | | | | | |
| MW = WYŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 10 | 15 | 91,67% | 83,33% | **50** | 91,67% | **50** | 83,33% |
| 60 | 0,0,0 | 10 | 14 | 91,67% | 84,44% | **60** | 91,67% | **60** | 84,44% |
| 70 | 0,0,0 | 10 | 11 | 91,67% | 87,78% | **70** | 91,67% | **70** | 87,78% |
| 80 | 0,0,0 | 10 | 10 | 91,67% | 88,89% | **80** | 91,67% | **80** | 88,89% |
| 90 | 0,0,0 | 7 | 3 | 94,17% | 96,67% | **90** | 94,17% | **90** | 96,67% |
| 100 | 0,0,0 | 0 | 0 | 99,17% | 100,00% | **100** | 100,00% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.2, TT = 0.2, MW=WŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,2 | TT=0,2 |  | | | | | | | | |
| MW = WŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 46 | 33 | 61,67% | 63,33% | **50** | 61,67% | **50** | 63,33% |
| 60 | 0,0,0 | 44 | 29 | 63,33% | 67,78% | **60** | 63,33% | **60** | 67,78% |
| 70 | 0,0,0 | 33 | 27 | 72,50% | 70,00% | **70** | 72,50% | **70** | 70,00% |
| 80 | 3,0,0 | 24 | 21 | 80,00% | 76,67% | **80** | 80,00% | **80** | 76,67% |
| 90 | 3,0,0 | 13 | 9 | 89,17% | 90,00% | **90** | 89,17% | **90** | 90,00% |
| 100 | 3,0,0 | 1 | 0 | 99,17% | 100,00% | **100** | 99,17% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.2, TT = 0.2, MW=WYŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,2 | TT=0,2 |  | | | | | | | | |
| MW = WYŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 20 | 60 | 83,33% | 33,33% | **50** | 83,33% | **50** | 33,33% |
| 60 | 0,0,0 | 19 | 60 | 84,17% | 33,33% | **60** | 84,17% | **60** | 33,33% |
| 70 | 0,0,0 | 11 | 60 | 90,83% | 33,33% | **70** | 90,83% | **70** | 33,33% |
| 80 | 3,0,0 | 20 | 60 | 83,33% | 33,33% | **80** | 83,33% | **80** | 33,33% |
| 90 | 3,0,0 | 10 | 16 | 91,67% | 82,22% | **90** | 91,67% | **90** | 82,22% |
| 100 | 3,0,0 | 1 | 0 | 99,17% | 100,00% | **100** | 99,17% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.1, TT = 0.2, MW=WŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,1 | TT=0,2 |  | | | | | | | | |
| MW = WŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 3,0,0 | 59 | 16 | 50,83% | 82,22% | **50** | 50,83% | **50** | 82,22% |
| 60 | 3,0,0 | 46 | 9 | 61,67% | 90,00% | **60** | 61,67% | **60** | 90,00% |
| 70 | 3,0,0 | 36 | 1 | 70,00% | 98,89% | **70** | 70,00% | **70** | 98,89% |
| 80 | 3,0,0 | 8 | 0 | 93,33% | 100,00% | **80** | 93,33% | **80** | 100,00% |
| 90 | 3,0,0 | 5 | 0 | 95,83% | 100,00% | **90** | 95,83% | **90** | 100,00% |
| 100 | 3,0,0 | 1 | 0 | 99,17% | 100,00% | **100** | 99,17% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **dla TU = 0.1, TT = 0.2, MW=WYŁ**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TU = 0,1 | TT=0,2 |  | | | | | | | | |
| MW = WYŁ |  | | | | | **Dane do wykresów** | |  | | |
| ZPWU | **WU 1,2,3** | **LWUPT** | **LWTPT** | **PPDDU** | **PPDTT** |  | **ZPWU** | **PPDDU** | **ZPWU** | **PPDDT** |
| 50 | 0,0,0 | 10 | 90 | 91,67% | 0,00% | **50** | 91,67% | **50** | 0,00% |
| 60 | 3,0,0 | 29 | 60 | 75,83% | 33,33% | **60** | 75,83% | **60** | 33,33% |
| 70 | 3,0,0 | 12 | 60 | 90,00% | 33,33% | **70** | 90,00% | **70** | 33,33% |
| 80 | 3,0,0 | 25 | 2 | 79,17% | 97,78% | **80** | 79,17% | **80** | 97,78% |
| 90 | 3,0,0 | 5 | 0 | 95,83% | 100,00% | **90** | 95,83% | **90** | 100,00% |
| 100 | 3,0,0 | 1 | 0 | 99,17% | 100,00% | **100** | 99,17% | **100** | 100,00% |

**Rozwinięcie oznaczeń:**

* **TU** – Tolerancja Uczenia
* **TT** – Tolerancja Testowania
* **MW = WŁ** – Mieszanie Wzorców WŁączone
* **MW = WYŁ** – Mieszanie Wzorców WYŁączone
* **WU 1,2,3** – Warstwa Ukryta 1,2,3 (dokładnie: liczba elementów w tej warstwie)
* **LWUPT** – Liczba Wzorców Uczących Poza Tolerancją
* **LWTPT** – Liczba Wzorców Testowych Poza Tolerancją
* **PPDDU [%]** – Procent Poprawnych Decyzji dla Danych Uczących
* **PPDDT** [**%**] – Procent Poprawnych Decyzji dla Danych Testowych
* **ZPWU [%]** – Zadany Procent Wzorców Uczących mieszczący się w tolerancji

1. **Etapy uruchomienia sieci.**
2. **TU = 0,4 i TT = 0,4; ZPWU = 50%; MW = WŁ**

**Rozwinięcie skrótów:**

**TU** – Tolerancja Uczenia, **TT** – Tolerancja Testowania, **ZPWU** – Zadany Procent Wartości Uczących,

**MW = WŁ** – Mieszanie Wzorców Włączone.

**Uruchomienie sieci dla danych uczących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  |  | odp. rzeczywista | | | odp.oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,822 | 9,322 | 0,215663 | 0,40733 | 0,328522 | 1 | 0 | 0 |
| 2. | -8,678 | 8,094 | 0,21653 | 0,399004 | 0,328659 | 1 | 0 | 0 |
| 3. | -7,2 | 6,669 | 0,220143 | 0,385518 | 0,330985 | 1 | 0 | 0 |
| 4. | -6,118 | 5,343 | 0,227235 | 0,370792 | 0,336515 | 1 | 0 | 0 |
| 5. | -4,89 | 4,409 | 0,232591 | 0,357002 | 0,340466 | 1 | 0 | 0 |
| 6. | -4,058 | 3,107 | 0,239397 | 0,344201 | 0,345867 | 1 | 0 | 0 |
| 7. | -3,101 | 2,493 | 0,243041 | 0,334032 | 0,348482 | 1 | 0 | 0 |
| 8. | -2,185 | 1,658 | 0,247705 | 0,323023 | 0,351991 | 1 | 0 | 0 |
| 9. | -1,373 | 0,528 | 0,253697 | 0,311255 | 0,356688 | 1 | 0 | 0 |
| 10. | -1,831 | -0,405 | 0,257786 | 0,309791 | 0,36043 | 1 | 0 | 0 |
| 11. | -3,205 | -1,977 | 0,264221 | 0,311729 | 0,366661 | 1 | 0 | 0 |
| 12. | -4,079 | -2,739 | 0,267183 | 0,314189 | 0,369656 | 1 | 0 | 0 |
| 13. | -5,452 | -3,009 | 0,267419 | 0,322837 | 0,370589 | 1 | 0 | 0 |
| 14. | -7,949 | -3,058 | 0,265741 | 0,34085 | 0,370489 | 1 | 0 | 0 |
| 15. | -9,469 | -3,034 | 0,264463 | 0,35209 | 0,370209 | 1 | 0 | 0 |
| 16. | -9,385 | -0,798 | 0,253883 | 0,363008 | 0,361123 | 1 | 0 | 0 |
| 17. | -9,385 | 1,339 | 0,243727 | 0,374022 | 0,352426 | 1 | 0 | 0 |
| 18. | -9,469 | 3,23 | 0,234692 | 0,384372 | 0,344717 | 1 | 0 | 0 |
| 19. | -9,489 | 4,876 | 0,226882 | 0,392986 | 0,338012 | 1 | 0 | 0 |
| 20. | -9,718 | 7,013 | 0,216609 | 0,405631 | 0,329282 | 1 | 0 | 0 |
| 21. | -7,512 | 5,195 | 0,226875 | 0,380208 | 0,33695 | 1 | 0 | 0 |
| 22. | -5,993 | 2,763 | 0,239554 | 0,356577 | 0,347036 | 1 | 0 | 0 |
| 23. | -4,599 | 0,897 | 0,249479 | 0,336754 | 0,354799 | 1 | 0 | 0 |
| 24. | -5,244 | -0,602 | 0,256115 | 0,333737 | 0,360823 | 1 | 0 | 0 |
| 25. | -6,493 | -1,093 | 0,257497 | 0,340339 | 0,362671 | 1 | 0 | 0 |
| 26. | -7,908 | 0,43 | 0,249172 | 0,358544 | 0,356303 | 1 | 0 | 0 |
| 27. | -7,866 | 2,493 | 0,239408 | 0,368873 | 0,34791 | 1 | 0 | 0 |
| 28. | -8,157 | 3,967 | 0,232199 | 0,378592 | 0,341874 | 1 | 0 | 0 |
| 29. | -6,888 | 3,844 | 0,233747 | 0,368691 | 0,342527 | 1 | 0 | 0 |
| 30. | -6,826 | 0,307 | 0,250583 | 0,349999 | 0,356934 | 1 | 0 | 0 |
| 31. | -3,454 | 0,037 | 0,254443 | 0,32394 | 0,358437 | 1 | 0 | 0 |
| 32. | -5,265 | -2,076 | 0,263116 | 0,326284 | 0,366817 | 1 | 0 | 0 |
| 33. | -6,971 | -2,346 | 0,263097 | 0,33737 | 0,367711 | 1 | 0 | 0 |
| 34. | -7,554 | -1,634 | 0,25926 | 0,345308 | 0,364744 | 1 | 0 | 0 |
| 35. | -8,22 | -1,928 | 0,260151 | 0,348662 | 0,365861 | 1 | 0 | 0 |
| 36. | -8,47 | 6,767 | 0,218717 | 0,395281 | 0,330434 | 1 | 0 | 0 |
| 37. | -9,448 | 8,192 | 0,215947 | 0,404609 | 0,328567 | 1 | 0 | 0 |
| 38. | -8,033 | 7,406 | 0,21702 | 0,394305 | 0,328737 | 1 | 0 | 0 |
| 39. | -6,742 | 5,416 | 0,226415 | 0,375725 | 0,336143 | 1 | 0 | 0 |
| 40. | -4,412 | 2,395 | 0,242506 | 0,343116 | 0,348724 | 1 | 0 | 0 |
| 41. | 0,375 | 0,43 | 0,255499 | 0,297974 | 0,357297 | 0 | 1 | 0 |
| 42. | 1,832 | 1,855 | 0,249836 | 0,294674 | 0,351672 | 0 | 1 | 0 |
| 43. | 3,455 | 2,96 | 0,245824 | 0,288515 | 0,347368 | 0 | 1 | 0 |
| 44. | 4,828 | 4,336 | 0,240339 | 0,285579 | 0,34193 | 0 | 1 | 0 |
| 45. | 5,432 | 5,367 | 0,235909 | 0,286479 | 0,337804 | 0 | 1 | 0 |
| 46. | 6,639 | 6,276 | 0,23252 | 0,282351 | 0,334247 | 0 | 1 | 0 |
| 47. | 7,617 | 7,357 | 0,228904 | 0,279955 | 0,330616 | 0 | 1 | 0 |
| 48. | 8,72 | 8,168 | 0,229743 | 0,271914 | 0,330748 | 0 | 1 | 0 |
| 49. | 9,365 | 8,905 | 0,230234 | 0,267215 | 0,330825 | 0 | 1 | 0 |
| 50. | 1,041 | -0,258 | 0,259283 | 0,289565 | 0,360177 | 0 | 1 | 0 |
| 51. | 1,603 | -0,847 | 0,262518 | 0,282431 | 0,362641 | 0 | 1 | 0 |
| 52. | 2,206 | -1,462 | 0,265909 | 0,27487 | 0,365215 | 0 | 1 | 0 |
| 53. | 2,997 | -2,199 | 0,270028 | 0,26532 | 0,368308 | 0 | 1 | 0 |
| 54. | 3,434 | -2,739 | 0,272938 | 0,259368 | 0,370556 | 0 | 1 | 0 |
| 55. | 4,62 | -3,058 | 0,275368 | 0,249113 | 0,371996 | 0 | 1 | 0 |
| 56. | 5,765 | -3,058 | 0,276246 | 0,240805 | 0,372133 | 0 | 1 | 0 |
| 57. | 6,701 | -3,034 | 0,276849 | 0,234146 | 0,372147 | 0 | 1 | 0 |
| 58. | 8,345 | -3,107 | 0,278458 | 0,221886 | 0,372641 | 0 | 1 | 0 |
| 59. | 9,032 | -3,107 | 0,278984 | 0,216928 | 0,372724 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. | 2,456 | 0,602 | 0,256272 | 0,283666 | 0,356847 | 0 | 1 | 0 |
| 61. | 3,309 | -0,7 | 0,263123 | 0,270749 | 0,362247 | 0 | 1 | 0 |
| 62. | 4,35 | -1,462 | 0,26755 | 0,259258 | 0,365472 | 0 | 1 | 0 |
| 63. | 4,308 | 1,977 | 0,251147 | 0,277233 | 0,351472 | 0 | 1 | 0 |
| 64. | 5,14 | 0,626 | 0,258209 | 0,264228 | 0,357071 | 0 | 1 | 0 |
| 65. | 5,661 | -0,184 | 0,262465 | 0,256281 | 0,36043 | 0 | 1 | 0 |
| 66. | 6,41 | -1,118 | 0,267488 | 0,246054 | 0,36432 | 0 | 1 | 0 |
| 67. | 6,264 | 3,328 | 0,246219 | 0,269923 | 0,346207 | 0 | 1 | 0 |
| 68. | 7,658 | 1,388 | 0,256508 | 0,249828 | 0,354272 | 0 | 1 | 0 |
| 69. | 7,846 | 0,553 | 0,260626 | 0,244188 | 0,357693 | 0 | 1 | 0 |
| 70. | 8,616 | -0,798 | 0,267652 | 0,231702 | 0,363283 | 0 | 1 | 0 |
| 71. | 7,783 | 5,171 | 0,238629 | 0,268329 | 0,338884 | 0 | 1 | 0 |
| 72. | 8,324 | 4,09 | 0,244172 | 0,258841 | 0,343351 | 0 | 1 | 0 |
| 73. | 8,532 | 2,96 | 0,249699 | 0,251535 | 0,347977 | 0 | 1 | 0 |
| 74. | 8,99 | 1,241 | 0,258226 | 0,239412 | 0,35503 | 0 | 1 | 0 |
| 75. | 9,282 | 6,08 | 0,235461 | 0,262085 | 0,335363 | 0 | 1 | 0 |
| 76. | 9,781 | 2,641 | 0,25217 | 0,240837 | 0,349426 | 0 | 1 | 0 |
| 77. | 9,719 | -1,019 | 0,26955 | 0,222601 | 0,364314 | 0 | 1 | 0 |
| 78. | 8,22 | -1,56 | 0,270981 | 0,230678 | 0,366335 | 0 | 1 | 0 |
| 79. | 5,994 | 1,437 | 0,255003 | 0,262176 | 0,353873 | 0 | 1 | 0 |
| 80. | 3,08 | 1,019 | 0,254764 | 0,28126 | 0,355224 | 0 | 1 | 0 |
| 81. | -9,24 | -9,003 | 0,293127 | 0,319615 | 0,394482 | 0 | 0 | 1 |
| 82. | -7,783 | -7,504 | 0,287083 | 0,316693 | 0,388574 | 0 | 0 | 1 |
| 83. | -6,43 | -6,08 | 0,28132 | 0,314145 | 0,382953 | 0 | 0 | 1 |
| 84. | -5,057 | -4,778 | 0,276158 | 0,310822 | 0,377828 | 0 | 0 | 1 |
| 85. | -3,683 | -3,648 | 0,27182 | 0,306605 | 0,373399 | 0 | 0 | 1 |
| 86. | -1,436 | -3,55 | 0,273074 | 0,290694 | 0,37327 | 0 | 0 | 1 |
| 87. | 0,708 | -3,599 | 0,274951 | 0,2748 | 0,373726 | 0 | 0 | 1 |
| 88. | 2,456 | -3,525 | 0,275938 | 0,262449 | 0,373635 | 0 | 0 | 1 |
| 89. | 3,975 | -3,918 | 0,278978 | 0,249391 | 0,375414 | 0 | 0 | 1 |
| 90. | 5,14 | -5,122 | 0,285621 | 0,234783 | 0,380447 | 0 | 0 | 1 |
| 91. | 6,202 | -6,006 | 0,290659 | 0,222592 | 0,384165 | 0 | 0 | 1 |
| 92. | 6,909 | -6,915 | 0,295547 | 0,212866 | 0,387941 | 0 | 0 | 1 |
| 93. | 7,908 | -7,848 | 0,300776 | 0,200945 | 0,391847 | 0 | 0 | 1 |
| 94. | 8,699 | -8,708 | 0,305497 | 0,19092 | 0,395431 | 0 | 0 | 1 |
| 95. | -4,099 | -5,49 | 0,280291 | 0,300148 | 0,380836 | 0 | 0 | 1 |
| 96. | -1,831 | -5,564 | 0,282383 | 0,283207 | 0,381408 | 0 | 0 | 1 |
| 97. | 0,541 | -5,711 | 0,284905 | 0,265163 | 0,382289 | 0 | 0 | 1 |
| 98. | 3,309 | -5,736 | 0,287149 | 0,244916 | 0,382722 | 0 | 0 | 1 |
| 99. | -6,638 | -7,504 | 0,287961 | 0,308321 | 0,388711 | 0 | 0 | 1 |
| 100. | -4,141 | -7,431 | 0,289529 | 0,290454 | 0,388713 | 0 | 0 | 1 |
| 101. | -1,81 | -7,676 | 0,292489 | 0,27219 | 0,389987 | 0 | 0 | 1 |
| 102. | 1,228 | -7,676 | 0,294822 | 0,250087 | 0,39035 | 0 | 0 | 1 |
| 103. | 2,664 | -7,652 | 0,29581 | 0,239791 | 0,390424 | 0 | 0 | 1 |
| 104. | 4,537 | -7,627 | 0,297129 | 0,22636 | 0,390547 | 0 | 0 | 1 |
| 105. | 5,681 | -7,603 | 0,297893 | 0,218221 | 0,390586 | 0 | 0 | 1 |
| 106. | -8,053 | -8,929 | 0,293685 | 0,311316 | 0,394324 | 0 | 0 | 1 |
| 107. | -5,848 | -9,003 | 0,295732 | 0,294821 | 0,394888 | 0 | 0 | 1 |
| 108. | -4,266 | -8,978 | 0,296827 | 0,2834 | 0,394976 | 0 | 0 | 1 |
| 109. | -1,977 | -9,003 | 0,298705 | 0,266587 | 0,395351 | 0 | 0 | 1 |
| 110. | 0 | -9,224 | 0,301281 | 0,251075 | 0,396483 | 0 | 0 | 1 |
| 111. | 1,353 | -9,199 | 0,302201 | 0,241383 | 0,396544 | 0 | 0 | 1 |
| 112. | 2,373 | -9,052 | 0,302282 | 0,234743 | 0,39607 | 0 | 0 | 1 |
| 113. | 4,558 | -8,954 | 0,303492 | 0,219447 | 0,395933 | 0 | 0 | 1 |
| 114. | 5,869 | -8,905 | 0,304265 | 0,210245 | 0,395891 | 0 | 0 | 1 |
| 115. | 6,847 | -8,806 | 0,304543 | 0,203712 | 0,395607 | 0 | 0 | 1 |
| 116. | -0,458 | -6,792 | 0,289303 | 0,266884 | 0,38656 | 0 | 0 | 1 |
| 117. | -2,955 | -6,571 | 0,28633 | 0,286225 | 0,385363 | 0 | 0 | 1 |
| 118. | -5,078 | -6,497 | 0,284348 | 0,302111 | 0,384809 | 0 | 0 | 1 |
| 119. | 2,102 | -6,031 | 0,287632 | 0,252168 | 0,383776 | 0 | 0 | 1 |
| 120. | 4,516 | -6,203 | 0,290306 | 0,233779 | 0,384763 | 0 | 0 | 1 |

**Uruchomienie dla danych testujących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | | odp. oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,697 | 9,175 | 0,324838 | 0,314757 | 0,283915 | 1 | 0 | 0 |
| 2. | -8,636 | 8,045 | 0,318147 | 0,321546 | 0,286317 | 1 | 0 | 0 |
| 3. | -7,991 | 7,259 | 0,31408 | 0,325673 | 0,287777 | 1 | 0 | 0 |
| 4. | -7,221 | 6,718 | 0,306385 | 0,331493 | 0,288705 | 1 | 0 | 0 |
| 5. | -6,076 | 5,613 | 0,292616 | 0,340881 | 0,289413 | 1 | 0 | 0 |
| 6. | -4,932 | 4,483 | 0,278722 | 0,350306 | 0,290077 | 1 | 0 | 0 |
| 7. | -3,912 | 3,034 | 0,263742 | 0,359528 | 0,289916 | 1 | 0 | 0 |
| 8. | -2,996 | 2,518 | 0,25495 | 0,366342 | 0,291111 | 1 | 0 | 0 |
| 9. | -2,143 | 1,462 | 0,243383 | 0,373755 | 0,291241 | 1 | 0 | 0 |
| 10. | -1,269 | 0,626 | 0,233003 | 0,380887 | 0,291795 | 1 | 0 | 0 |
| 11. | -1,748 | -0,381 | 0,230074 | 0,379706 | 0,288993 | 1 | 0 | 0 |
| 12. | -3,371 | -0,061 | 0,242092 | 0,368752 | 0,285863 | 1 | 0 | 0 |
| 13. | -4,62 | 0,872 | 0,255412 | 0,359034 | 0,284626 | 1 | 0 | 0 |
| 14. | -6,888 | 3,746 | 0,286659 | 0,33917 | 0,284391 | 1 | 0 | 0 |
| 15. | -8,262 | 3,992 | 0,296768 | 0,32992 | 0,281701 | 1 | 0 | 0 |
| 16. | -9,406 | 3,157 | 0,29902 | 0,324159 | 0,277691 | 1 | 0 | 0 |
| 17. | -9,385 | 1,265 | 0,287668 | 0,327824 | 0,274517 | 1 | 0 | 0 |
| 18. | -6,742 | 0,258 | 0,265094 | 0,346612 | 0,278779 | 1 | 0 | 0 |
| 19. | -7,866 | 0,332 | 0,27259 | 0,339284 | 0,276363 | 1 | 0 | 0 |
| 20. | -8,22 | -2,027 | 0,260864 | 0,341422 | 0,271547 | 1 | 0 | 0 |
| 21. | -7,367 | -1,732 | 0,257257 | 0,346327 | 0,273977 | 1 | 0 | 0 |
| 22. | -6,659 | -1,167 | 0,256155 | 0,349801 | 0,276539 | 1 | 0 | 0 |
| 23. | -5,39 | -0,626 | 0,251397 | 0,356905 | 0,280331 | 1 | 0 | 0 |
| 24. | -4,287 | -2,739 | 0,232059 | 0,36789 | 0,279227 | 1 | 0 | 0 |
| 25. | -3,329 | -1,977 | 0,23056 | 0,372588 | 0,282693 | 1 | 0 | 0 |
| 26. | -6,867 | -2,297 | 0,25079 | 0,350579 | 0,274145 | 1 | 0 | 0 |
| 27. | -9,177 | -0,798 | 0,27414 | 0,333006 | 0,271476 | 1 | 0 | 0 |
| 28. | -7,471 | 5,195 | 0,298922 | 0,332736 | 0,285542 | 1 | 0 | 0 |
| 29. | -8,532 | 6,767 | 0,31494 | 0,323013 | 0,28582 | 1 | 0 | 0 |
| 30. | -9,531 | 4,778 | 0,309428 | 0,320333 | 0,280169 | 1 | 0 | 0 |
| 31. | 6,722 | 6,178 | 0,2158 | 0,421403 | 0,3194 | 0 | 1 | 0 |
| 32. | 7,679 | 7,259 | 0,215815 | 0,425582 | 0,323314 | 0 | 1 | 0 |
| 33. | 8,741 | 7,971 | 0,209218 | 0,4323 | 0,325726 | 0 | 1 | 0 |
| 34. | 9,261 | 8,634 | 0,205992 | 0,435586 | 0,326906 | 0 | 1 | 0 |
| 35. | 5,681 | 5,416 | 0,21781 | 0,416212 | 0,315735 | 0 | 1 | 0 |
| 36. | 4,87 | 4,385 | 0,216815 | 0,412975 | 0,312133 | 0 | 1 | 0 |
| 37. | 3,684 | 2,985 | 0,21599 | 0,408037 | 0,30705 | 0 | 1 | 0 |
| 38. | 2,04 | 1,977 | 0,220311 | 0,399455 | 0,301601 | 0 | 1 | 0 |
| 39. | 0,479 | 0,504 | 0,221392 | 0,392255 | 0,295548 | 0 | 1 | 0 |
| 40. | 1,062 | -0,135 | 0,214022 | 0,397153 | 0,295778 | 0 | 1 | 0 |
| 41. | 1,582 | -0,798 | 0,206917 | 0,401691 | 0,295825 | 0 | 1 | 0 |
| 42. | 2,393 | -1,486 | 0,197879 | 0,408121 | 0,296489 | 0 | 1 | 0 |
| 43. | 2,997 | -2,1 | 0,190572 | 0,413093 | 0,29681 | 0 | 1 | 0 |
| 44. | 3,538 | -2,69 | 0,183809 | 0,417617 | 0,297029 | 0 | 1 | 0 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. | 4,35 | -1,584 | 0,185224 | 0,420719 | 0,300758 | 0 | 1 | 0 |
| 46. | 5,681 | -0,282 | 0,184579 | 0,426743 | 0,306 | 0 | 1 | 0 |
| 47. | 5,14 | 0,577 | 0,192909 | 0,421731 | 0,30624 | 0 | 1 | 0 |
| 48. | 6,098 | 1,388 | 0,19171 | 0,426299 | 0,309799 | 0 | 1 | 0 |
| 49. | 7,658 | 1,363 | 0,181945 | 0,436209 | 0,313296 | 0 | 1 | 0 |
| 50. | 8,99 | 1,191 | 0,17276 | 0,444929 | 0,316024 | 0 | 1 | 0 |
| 51. | 8,574 | 2,862 | 0,184999 | 0,439232 | 0,317936 | 0 | 1 | 0 |
| 52. | 8,262 | 4,041 | 0,193778 | 0,43509 | 0,319243 | 0 | 1 | 0 |
| 53. | 6,16 | 3,279 | 0,202343 | 0,423199 | 0,31317 | 0 | 1 | 0 |
| 54. | 4,433 | 2,027 | 0,205738 | 0,414566 | 0,307113 | 0 | 1 | 0 |
| 55. | 3,33 | 1,167 | 0,207555 | 0,409157 | 0,303143 | 0 | 1 | 0 |
| 56. | 2,373 | 0,43 | 0,209186 | 0,404442 | 0,299714 | 0 | 1 | 0 |
| 57. | 5,827 | -3,034 | 0,167753 | 0,432744 | 0,301631 | 0 | 1 | 0 |
| 58. | 6,597 | -3,009 | 0,163183 | 0,437562 | 0,30342 | 0 | 1 | 0 |
| 59. | 6,431 | -1,216 | 0,174552 | 0,43321 | 0,306106 | 0 | 1 | 0 |
| 60. | 8,283 | -1,56 | 0,161218 | 0,445531 | 0,309719 | 0 | 1 | 0 |
| 61. | -4,953 | -4,851 | 0,22381 | 0,367572 | 0,274124 | 0 | 0 | 1 |
| 62. | -3,683 | -3,722 | 0,222523 | 0,373577 | 0,278919 | 0 | 0 | 1 |
| 63. | -1,228 | -3,623 | 0,207843 | 0,389049 | 0,284643 | 0 | 0 | 1 |
| 64. | 0,541 | -3,623 | 0,196885 | 0,400311 | 0,288648 | 0 | 0 | 1 |
| 65. | 2,477 | -3,623 | 0,184932 | 0,412612 | 0,293033 | 0 | 0 | 1 |
| 66. | 3,933 | -4,016 | 0,173698 | 0,422572 | 0,295662 | 0 | 0 | 1 |
| 67. | 5,057 | -5,073 | 0,160712 | 0,431636 | 0,296405 | 0 | 0 | 1 |
| 68. | 6,035 | -5,932 | 0,149812 | 0,439397 | 0,297156 | 0 | 0 | 1 |
| 69. | 6,743 | -6,866 | 0,140167 | 0,445579 | 0,297166 | 0 | 0 | 1 |
| 70. | 7,742 | -7,775 | 0,128946 | 0,453536 | 0,297879 | 0 | 0 | 1 |
| 71. | 8,449 | -8,634 | 0,119817 | 0,459552 | 0,298015 | 0 | 0 | 1 |
| 72. | 0,562 | -5,785 | 0,184184 | 0,404454 | 0,285009 | 0 | 0 | 1 |
| 73. | -1,748 | -5,711 | 0,198879 | 0,389617 | 0,279908 | 0 | 0 | 1 |
| 74. | -0,603 | -6,596 | 0,186657 | 0,39855 | 0,280991 | 0 | 0 | 1 |
| 75. | -2,83 | -6,62 | 0,200277 | 0,384411 | 0,275913 | 0 | 0 | 1 |
| 76. | -4,162 | -5,613 | 0,214423 | 0,374041 | 0,274615 | 0 | 0 | 1 |
| 77. | -5,119 | -6,522 | 0,21505 | 0,369624 | 0,270906 | 0 | 0 | 1 |
| 78. | -4,162 | -7,554 | 0,203079 | 0,377654 | 0,271312 | 0 | 0 | 1 |
| 79. | -6,68 | -7,48 | 0,219146 | 0,361438 | 0,26575 | 0 | 0 | 1 |
| 80. | -7,7 | -7,431 | 0,225784 | 0,354828 | 0,263531 | 0 | 0 | 1 |
| 81. | -0,041 | -9,199 | 0,16813 | 0,406951 | 0,277828 | 0 | 0 | 1 |
| 82. | 1,499 | -9,101 | 0,159271 | 0,416545 | 0,281479 | 0 | 0 | 1 |
| 83. | 2,435 | -9,003 | 0,154122 | 0,422297 | 0,283764 | 0 | 0 | 1 |
| 84. | 4,745 | -7,578 | 0,148228 | 0,434283 | 0,291424 | 0 | 0 | 1 |
| 85. | -7,929 | -8,806 | 0,219147 | 0,355928 | 0,260678 | 0 | 0 | 1 |
| 86. | -5,848 | -8,978 | 0,205216 | 0,369544 | 0,265082 | 0 | 0 | 1 |
| 87. | -4,016 | -8,929 | 0,194161 | 0,381144 | 0,269303 | 0 | 0 | 1 |
| 88. | -1,935 | -7,701 | 0,188453 | 0,392123 | 0,276096 | 0 | 0 | 1 |
| 89. | -6,201 | -6,055 | 0,22452 | 0,361843 | 0,269256 | 0 | 0 | 1 |
| 90. | 1,166 | -7,652 | 0,169662 | 0,411751 | 0,283194 | 0 | 0 | 1 |

**Uruchomienie dla danych weryfikujących:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** |
| 1. | -1,165 | -1,363 | 0,28627 | 0,450889 | 0,484358 |
| 2. | -0,229 | -0,676 | 0,29343 | 0,452353 | 0,489327 |
| 3. | 0,978 | -1,879 | 0,28282 | 0,45361 | 0,49171 |
| 4. | -1,706 | -8,831 | 0,21537 | 0,447912 | 0,467819 |
| 5. | -2,351 | -2,567 | 0,27404 | 0,448934 | 0,477407 |
| 6. | -5,806 | -1,019 | 0,28639 | 0,444757 | 0,466884 |
| 7. | -0,395 | -2,763 | 0,27351 | 0,451501 | 0,484662 |
| 8. | 0,021 | -5,441 | 0,24844 | 0,451253 | 0,481122 |
| 9. | -3,704 | 0,749 | 0,30462 | 0,448116 | 0,478524 |
| 10. | 1,603 | -2,714 | 0,27533 | 0,454197 | 0,492536 |
| 11. | -0,021 | 1,756 | 0,3167 | 0,453364 | 0,494812 |
| 12. | -1,332 | 2,223 | 0,32025 | 0,451745 | 0,490611 |
| 13. | -2,872 | 3,5 | 0,33135 | 0,450063 | 0,487073 |
| 14. | -3,995 | 4,704 | 0,34205 | 0,448917 | 0,485016 |
| 15. | -4,849 | 6,08 | 0,35456 | 0,448185 | 0,484338 |
| 16. | -0,645 | 4,581 | 0,34315 | 0,453378 | 0,497811 |
| 17. | 2,83 | 4,532 | 0,34505 | 0,458022 | 0,511178 |
| 18. | 1,686 | 3,771 | 0,33703 | 0,45626 | 0,505297 |
| 19. | -7,117 | 3,55 | 0,32894 | 0,444373 | 0,470593 |

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| --- | --- | --- | --- | --- | --- |
| 20. | -0,021 | 3,107 | 0,32955 | 0,453771 | 0,497405 |
| 21. | 0,583 | 2,125 | 0,32062 | 0,454286 | 0,497866 |
| 22. | 6,181 | 6,915 | 0,36999 | 0,463225 | 0,528623 |
| 23. | 4,162 | 6,006 | 0,35998 | 0,46025 | 0,519129 |
| 24. | 1,228 | 4,901 | 0,34747 | 0,455986 | 0,505686 |
| 25. | -3,309 | 8,241 | 0,36622 | 0,45059 | 0,492483 |
| 26. | -3,454 | 5,613 | 0,35106 | 0,449918 | 0,488873 |
| 27. | -7,7 | -4,262 | 0,25437 | 0,44123 | 0,45316 |
| 28. | -8,99 | -5,76 | 0,23936 | 0,43904 | 0,445172 |
| 29. | -8,907 | -7,726 | 0,22091 | 0,438558 | 0,441671 |
| 30. | -6,305 | -5,245 | 0,24603 | 0,44281 | 0,456733 |
| 31. | -6,097 | -4,483 | 0,25337 | 0,44332 | 0,459028 |
| 32. | -7,991 | -6,522 | 0,23285 | 0,440155 | 0,447622 |
| 33. | -9,406 | -4,213 | 0,25369 | 0,438948 | 0,446544 |
| 34. | -4,536 | -5,859 | 0,24143 | 0,445004 | 0,462485 |
| 35. | -4,578 | -7,259 | 0,22821 | 0,444525 | 0,459605 |
| 36. | 7,18 | 0,872 | 0,31318 | 0,462747 | 0,52098 |
| 37. | 6,722 | -5,736 | 0,25018 | 0,460149 | 0,506602 |
| 38. | 4,537 | 1,683 | 0,3191 | 0,459453 | 0,512333 |
| 39. | 7,991 | -4,778 | 0,26009 | 0,462136 | 0,513339 |
| 40. | 7,887 | -6,817 | 0,24076 | 0,461384 | 0,509043 |

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| --- | --- | --- | --- | --- | --- |
| 41. | 7,867 | -0,676 | 0,29892 | 0,463202 | 0,520679 |
| 42. | 8,262 | 3,746 | 0,34126 | 0,465057 | 0,530598 |
| 43. | 3,247 | -0,307 | 0,2993 | 0,457126 | 0,503536 |
| 44. | 9,302 | -7,038 | 0,23963 | 0,463212 | 0,514088 |
| 45. | 5,931 | -4,262 | 0,26359 | 0,459533 | 0,506361 |
| 46. | -7,512 | -1,855 | 0,2773 | 0,44221 | 0,458573 |
| 47. | -8,137 | 1,069 | 0,30465 | 0,442252 | 0,461791 |
| 48. | -1,248 | -6,645 | 0,23623 | 0,449186 | 0,47384 |
| 49. | 1,811 | -6,325 | 0,24131 | 0,453389 | 0,486398 |
| 50. | -9,51 | -7,382 | 0,22374 | 0,43785 | 0,439964 |
| 51. | -9,177 | 0,16 | 0,2953 | 0,440577 | 0,455945 |
| 52. | -1,81 | 3,034 | 0,32764 | 0,451348 | 0,490311 |
| 53. | -6,597 | 7,775 | 0,36399 | 0,446172 | 0,479671 |
| 54. | -7,159 | 8,413 | 0,36361 | 0,445417 | 0,477477 |
| 55. | -6,139 | 7,062 | 0,36302 | 0,446747 | 0,481199 |
| 56. | -8,574 | 4,434 | 0,33637 | 0,44268 | 0,466599 |
| 57. | -1,103 | 6,252 | 0,35874 | 0,453266 | 0,499239 |
| 58. | -0,458 | 8,143 | 0,36816 | 0,454416 | 0,503551 |
| 59. | 3,039 | 7,382 | 0,370532 | 0,459103 | 0,517069 |
| 60. | 1,519 | 7,21 | 0,369501 | 0,457067 | 0,511201 |

1. **TU = 0,3 i TT = 0,3; ZPWU = 100%; MW = WŁ**

**Rozwinięcie skrótów:**

**TU** – Tolerancja Uczenia, **TT** – Tolerancja Testowania, **ZPWU** – Zadany Procent Wartości Uczących,

**MW = WŁ** – Mieszanie Wzorców Włączone.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. | 2,456 | 0,602 | 0,257927 | 0,505771 | 0,223392 | 0 | 1 | 0 |
| 61. | 3,309 | -0,7 | 0,178446 | 0,50752 | 0,300004 | 0 | 1 | 0 |
| 62. | 4,35 | -1,462 | 0,1095 | 0,527833 | 0,34752 | 0 | 1 | 0 |
| 63. | 4,308 | 1,977 | 0,219214 | 0,600401 | 0,155856 | 0 | 1 | 0 |
| 64. | 5,14 | 0,626 | 0,13998 | 0,60032 | 0,233952 | 0 | 1 | 0 |
| 65. | 5,661 | -0,184 | 0,09269 | 0,60103 | 0,281557 | 0 | 1 | 0 |
| 66. | 6,41 | -1,118 | 0,03353 | 0,606903 | 0,337404 | 0 | 1 | 0 |
| 67. | 6,264 | 3,328 | 0,175523 | 0,69282 | 0,091717 | 0 | 1 | 0 |
| 68. | 7,658 | 1,388 | 0,056172 | 0,699065 | 0,202811 | 0 | 1 | 0 |
| 69. | 7,846 | 0,553 | 0,023835 | 0,688598 | 0,250047 | 0 | 1 | 0 |
| 70. | 8,616 | -0,798 | -0,04497 | 0,686531 | 0,329293 | 0 | 1 | 0 |
| 71. | 7,783 | 5,171 | 0,166858 | 0,774516 | 0,003152 | 0 | 1 | 0 |
| 72. | 8,324 | 4,09 | 0,109817 | 0,770777 | 0,060399 | 0 | 1 | 0 |
| 73. | 8,532 | 2,96 | 0,066728 | 0,756161 | 0,120932 | 0 | 1 | 0 |
| 74. | 8,99 | 1,241 | -0,00236 | 0,737831 | 0,216825 | 0 | 1 | 0 |
| 75. | 9,282 | 6,08 | 0,129986 | 0,833078 | -0,03563 | 0 | 1 | 0 |
| 76. | 9,781 | 2,641 | 0,006158 | 0,787255 | 0,143487 | 0 | 1 | 0 |
| 77. | 9,719 | -1,019 | -0,09235 | 0,717183 | 0,346667 | 0 | 1 | 0 |
| 78. | 8,22 | -1,56 | -0,05074 | 0,658356 | 0,370363 | 0 | 1 | 0 |
| 79. | 5,994 | 1,437 | 0,128191 | 0,645969 | 0,19279 | 0 | 1 | 0 |
| 80. | 3,08 | 1,019 | 0,243365 | 0,537116 | 0,203042 | 0 | 1 | 0 |
| 81. | -9,24 | -9,003 | 0,473805 | -0,109 | 0,693247 | 0 | 0 | 1 |
| 82. | -7,783 | -7,504 | 0,456874 | -0,03613 | 0,624038 | 0 | 0 | 1 |
| 83. | -6,43 | -6,08 | 0,442108 | 0,036749 | 0,555079 | 0 | 0 | 1 |
| 84. | -5,057 | -4,778 | 0,422483 | 0,111469 | 0,490519 | 0 | 0 | 1 |
| 85. | -3,683 | -3,648 | 0,3972 | 0,185199 | 0,434121 | 0 | 0 | 1 |
| 86. | -1,436 | -3,55 | 0,299067 | 0,269333 | 0,43863 | 0 | 0 | 1 |
| 87. | 0,708 | -3,599 | 0,201506 | 0,347271 | 0,450838 | 0 | 0 | 1 |
| 88. | 2,456 | -3,525 | 0,127315 | 0,413309 | 0,454456 | 0 | 0 | 1 |
| 89. | 3,975 | -3,918 | 0,051113 | 0,459893 | 0,482821 | 0 | 0 | 1 |
| 90. | 5,14 | -5,122 | -0,03045 | 0,475159 | 0,553155 | 0 | 0 | 1 |
| 91. | 6,202 | -6,006 | -0,09452 | 0,493758 | 0,604226 | 0 | 0 | 1 |
| 92. | 6,909 | -6,915 | -0,14283 | 0,498985 | 0,653594 | 0 | 0 | 1 |
| 93. | 7,908 | -7,848 | -0,19826 | 0,514106 | 0,7035 | 0 | 0 | 1 |
| 94. | 8,699 | -8,708 | -0,2416 | 0,523358 | 0,747137 | 0 | 0 | 1 |
| 95. | -4,099 | -5,49 | 0,356446 | 0,129703 | 0,533389 | 0 | 0 | 1 |
| 96. | -1,831 | -5,564 | 0,251885 | 0,209409 | 0,547082 | 0 | 0 | 1 |
| 97. | 0,541 | -5,711 | 0,142352 | 0,292979 | 0,565011 | 0 | 0 | 1 |
| 98. | 3,309 | -5,736 | 0,024936 | 0,394488 | 0,578012 | 0 | 0 | 1 |
| 99. | -6,638 | -7,504 | 0,405725 | 0,000729 | 0,628714 | 0 | 0 | 1 |
| 100. | -4,141 | -7,431 | 0,295546 | 0,08632 | 0,635145 | 0 | 0 | 1 |
| 101. | -1,81 | -7,676 | 0,183574 | 0,163105 | 0,656918 | 0 | 0 | 1 |
| 102. | 1,228 | -7,676 | 0,053271 | 0,273592 | 0,669002 | 0 | 0 | 1 |
| 103. | 2,664 | -7,652 | -0,0044 | 0,327075 | 0,673487 | 0 | 0 | 1 |
| 104. | 4,537 | -7,627 | -0,07596 | 0,396699 | 0,679623 | 0 | 0 | 1 |
| 105. | 5,681 | -7,603 | -0,11706 | 0,439153 | 0,682927 | 0 | 0 | 1 |
| 106. | -8,053 | -8,929 | 0,423345 | -0,07198 | 0,694249 | 0 | 0 | 1 |
| 107. | -5,848 | -9,003 | 0,32169 | -0,0037 | 0,706335 | 0 | 0 | 1 |
| 108. | -4,266 | -8,978 | 0,251293 | 0,049356 | 0,711189 | 0 | 0 | 1 |
| 109. | -1,977 | -9,003 | 0,149191 | 0,128022 | 0,721084 | 0 | 0 | 1 |
| 110. | 0 | -9,224 | 0,058167 | 0,193843 | 0,738904 | 0 | 0 | 1 |
| 111. | 1,353 | -9,199 | 0,003647 | 0,243661 | 0,742761 | 0 | 0 | 1 |
| 112. | 2,373 | -9,052 | -0,03245 | 0,284455 | 0,739701 | 0 | 0 | 1 |
| 113. | 4,558 | -8,954 | -0,11154 | 0,367295 | 0,743244 | 0 | 0 | 1 |
| 114. | 5,869 | -8,905 | -0,15608 | 0,416621 | 0,745817 | 0 | 0 | 1 |
| 115. | 6,847 | -8,806 | -0,18621 | 0,454561 | 0,744841 | 0 | 0 | 1 |
| 116. | -0,458 | -6,792 | 0,15209 | 0,231797 | 0,61744 | 0 | 0 | 1 |
| 117. | -2,955 | -6,571 | 0,269923 | 0,146594 | 0,595644 | 0 | 0 | 1 |
| 118. | -5,078 | -6,497 | 0,368029 | 0,073908 | 0,582894 | 0 | 0 | 1 |
| 119. | 2,102 | -6,031 | 0,065994 | 0,343285 | 0,588472 | 0 | 0 | 1 |
| 120. | 4,516 | -6,203 | -0,03633 | 0,428181 | 0,607479 | 0 | 0 | 1 |

**Uruchomienie sieci dla danych uczących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  |  | odp. rzeczywista | | | odp.oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,822 | 9,322 | 0,929773 | 0,205409 | -0,15542 | 1 | 0 | 0 |
| 2. | -8,678 | 8,094 | 0,896137 | 0,247132 | -0,15155 | 1 | 0 | 0 |
| 3. | -7,2 | 6,669 | 0,83712 | 0,289471 | -0,12359 | 1 | 0 | 0 |
| 4. | -6,118 | 5,343 | 0,766321 | 0,299167 | -0,05906 | 1 | 0 | 0 |
| 5. | -4,89 | 4,409 | 0,694745 | 0,323191 | -0,00916 | 1 | 0 | 0 |
| 6. | -4,058 | 3,107 | 0,623886 | 0,324221 | 0,060207 | 1 | 0 | 0 |
| 7. | -3,101 | 2,493 | 0,565309 | 0,345549 | 0,096412 | 1 | 0 | 0 |
| 8. | -2,185 | 1,658 | 0,499787 | 0,360321 | 0,145082 | 1 | 0 | 0 |
| 9. | -1,373 | 0,528 | 0,427897 | 0,36453 | 0,210574 | 1 | 0 | 0 |
| 10. | -1,831 | -0,405 | 0,418451 | 0,326362 | 0,260491 | 1 | 0 | 0 |
| 11. | -3,205 | -1,977 | 0,429489 | 0,240083 | 0,342624 | 1 | 0 | 0 |
| 12. | -4,079 | -2,739 | 0,444108 | 0,191171 | 0,381531 | 1 | 0 | 0 |
| 13. | -5,452 | -3,009 | 0,496288 | 0,136044 | 0,390538 | 1 | 0 | 0 |
| 14. | -7,949 | -3,058 | 0,601905 | 0,048448 | 0,382127 | 1 | 0 | 0 |
| 15. | -9,469 | -3,034 | 0,664776 | -0,00157 | 0,37398 | 1 | 0 | 0 |
| 16. | -9,385 | -0,798 | 0,724051 | 0,047088 | 0,248813 | 1 | 0 | 0 |
| 17. | -9,385 | 1,339 | 0,780593 | 0,092287 | 0,131318 | 1 | 0 | 0 |
| 18. | -9,469 | 3,23 | 0,830533 | 0,130247 | 0,031705 | 1 | 0 | 0 |
| 19. | -9,489 | 4,876 | 0,869694 | 0,165721 | -0,04964 | 1 | 0 | 0 |
| 20. | -9,718 | 7,013 | 0,923015 | 0,205068 | -0,14725 | 1 | 0 | 0 |
| 21. | -7,512 | 5,195 | 0,811908 | 0,244562 | -0,05731 | 1 | 0 | 0 |
| 22. | -5,993 | 2,763 | 0,691722 | 0,245185 | 0,070088 | 1 | 0 | 0 |
| 23. | -4,599 | 0,897 | 0,580314 | 0,254038 | 0,176076 | 1 | 0 | 0 |
| 24. | -5,244 | -0,602 | 0,562048 | 0,19677 | 0,256299 | 1 | 0 | 0 |
| 25. | -6,493 | -1,093 | 0,599947 | 0,141091 | 0,278219 | 1 | 0 | 0 |
| 26. | -7,908 | 0,43 | 0,70115 | 0,124309 | 0,18724 | 1 | 0 | 0 |
| 27. | -7,866 | 2,493 | 0,755502 | 0,171148 | 0,076404 | 1 | 0 | 0 |
| 28. | -8,157 | 3,967 | 0,803756 | 0,193469 | -0,00015 | 1 | 0 | 0 |
| 29. | -6,888 | 3,844 | 0,755165 | 0,236865 | 0,011054 | 1 | 0 | 0 |
| 30. | -6,826 | 0,307 | 0,654855 | 0,160036 | 0,198768 | 1 | 0 | 0 |
| 31. | -3,454 | 0,037 | 0,504454 | 0,276589 | 0,228619 | 1 | 0 | 0 |
| 32. | -5,265 | -2,076 | 0,517365 | 0,163231 | 0,338959 | 1 | 0 | 0 |
| 33. | -6,971 | -2,346 | 0,582275 | 0,097087 | 0,346499 | 1 | 0 | 0 |
| 34. | -7,554 | -1,634 | 0,627841 | 0,09211 | 0,303845 | 1 | 0 | 0 |
| 35. | -8,22 | -1,928 | 0,646417 | 0,062947 | 0,31739 | 1 | 0 | 0 |
| 36. | -8,47 | 6,767 | 0,880279 | 0,245032 | -0,13233 | 1 | 0 | 0 |
| 37. | -9,448 | 8,192 | 0,919006 | 0,219005 | -0,15415 | 1 | 0 | 0 |
| 38. | -8,033 | 7,406 | 0,876252 | 0,270804 | -0,14936 | 1 | 0 | 0 |
| 39. | -6,742 | 5,416 | 0,790575 | 0,277841 | -0,06484 | 1 | 0 | 0 |
| 40. | -4,412 | 2,395 | 0,617424 | 0,29494 | 0,096069 | 1 | 0 | 0 |
| 41. | 0,375 | 0,43 | 0,346129 | 0,426553 | 0,223735 | 0 | 1 | 0 |
| 42. | 1,832 | 1,855 | 0,326492 | 0,511126 | 0,151762 | 0 | 1 | 0 |
| 43. | 3,455 | 2,96 | 0,289037 | 0,591974 | 0,099351 | 0 | 1 | 0 |
| 44. | 4,828 | 4,336 | 0,271656 | 0,666527 | 0,033402 | 0 | 1 | 0 |
| 45. | 5,432 | 5,367 | 0,277743 | 0,706399 | -0,01583 | 0 | 1 | 0 |
| 46. | 6,639 | 6,276 | 0,25281 | 0,760809 | -0,0551 | 0 | 1 | 0 |
| 47. | 7,617 | 7,357 | 0,238581 | 0,805897 | -0,09431 | 0 | 1 | 0 |
| 48. | 8,72 | 8,168 | 0,189546 | 0,836561 | -0,09029 | 0 | 1 | 0 |
| 49. | 9,365 | 8,905 | 0,161192 | 0,853903 | -0,08794 | 0 | 1 | 0 |
| 50. | 1,041 | -0,258 | 0,293827 | 0,435365 | 0,265072 | 0 | 1 | 0 |
| 51. | 1,603 | -0,847 | 0,249583 | 0,442598 | 0,300625 | 0 | 1 | 0 |
| 52. | 2,206 | -1,462 | 0,203034 | 0,450727 | 0,33791 | 0 | 1 | 0 |
| 53. | 2,997 | -2,199 | 0,145068 | 0,462928 | 0,382871 | 0 | 1 | 0 |
| 54. | 3,434 | -2,739 | 0,10951 | 0,466681 | 0,415058 | 0 | 1 | 0 |
| 55. | 4,62 | -3,058 | 0,049942 | 0,50232 | 0,438107 | 0 | 1 | 0 |
| 56. | 5,765 | -3,058 | 0,003319 | 0,543011 | 0,443178 | 0 | 1 | 0 |
| 57. | 6,701 | -3,034 | -0,03293 | 0,576243 | 0,445987 | 0 | 1 | 0 |
| 58. | 8,345 | -3,107 | -0,09686 | 0,630782 | 0,457296 | 0 | 1 | 0 |
| 59. | 9,032 | -3,107 | -0,12157 | 0,653633 | 0,460325 | 0 | 1 | 0 |

**Uruchomienie dla danych testujących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | | odp. oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,697 | 9,175 | 1,011612 | 0,111081 | -0,09609 | 1 | 0 | 0 |
| 2. | -8,636 | 8,045 | 0,97669 | 0,154784 | -0,08639 | 1 | 0 | 0 |
| 3. | -7,991 | 7,259 | 0,95395 | 0,181713 | -0,08045 | 1 | 0 | 0 |
| 4. | -7,221 | 6,718 | 0,914017 | 0,20234 | -0,05264 | 1 | 0 | 0 |
| 5. | -6,076 | 5,613 | 0,838248 | 0,223463 | 0,008059 | 1 | 0 | 0 |
| 6. | -4,932 | 4,483 | 0,752629 | 0,244018 | 0,072931 | 1 | 0 | 0 |
| 7. | -3,912 | 3,034 | 0,654695 | 0,251407 | 0,154967 | 1 | 0 | 0 |
| 8. | -2,996 | 2,518 | 0,587093 | 0,277644 | 0,191006 | 1 | 0 | 0 |
| 9. | -2,143 | 1,462 | 0,501377 | 0,287743 | 0,254475 | 1 | 0 | 0 |
| 10. | -1,269 | 0,626 | 0,41967 | 0,304254 | 0,307511 | 1 | 0 | 0 |
| 11. | -1,748 | -0,381 | 0,411744 | 0,258611 | 0,35432 | 1 | 0 | 0 |
| 12. | -3,371 | -0,061 | 0,519015 | 0,19769 | 0,319374 | 1 | 0 | 0 |
| 13. | -4,62 | 0,872 | 0,62179 | 0,168162 | 0,257056 | 1 | 0 | 0 |
| 14. | -6,888 | 3,746 | 0,823846 | 0,143677 | 0,087921 | 1 | 0 | 0 |
| 15. | -8,262 | 3,992 | 0,889414 | 0,093322 | 0,06169 | 1 | 0 | 0 |
| 16. | -9,406 | 3,157 | 0,914879 | 0,028539 | 0,08987 | 1 | 0 | 0 |
| 17. | -9,385 | 1,265 | 0,867201 | -0,01301 | 0,183945 | 1 | 0 | 0 |
| 18. | -6,742 | 0,258 | 0,714688 | 0,066763 | 0,264862 | 1 | 0 | 0 |
| 19. | -7,866 | 0,332 | 0,772717 | 0,024251 | 0,248438 | 1 | 0 | 0 |
| 20. | -8,22 | -2,027 | 0,719282 | -0,04127 | 0,366527 | 1 | 0 | 0 |
| 21. | -7,367 | -1,732 | 0,684449 | -0,0029 | 0,360871 | 1 | 0 | 0 |
| 22. | -6,659 | -1,167 | 0,665149 | 0,037158 | 0,339569 | 1 | 0 | 0 |
| 23. | -5,39 | -0,626 | 0,614079 | 0,100378 | 0,325853 | 1 | 0 | 0 |
| 24. | -4,287 | -2,739 | 0,477464 | 0,095051 | 0,447529 | 1 | 0 | 0 |
| 25. | -3,329 | -1,977 | 0,448187 | 0,152614 | 0,41908 | 1 | 0 | 0 |
| 26. | -6,867 | -2,297 | 0,6394 | 0,00358 | 0,395782 | 1 | 0 | 0 |
| 27. | -9,177 | -0,798 | 0,802264 | -0,05004 | 0,291998 | 1 | 0 | 0 |
| 28. | -7,471 | 5,195 | 0,886944 | 0,154604 | 0,013307 | 1 | 0 | 0 |
| 29. | -8,532 | 6,767 | 0,963966 | 0,148683 | -0,06714 | 1 | 0 | 0 |
| 30. | -9,531 | 4,778 | 0,956507 | 0,060858 | 0,011831 | 1 | 0 | 0 |
| 31. | 6,722 | 6,178 | 0,144337 | 0,754319 | 0,113995 | 0 | 1 | 0 |
| 32. | 7,679 | 7,259 | 0,124814 | 0,806327 | 0,074614 | 0 | 1 | 0 |
| 33. | 8,741 | 7,971 | 0,064701 | 0,839974 | 0,085781 | 0 | 1 | 0 |
| 34. | 9,261 | 8,634 | 0,036009 | 0,855861 | 0,091275 | 0 | 1 | 0 |
| 35. | 5,681 | 5,416 | 0,178057 | 0,701508 | 0,140445 | 0 | 1 | 0 |
| 36. | 4,87 | 4,385 | 0,188917 | 0,648754 | 0,183285 | 0 | 1 | 0 |
| 37. | 3,684 | 2,985 | 0,208736 | 0,570231 | 0,24147 | 0 | 1 | 0 |
| 38. | 2,04 | 1,977 | 0,270235 | 0,478611 | 0,274929 | 0 | 1 | 0 |
| 39. | 0,479 | 0,504 | 0,310248 | 0,376067 | 0,333591 | 0 | 1 | 0 |
| 40. | 1,062 | -0,135 | 0,251991 | 0,385026 | 0,37332 | 0 | 1 | 0 |
| 41. | 1,582 | -0,798 | 0,197161 | 0,390688 | 0,413477 | 0 | 1 | 0 |
| 42. | 2,393 | -1,486 | 0,125513 | 0,408118 | 0,457924 | 0 | 1 | 0 |
| 43. | 2,997 | -2,1 | 0,070123 | 0,418545 | 0,495875 | 0 | 1 | 0 |
| 44. | 3,538 | -2,69 | 0,020667 | 0,426875 | 0,531482 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. | 4,35 | -1,584 | 0,013106 | 0,488194 | 0,484665 | 0 | 1 | 0 |
| 46. | 5,681 | -0,282 | -0,01562 | 0,573778 | 0,432921 | 0 | 1 | 0 |
| 47. | 5,14 | 0,577 | 0,041498 | 0,572208 | 0,38248 | 0 | 1 | 0 |
| 48. | 6,098 | 1,388 | 0,016185 | 0,628662 | 0,351264 | 0 | 1 | 0 |
| 49. | 7,658 | 1,363 | -0,06591 | 0,687159 | 0,370191 | 0 | 1 | 0 |
| 50. | 8,99 | 1,191 | -0,13541 | 0,731734 | 0,394133 | 0 | 1 | 0 |
| 51. | 8,574 | 2,862 | -0,06619 | 0,751369 | 0,302814 | 0 | 1 | 0 |
| 52. | 8,262 | 4,041 | -0,01327 | 0,76434 | 0,238482 | 0 | 1 | 0 |
| 53. | 6,16 | 3,279 | 0,075953 | 0,673079 | 0,254098 | 0 | 1 | 0 |
| 54. | 4,433 | 2,027 | 0,130912 | 0,577818 | 0,299316 | 0 | 1 | 0 |
| 55. | 3,33 | 1,167 | 0,164602 | 0,512545 | 0,331432 | 0 | 1 | 0 |
| 56. | 2,373 | 0,43 | 0,194499 | 0,454665 | 0,358842 | 0 | 1 | 0 |
| 57. | 5,827 | -3,034 | -0,1072 | 0,514309 | 0,573213 | 0 | 1 | 0 |
| 58. | 6,597 | -3,009 | -0,14272 | 0,546444 | 0,580203 | 0 | 1 | 0 |
| 59. | 6,431 | -1,216 | -0,08282 | 0,581948 | 0,489007 | 0 | 1 | 0 |
| 60. | 8,283 | -1,56 | -0,17893 | 0,646461 | 0,526691 | 0 | 1 | 0 |
| 61. | -4,953 | -4,851 | 0,440959 | 0,0198 | 0,546937 | 0 | 0 | 1 |
| 62. | -3,683 | -3,722 | 0,406101 | 0,096255 | 0,504268 | 0 | 0 | 1 |
| 63. | -1,228 | -3,623 | 0,262242 | 0,200306 | 0,526191 | 0 | 0 | 1 |
| 64. | 0,541 | -3,623 | 0,157576 | 0,275481 | 0,54542 | 0 | 0 | 1 |
| 65. | 2,477 | -3,623 | 0,047651 | 0,3584 | 0,566281 | 0 | 0 | 1 |
| 66. | 3,933 | -4,016 | -0,04265 | 0,410754 | 0,600917 | 0 | 0 | 1 |
| 67. | 5,057 | -5,073 | -0,12943 | 0,432249 | 0,662608 | 0 | 0 | 1 |
| 68. | 6,035 | -5,932 | -0,19655 | 0,452362 | 0,711417 | 0 | 0 | 1 |
| 69. | 6,743 | -6,866 | -0,24866 | 0,459195 | 0,758904 | 0 | 0 | 1 |
| 70. | 7,742 | -7,775 | -0,30584 | 0,478814 | 0,805712 | 0 | 0 | 1 |
| 71. | 8,449 | -8,634 | -0,34641 | 0,487376 | 0,845644 | 0 | 0 | 1 |
| 72. | 0,562 | -5,785 | 0,081146 | 0,222584 | 0,650129 | 0 | 0 | 1 |
| 73. | -1,748 | -5,711 | 0,217629 | 0,127805 | 0,622841 | 0 | 0 | 1 |
| 74. | -0,603 | -6,596 | 0,119324 | 0,153759 | 0,675969 | 0 | 0 | 1 |
| 75. | -2,83 | -6,62 | 0,249183 | 0,062537 | 0,654603 | 0 | 0 | 1 |
| 76. | -4,162 | -5,613 | 0,365928 | 0,033236 | 0,592815 | 0 | 0 | 1 |
| 77. | -5,119 | -6,522 | 0,39024 | -0,02365 | 0,626473 | 0 | 0 | 1 |
| 78. | -4,162 | -7,554 | 0,295012 | -0,01034 | 0,684317 | 0 | 0 | 1 |
| 79. | -6,68 | -7,48 | 0,448689 | -0,10017 | 0,655577 | 0 | 0 | 1 |
| 80. | -7,7 | -7,431 | 0,510439 | -0,13394 | 0,642866 | 0 | 0 | 1 |
| 81. | -0,041 | -9,199 | 0,000561 | 0,114251 | 0,794626 | 0 | 0 | 1 |
| 82. | 1,499 | -9,101 | -0,07575 | 0,180409 | 0,804308 | 0 | 0 | 1 |
| 83. | 2,435 | -9,003 | -0,11835 | 0,222288 | 0,808591 | 0 | 0 | 1 |
| 84. | 4,745 | -7,578 | -0,18405 | 0,35658 | 0,77062 | 0 | 0 | 1 |
| 85. | -7,929 | -8,806 | 0,474925 | -0,16765 | 0,703829 | 0 | 0 | 1 |
| 86. | -5,848 | -8,978 | 0,344401 | -0,10167 | 0,731579 | 0 | 0 | 1 |
| 87. | -4,016 | -8,929 | 0,236266 | -0,03493 | 0,746809 | 0 | 0 | 1 |
| 88. | -1,935 | -7,701 | 0,157519 | 0,073045 | 0,71284 | 0 | 0 | 1 |
| 89. | -6,201 | -6,055 | 0,471562 | -0,05351 | 0,592698 | 0 | 0 | 1 |
| 90. | 1,166 | -7,652 | -0,0136 | 0,202003 | 0,740421 | 0 | 0 | 1 |

**Uruchomienie dla danych weryfikujących:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** |
| 1. | -1,165 | -1,363 | 0,340933 | 0,259008 | 0,411737 |
| 2. | -0,229 | -0,676 | 0,309723 | 0,316225 | 0,386768 |
| 3. | 0,978 | -1,879 | 0,194057 | 0,337834 | 0,462249 |
| 4. | -1,706 | -8,831 | 0,104784 | 0,055884 | 0,764155 |
| 5. | -2,351 | -2,567 | 0,368281 | 0,179034 | 0,460328 |
| 6. | -5,806 | -1,019 | 0,623845 | 0,074352 | 0,341536 |
| 7. | -0,395 | -2,763 | 0,243675 | 0,256966 | 0,492011 |
| 8. | 0,021 | -5,441 | 0,123774 | 0,208194 | 0,628341 |
| 9. | -3,704 | 0,749 | 0,566394 | 0,203601 | 0,273693 |
| 10. | 1,603 | -2,714 | 0,128051 | 0,343712 | 0,511533 |
| 11. | -0,021 | 1,756 | 0,386045 | 0,385953 | 0,263154 |
| 12. | -1,332 | 2,223 | 0,480932 | 0,341536 | 0,224493 |
| 13. | -2,872 | 3,5 | 0,613423 | 0,30751 | 0,143024 |
| 14. | -3,995 | 4,704 | 0,712309 | 0,28954 | 0,072125 |
| 15. | -4,849 | 6,08 | 0,795251 | 0,287394 | -0,00108 |
| 16. | -0,645 | 4,581 | 0,524438 | 0,429618 | 0,113569 |
| 17. | 2,83 | 4,532 | 0,316 | 0,572228 | 0,15354 |
| 18. | 1,686 | 3,771 | 0,35702 | 0,507473 | 0,179246 |
| 19. | -7,117 | 3,55 | 0,828796 | 0,129503 | 0,095014 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 20. | -0,021 | 3,107 | 0,435111 | 0,419562 | 0,194018 |
| 21. | 0,583 | 2,125 | 0,363227 | 0,420849 | 0,250932 |
| 22. | 6,181 | 6,915 | 0,202233 | 0,750493 | 0,072457 |
| 23. | 4,162 | 6,006 | 0,289748 | 0,657838 | 0,095126 |
| 24. | 1,228 | 4,901 | 0,425617 | 0,51582 | 0,117907 |
| 25. | -3,309 | 8,241 | 0,753871 | 0,381274 | -0,0362 |
| 26. | -3,454 | 5,613 | 0,712879 | 0,33547 | 0,034587 |
| 27. | -7,7 | -4,262 | 0,619677 | -0,06982 | 0,487286 |
| 28. | -8,99 | -5,76 | 0,640463 | -0,14434 | 0,548382 |
| 29. | -8,907 | -7,726 | 0,56953 | -0,17865 | 0,644367 |
| 30. | -6,305 | -5,245 | 0,506522 | -0,03998 | 0,551862 |
| 31. | -6,097 | -4,483 | 0,521339 | -0,01565 | 0,516097 |
| 32. | -7,991 | -6,522 | 0,559031 | -0,12588 | 0,596424 |
| 33. | -9,406 | -4,213 | 0,712043 | -0,12811 | 0,465863 |
| 34. | -4,536 | -5,859 | 0,37942 | 0,01317 | 0,600779 |
| 35. | -4,578 | -7,259 | 0,330809 | -0,01951 | 0,666593 |
| 36. | 7,18 | 0,872 | -0,05684 | 0,658546 | 0,390227 |
| 37. | 6,722 | -5,736 | -0,22033 | 0,48596 | 0,709351 |
| 38. | 4,537 | 1,683 | 0,112953 | 0,573937 | 0,318315 |
| 39. | 7,991 | -4,778 | -0,24787 | 0,561047 | 0,678498 |
| 40. | 7,887 | -6,817 | -0,29042 | 0,508113 | 0,767407 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 41. | 7,867 | -0,676 | -0,13592 | 0,650293 | 0,477473 |
| 42. | 8,262 | 3,746 | -0,02267 | 0,75843 | 0,253642 |
| 43. | 3,247 | -0,307 | 0,117602 | 0,473285 | 0,406864 |
| 44. | 9,302 | -7,038 | -0,34274 | 0,560672 | 0,789503 |
| 45. | 5,931 | -4,262 | -0,14709 | 0,488882 | 0,633516 |
| 46. | -7,512 | -1,855 | 0,688132 | -0,01112 | 0,36561 |
| 47. | -8,137 | 1,069 | 0,806621 | 0,030453 | 0,207693 |
| 48. | -1,248 | -6,645 | 0,154865 | 0,125929 | 0,671755 |
| 49. | 1,811 | -6,325 | -0,00509 | 0,262302 | 0,687637 |
| 50. | -9,51 | -7,382 | 0,614985 | -0,19118 | 0,621851 |
| 51. | -9,177 | 0,16 | 0,828837 | -0,02941 | 0,242593 |
| 52. | -1,81 | 3,034 | 0,53745 | 0,341355 | 0,177986 |
| 53. | -6,597 | 7,775 | 0,900812 | 0,240627 | -0,06748 |
| 54. | -7,159 | 8,413 | 0,922896 | 0,216776 | -0,07273 |
| 55. | -6,139 | 7,062 | 0,878759 | 0,256786 | -0,05735 |
| 56. | -8,574 | 4,434 | 0,912672 | 0,091148 | 0,037546 |
| 57. | -1,103 | 6,252 | 0,608028 | 0,451516 | 0,028666 |
| 58. | -0,458 | 8,143 | 0,604071 | 0,501562 | -0,00834 |
| 59. | 3,039 | 7,382 | 0,400711 | 0,641547 | 0,026715 |
| 60. | 1,519 | 7,21 | 0,490914 | 0,582055 | 0,011361 |

1. **TU = 0,2 i TT = 0,2; ZPWU = 100%; MW = WŁ**

**Rozwinięcie skrótów:**

**TU** – Tolerancja Uczenia, **TT** – Tolerancja Testowania, **ZPWU** – Zadany Procent Wartości Uczących,

**MW = WŁ** – Mieszanie Wzorców Włączone.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. | 2,456 | 0,602 | 0,088927 | 0,782824 | 0,040446 | 0 | 1 | 0 |
| 61. | 3,309 | -0,7 | 0,021253 | 0,805198 | 0,083915 | 0 | 1 | 0 |
| 62. | 4,35 | -1,462 | 0,008561 | 0,785784 | 0,121096 | 0 | 1 | 0 |
| 63. | 4,308 | 1,977 | 0,069756 | 0,796989 | 0,050593 | 0 | 1 | 0 |
| 64. | 5,14 | 0,626 | 0,030826 | 0,816333 | 0,068214 | 0 | 1 | 0 |
| 65. | 5,661 | -0,184 | 0,024938 | 0,814423 | 0,076669 | 0 | 1 | 0 |
| 66. | 6,41 | -1,118 | 0,020358 | 0,800347 | 0,097888 | 0 | 1 | 0 |
| 67. | 6,264 | 3,328 | 0,055393 | 0,805319 | 0,059882 | 0 | 1 | 0 |
| 68. | 7,658 | 1,388 | 0,033133 | 0,816949 | 0,069742 | 0 | 1 | 0 |
| 69. | 7,846 | 0,553 | 0,031444 | 0,81618 | 0,072097 | 0 | 1 | 0 |
| 70. | 8,616 | -0,798 | 0,028757 | 0,806814 | 0,085589 | 0 | 1 | 0 |
| 71. | 7,783 | 5,171 | 0,062893 | 0,800981 | 0,059701 | 0 | 1 | 0 |
| 72. | 8,324 | 4,09 | 0,042505 | 0,812464 | 0,067206 | 0 | 1 | 0 |
| 73. | 8,532 | 2,96 | 0,037132 | 0,815419 | 0,069026 | 0 | 1 | 0 |
| 74. | 8,99 | 1,241 | 0,034323 | 0,816125 | 0,070787 | 0 | 1 | 0 |
| 75. | 9,282 | 6,08 | 0,052661 | 0,806665 | 0,064793 | 0 | 1 | 0 |
| 76. | 9,781 | 2,641 | 0,036747 | 0,815531 | 0,070131 | 0 | 1 | 0 |
| 77. | 9,719 | -1,019 | 0,030041 | 0,803545 | 0,089034 | 0 | 1 | 0 |
| 78. | 8,22 | -1,56 | 0,021976 | 0,788 | 0,112688 | 0 | 1 | 0 |
| 79. | 5,994 | 1,437 | 0,034539 | 0,816227 | 0,066852 | 0 | 1 | 0 |
| 80. | 3,08 | 1,019 | 0,079008 | 0,790251 | 0,044671 | 0 | 1 | 0 |
| 81. | -9,24 | -9,003 | -0,05796 | -0,32556 | 0,963103 | 0 | 0 | 1 |
| 82. | -7,783 | -7,504 | 0,033091 | -0,36396 | 0,987635 | 0 | 0 | 1 |
| 83. | -6,43 | -6,08 | 0,119438 | -0,38365 | 0,992222 | 0 | 0 | 1 |
| 84. | -5,057 | -4,778 | 0,165135 | -0,33194 | 0,938086 | 0 | 0 | 1 |
| 85. | -3,683 | -3,648 | 0,191944 | -0,08104 | 0,691536 | 0 | 0 | 1 |
| 86. | -1,436 | -3,55 | -0,08955 | 0,220214 | 0,720835 | 0 | 0 | 1 |
| 87. | 0,708 | -3,599 | -0,11947 | 0,297926 | 0,707862 | 0 | 0 | 1 |
| 88. | 2,456 | -3,525 | -0,09732 | 0,372724 | 0,633258 | 0 | 0 | 1 |
| 89. | 3,975 | -3,918 | -0,1085 | 0,261235 | 0,740323 | 0 | 0 | 1 |
| 90. | 5,14 | -5,122 | -0,16868 | -0,0868 | 1,025057 | 0 | 0 | 1 |
| 91. | 6,202 | -6,006 | -0,18853 | -0,19828 | 1,098398 | 0 | 0 | 1 |
| 92. | 6,909 | -6,915 | -0,19762 | -0,24405 | 1,126376 | 0 | 0 | 1 |
| 93. | 7,908 | -7,848 | -0,19921 | -0,26127 | 1,136098 | 0 | 0 | 1 |
| 94. | 8,699 | -8,708 | -0,19909 | -0,26741 | 1,139361 | 0 | 0 | 1 |
| 95. | -4,099 | -5,49 | -0,17191 | -0,22734 | 1,06425 | 0 | 0 | 1 |
| 96. | -1,831 | -5,564 | -0,24607 | -0,1711 | 1,093778 | 0 | 0 | 1 |
| 97. | 0,541 | -5,711 | -0,23048 | -0,18108 | 1,100255 | 0 | 0 | 1 |
| 98. | 3,309 | -5,736 | -0,20346 | -0,18346 | 1,094218 | 0 | 0 | 1 |
| 99. | -6,638 | -7,504 | -0,19223 | -0,26026 | 1,058291 | 0 | 0 | 1 |
| 100. | -4,141 | -7,431 | -0,30751 | -0,18089 | 1,114349 | 0 | 0 | 1 |
| 101. | -1,81 | -7,676 | -0,28812 | -0,20021 | 1,127147 | 0 | 0 | 1 |
| 102. | 1,228 | -7,676 | -0,24601 | -0,23225 | 1,132626 | 0 | 0 | 1 |
| 103. | 2,664 | -7,652 | -0,2308 | -0,24213 | 1,133827 | 0 | 0 | 1 |
| 104. | 4,537 | -7,627 | -0,21561 | -0,2509 | 1,134601 | 0 | 0 | 1 |
| 105. | 5,681 | -7,603 | -0,2084 | -0,25435 | 1,134642 | 0 | 0 | 1 |
| 106. | -8,053 | -8,929 | -0,25523 | -0,21753 | 1,040927 | 0 | 0 | 1 |
| 107. | -5,848 | -9,003 | -0,36318 | -0,12853 | 1,104657 | 0 | 0 | 1 |
| 108. | -4,266 | -8,978 | -0,34695 | -0,14823 | 1,118302 | 0 | 0 | 1 |
| 109. | -1,977 | -9,003 | -0,30508 | -0,1896 | 1,127632 | 0 | 0 | 1 |
| 110. | 0 | -9,224 | -0,27319 | -0,21695 | 1,132264 | 0 | 0 | 1 |
| 111. | 1,353 | -9,199 | -0,25398 | -0,23181 | 1,134587 | 0 | 0 | 1 |
| 112. | 2,373 | -9,052 | -0,24119 | -0,24098 | 1,135938 | 0 | 0 | 1 |
| 113. | 4,558 | -8,954 | -0,22111 | -0,25464 | 1,137953 | 0 | 0 | 1 |
| 114. | 5,869 | -8,905 | -0,21233 | -0,2602 | 1,13872 | 0 | 0 | 1 |
| 115. | 6,847 | -8,806 | -0,20686 | -0,2633 | 1,139035 | 0 | 0 | 1 |
| 116. | -0,458 | -6,792 | -0,25907 | -0,21197 | 1,125128 | 0 | 0 | 1 |
| 117. | -2,955 | -6,571 | -0,27984 | -0,19328 | 1,115083 | 0 | 0 | 1 |
| 118. | -5,078 | -6,497 | -0,21289 | -0,23996 | 1,082525 | 0 | 0 | 1 |
| 119. | 2,102 | -6,031 | -0,22023 | -0,20367 | 1,110247 | 0 | 0 | 1 |
| 120. | 4,516 | -6,203 | -0,20283 | -0,21498 | 1,111758 | 0 | 0 | 1 |

**Uruchomienie sieci dla danych uczących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  |  | odp. rzeczywista | | | odp.oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,822 | 9,322 | 1,116403 | -0,03881 | -0,37341 | 1 | 0 | 0 |
| 2. | -8,678 | 8,094 | 1,130317 | -0,06309 | -0,36901 | 1 | 0 | 0 |
| 3. | -7,2 | 6,669 | 1,142106 | -0,08449 | -0,36499 | 1 | 0 | 0 |
| 4. | -6,118 | 5,343 | 1,1459 | -0,09159 | -0,36353 | 1 | 0 | 0 |
| 5. | -4,89 | 4,409 | 1,150946 | -0,10124 | -0,36111 | 1 | 0 | 0 |
| 6. | -4,058 | 3,107 | 1,149363 | -0,09897 | -0,35849 | 1 | 0 | 0 |
| 7. | -3,101 | 2,493 | 1,142931 | -0,08871 | -0,35068 | 1 | 0 | 0 |
| 8. | -2,185 | 1,658 | 1,098584 | -0,0194 | -0,32299 | 1 | 0 | 0 |
| 9. | -1,373 | 0,528 | 0,863695 | 0,24842 | -0,22112 | 1 | 0 | 0 |
| 10. | -1,831 | -0,405 | 0,751572 | 0,326455 | -0,17548 | 1 | 0 | 0 |
| 11. | -3,205 | -1,977 | 0,673516 | 0,20287 | -0,03063 | 1 | 0 | 0 |
| 12. | -4,079 | -2,739 | 0,656929 | -0,03137 | 0,184611 | 1 | 0 | 0 |
| 13. | -5,452 | -3,009 | 0,862063 | -0,27709 | 0,21084 | 1 | 0 | 0 |
| 14. | -7,949 | -3,058 | 0,967868 | -0,39201 | 0,186789 | 1 | 0 | 0 |
| 15. | -9,469 | -3,034 | 0,933152 | -0,39207 | 0,196381 | 1 | 0 | 0 |
| 16. | -9,385 | -0,798 | 1,047099 | -0,02357 | -0,3384 | 1 | 0 | 0 |
| 17. | -9,385 | 1,339 | 1,078493 | 0,015849 | -0,38011 | 1 | 0 | 0 |
| 18. | -9,469 | 3,23 | 1,094024 | -0,00239 | -0,37945 | 1 | 0 | 0 |
| 19. | -9,489 | 4,876 | 1,106145 | -0,02161 | -0,37639 | 1 | 0 | 0 |
| 20. | -9,718 | 7,013 | 1,116709 | -0,03933 | -0,37331 | 1 | 0 | 0 |
| 21. | -7,512 | 5,195 | 1,133179 | -0,06825 | -0,36801 | 1 | 0 | 0 |
| 22. | -5,993 | 2,763 | 1,136448 | -0,07499 | -0,36564 | 1 | 0 | 0 |
| 23. | -4,599 | 0,897 | 1,127646 | -0,06704 | -0,35307 | 1 | 0 | 0 |
| 24. | -5,244 | -0,602 | 1,097756 | -0,05867 | -0,32658 | 1 | 0 | 0 |
| 25. | -6,493 | -1,093 | 1,08797 | -0,08863 | -0,31033 | 1 | 0 | 0 |
| 26. | -7,908 | 0,43 | 1,096833 | -0,02414 | -0,36806 | 1 | 0 | 0 |
| 27. | -7,866 | 2,493 | 1,114195 | -0,0364 | -0,37311 | 1 | 0 | 0 |
| 28. | -8,157 | 3,967 | 1,119403 | -0,04418 | -0,37232 | 1 | 0 | 0 |
| 29. | -6,888 | 3,844 | 1,133254 | -0,06858 | -0,36775 | 1 | 0 | 0 |
| 30. | -6,826 | 0,307 | 1,110405 | -0,04725 | -0,36172 | 1 | 0 | 0 |
| 31. | -3,454 | 0,037 | 1,07018 | 0,006708 | -0,31205 | 1 | 0 | 0 |
| 32. | -5,265 | -2,076 | 1,000623 | -0,13233 | -0,14444 | 1 | 0 | 0 |
| 33. | -6,971 | -2,346 | 1,02796 | -0,25081 | -0,09573 | 1 | 0 | 0 |
| 34. | -7,554 | -1,634 | 1,061257 | -0,14078 | -0,25494 | 1 | 0 | 0 |
| 35. | -8,22 | -1,928 | 1,037755 | -0,18394 | -0,20003 | 1 | 0 | 0 |
| 36. | -8,47 | 6,767 | 1,1305 | -0,06342 | -0,36895 | 1 | 0 | 0 |
| 37. | -9,448 | 8,192 | 1,121319 | -0,04727 | -0,37189 | 1 | 0 | 0 |
| 38. | -8,033 | 7,406 | 1,136818 | -0,07479 | -0,36683 | 1 | 0 | 0 |
| 39. | -6,742 | 5,416 | 1,141231 | -0,0829 | -0,36524 | 1 | 0 | 0 |
| 40. | -4,412 | 2,395 | 1,143822 | -0,08934 | -0,35911 | 1 | 0 | 0 |
| 41. | 0,375 | 0,43 | 0,357276 | 0,623174 | -0,05402 | 0 | 1 | 0 |
| 42. | 1,832 | 1,855 | 0,333394 | 0,643744 | -0,04324 | 0 | 1 | 0 |
| 43. | 3,455 | 2,96 | 0,222215 | 0,710187 | -0,00258 | 0 | 1 | 0 |
| 44. | 4,828 | 4,336 | 0,20856 | 0,717991 | 0,005738 | 0 | 1 | 0 |
| 45. | 5,432 | 5,367 | 0,263298 | 0,685805 | -0,01037 | 0 | 1 | 0 |
| 46. | 6,639 | 6,276 | 0,204671 | 0,719996 | 0,010427 | 0 | 1 | 0 |
| 47. | 7,617 | 7,357 | 0,186865 | 0,730214 | 0,017479 | 0 | 1 | 0 |
| 48. | 8,72 | 8,168 | 0,096938 | 0,781612 | 0,048899 | 0 | 1 | 0 |
| 49. | 9,365 | 8,905 | 0,072057 | 0,795682 | 0,058102 | 0 | 1 | 0 |
| 50. | 1,041 | -0,258 | 0,128905 | 0,749564 | 0,029745 | 0 | 1 | 0 |
| 51. | 1,603 | -0,847 | 0,046674 | 0,782354 | 0,076118 | 0 | 1 | 0 |
| 52. | 2,206 | -1,462 | 0,009028 | 0,77515 | 0,124288 | 0 | 1 | 0 |
| 53. | 2,997 | -2,199 | -0,01646 | 0,718681 | 0,215545 | 0 | 1 | 0 |
| 54. | 3,434 | -2,739 | -0,03732 | 0,631245 | 0,3314 | 0 | 1 | 0 |
| 55. | 4,62 | -3,058 | -0,04393 | 0,572459 | 0,401549 | 0 | 1 | 0 |
| 56. | 5,765 | -3,058 | -0,03393 | 0,592168 | 0,374271 | 0 | 1 | 0 |
| 57. | 6,701 | -3,034 | -0,02537 | 0,613126 | 0,346025 | 0 | 1 | 0 |
| 58. | 8,345 | -3,107 | -0,01766 | 0,622509 | 0,331 | 0 | 1 | 0 |
| 59. | 9,032 | -3,107 | -0,01348 | 0,632985 | 0,316736 | 0 | 1 | 0 |

**Uruchomienie dla danych testujących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | | odp. oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,697 | 9,175 | 1,05771 | 0,07774 | -0,33224 | 1 | 0 | 0 |
| 2. | -8,636 | 8,045 | 1,058354 | 0,078002 | -0,33326 | 1 | 0 | 0 |
| 3. | -7,991 | 7,259 | 1,058853 | 0,078206 | -0,33405 | 1 | 0 | 0 |
| 4. | -7,221 | 6,718 | 1,060019 | 0,078686 | -0,3359 | 1 | 0 | 0 |
| 5. | -6,076 | 5,613 | 1,063265 | 0,080051 | -0,34104 | 1 | 0 | 0 |
| 6. | -4,932 | 4,483 | 1,068867 | 0,082644 | -0,34999 | 1 | 0 | 0 |
| 7. | -3,912 | 3,034 | 1,07752 | 0,089056 | -0,36498 | 1 | 0 | 0 |
| 8. | -2,996 | 2,518 | 1,080543 | 0,09948 | -0,37453 | 1 | 0 | 0 |
| 9. | -2,143 | 1,462 | 1,051602 | 0,147476 | -0,36421 | 1 | 0 | 0 |
| 10. | -1,269 | 0,626 | 0,8488 | 0,307912 | -0,23955 | 1 | 0 | 0 |
| 11. | -1,748 | -0,381 | 0,707964 | 0,374043 | -0,14721 | 1 | 0 | 0 |
| 12. | -3,371 | -0,061 | 1,038488 | 0,149541 | -0,35046 | 1 | 0 | 0 |
| 13. | -4,62 | 0,872 | 1,078667 | 0,095814 | -0,37037 | 1 | 0 | 0 |
| 14. | -6,888 | 3,746 | 1,064879 | 0,080747 | -0,3436 | 1 | 0 | 0 |
| 15. | -8,262 | 3,992 | 1,061676 | 0,07936 | -0,33851 | 1 | 0 | 0 |
| 16. | -9,406 | 3,157 | 1,060955 | 0,078996 | -0,33734 | 1 | 0 | 0 |
| 17. | -9,385 | 1,265 | 1,063459 | 0,078533 | -0,34062 | 1 | 0 | 0 |
| 18. | -6,742 | 0,258 | 1,073552 | 0,080585 | -0,35582 | 1 | 0 | 0 |
| 19. | -7,866 | 0,332 | 1,069139 | 0,077084 | -0,34795 | 1 | 0 | 0 |
| 20. | -8,22 | -2,027 | 1,033233 | -0,11779 | -0,1798 | 1 | 0 | 0 |
| 21. | -7,367 | -1,732 | 1,05057 | -0,04313 | -0,25911 | 1 | 0 | 0 |
| 22. | -6,659 | -1,167 | 1,066593 | 0,036636 | -0,32679 | 1 | 0 | 0 |
| 23. | -5,39 | -0,626 | 1,071583 | 0,082658 | -0,35638 | 1 | 0 | 0 |
| 24. | -4,287 | -2,739 | 0,683584 | -0,04858 | 0,220225 | 1 | 0 | 0 |
| 25. | -3,329 | -1,977 | 0,687907 | 0,219114 | -0,01724 | 1 | 0 | 0 |
| 26. | -6,867 | -2,297 | 1,01995 | -0,14822 | -0,1362 | 1 | 0 | 0 |
| 27. | -9,177 | -0,798 | 1,060983 | 0,03988 | -0,3189 | 1 | 0 | 0 |
| 28. | -7,471 | 5,195 | 1,061371 | 0,079247 | -0,33804 | 1 | 0 | 0 |
| 29. | -8,532 | 6,767 | 1,058697 | 0,078143 | -0,33381 | 1 | 0 | 0 |
| 30. | -9,531 | 4,778 | 1,05925 | 0,078363 | -0,33468 | 1 | 0 | 0 |
| 31. | 6,722 | 6,178 | 0,018612 | 0,736249 | 0,219686 | 0 | 1 | 0 |
| 32. | 7,679 | 7,259 | 0,024084 | 0,738095 | 0,210524 | 0 | 1 | 0 |
| 33. | 8,741 | 7,971 | -0,0442 | 0,794107 | 0,224668 | 0 | 1 | 0 |
| 34. | 9,261 | 8,634 | -0,04466 | 0,809579 | 0,204164 | 0 | 1 | 0 |
| 35. | 5,681 | 5,416 | 0,065729 | 0,70693 | 0,198251 | 0 | 1 | 0 |
| 36. | 4,87 | 4,385 | 0,033468 | 0,719313 | 0,222426 | 0 | 1 | 0 |
| 37. | 3,684 | 2,985 | 0,007183 | 0,727449 | 0,245202 | 0 | 1 | 0 |
| 38. | 2,04 | 1,977 | 0,144227 | 0,654159 | 0,168587 | 0 | 1 | 0 |
| 39. | 0,479 | 0,504 | 0,189778 | 0,625397 | 0,149212 | 0 | 1 | 0 |
| 40. | 1,062 | -0,135 | -0,0469 | 0,739483 | 0,299037 | 0 | 1 | 0 |
| 41. | 1,582 | -0,798 | -0,10048 | 0,781753 | 0,314776 | 0 | 1 | 0 |
| 42. | 2,393 | -1,486 | -0,07656 | 0,790286 | 0,26384 | 0 | 1 | 0 |
| 43. | 2,997 | -2,1 | 1,05771 | 0,07774 | -0,33224 | 0 | 1 | 0 |
| 44. | 3,538 | -2,69 | 1,058354 | 0,078002 | -0,33326 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. | 4,35 | -1,584 | 0,021988 | 0,81497 | 0,104379 | 0 | 1 | 0 |
| 46. | 5,681 | -0,282 | 0,048149 | 0,843915 | 0,042889 | 0 | 1 | 0 |
| 47. | 5,14 | 0,577 | -0,01246 | 0,83432 | 0,128574 | 0 | 1 | 0 |
| 48. | 6,098 | 1,388 | 0,002813 | 0,838011 | 0,10495 | 0 | 1 | 0 |
| 49. | 7,658 | 1,363 | 0,080456 | 0,852063 | -0,00262 | 0 | 1 | 0 |
| 50. | 8,99 | 1,191 | 0,144146 | 0,861768 | -0,08 | 0 | 1 | 0 |
| 51. | 8,574 | 2,862 | 0,065945 | 0,849736 | 0,016251 | 0 | 1 | 0 |
| 52. | 8,262 | 4,041 | 0,004278 | 0,837585 | 0,103831 | 0 | 1 | 0 |
| 53. | 6,16 | 3,279 | -0,05754 | 0,817057 | 0,210844 | 0 | 1 | 0 |
| 54. | 4,433 | 2,027 | -0,07716 | 0,803325 | 0,256372 | 0 | 1 | 0 |
| 55. | 3,33 | 1,167 | -0,08373 | 0,793511 | 0,278801 | 0 | 1 | 0 |
| 56. | 2,373 | 0,43 | -0,08542 | 0,782309 | 0,296027 | 0 | 1 | 0 |
| 57. | 5,827 | -3,034 | 0,057189 | 0,648467 | 0,218683 | 0 | 1 | 0 |
| 58. | 6,597 | -3,009 | 0,090235 | 0,673191 | 0,155254 | 0 | 1 | 0 |
| 59. | 6,431 | -1,216 | 0,113243 | 0,844989 | -0,03164 | 0 | 1 | 0 |
| 60. | 8,283 | -1,56 | 0,186749 | 0,850657 | -0,11166 | 0 | 1 | 0 |
| 61. | -4,953 | -4,851 | -0,036 | -0,29632 | 1,086425 | 0 | 0 | 1 |
| 62. | -3,683 | -3,722 | -0,02959 | -0,11948 | 0,969113 | 0 | 0 | 1 |
| 63. | -1,228 | -3,623 | -0,28939 | 0,162645 | 1,019497 | 0 | 0 | 1 |
| 64. | 0,541 | -3,623 | -0,24782 | 0,252241 | 0,92344 | 0 | 0 | 1 |
| 65. | 2,477 | -3,623 | -0,1575 | 0,329399 | 0,762836 | 0 | 0 | 1 |
| 66. | 3,933 | -4,016 | -0,11994 | 0,235685 | 0,777471 | 0 | 0 | 1 |
| 67. | 5,057 | -5,073 | -0,13045 | 0,023998 | 0,920922 | 0 | 0 | 1 |
| 68. | 6,035 | -5,932 | -0,11467 | -0,02582 | 0,934957 | 0 | 0 | 1 |
| 69. | 6,743 | -6,866 | -0,09946 | -0,03952 | 0,928669 | 0 | 0 | 1 |
| 70. | 7,742 | -7,775 | -0,08372 | -0,04035 | 0,914087 | 0 | 0 | 1 |
| 71. | 8,449 | -8,634 | -0,07486 | -0,03959 | 0,90504 | 0 | 0 | 1 |
| 72. | 0,562 | -5,785 | -0,27486 | -0,07119 | 1,098839 | 0 | 0 | 1 |
| 73. | -1,748 | -5,711 | -0,3512 | -0,10355 | 1,168086 | 0 | 0 | 1 |
| 74. | -0,603 | -6,596 | -0,2963 | -0,08933 | 1,122576 | 0 | 0 | 1 |
| 75. | -2,83 | -6,62 | -0,3627 | -0,12026 | 1,181043 | 0 | 0 | 1 |
| 76. | -4,162 | -5,613 | -0,32964 | -0,18739 | 1,187599 | 0 | 0 | 1 |
| 77. | -5,119 | -6,522 | -0,32681 | -0,20469 | 1,191994 | 0 | 0 | 1 |
| 78. | -4,162 | -7,554 | -0,37443 | -0,13296 | 1,192762 | 0 | 0 | 1 |
| 79. | -6,68 | -7,48 | -0,2453 | -0,2585 | 1,172322 | 0 | 0 | 1 |
| 80. | -7,7 | -7,431 | 0,059925 | -0,35971 | 1,081065 | 0 | 0 | 1 |
| 81. | -0,041 | -9,199 | -0,20546 | -0,06875 | 1,040502 | 0 | 0 | 1 |
| 82. | 1,499 | -9,101 | -0,16425 | -0,05914 | 0,999721 | 0 | 0 | 1 |
| 83. | 2,435 | -9,003 | -0,14422 | -0,05464 | 0,979244 | 0 | 0 | 1 |
| 84. | 4,745 | -7,578 | -0,12168 | -0,04838 | 0,954924 | 0 | 0 | 1 |
| 85. | -7,929 | -8,806 | -0,24775 | -0,2611 | 1,174782 | 0 | 0 | 1 |
| 86. | -5,848 | -8,978 | -0,38246 | -0,14363 | 1,201211 | 0 | 0 | 1 |
| 87. | -4,016 | -8,929 | -0,34752 | -0,1112 | 1,167429 | 0 | 0 | 1 |
| 88. | -1,935 | -7,701 | -0,3123 | -0,09757 | 1,137557 | 0 | 0 | 1 |
| 89. | -6,201 | -6,055 | -0,01241 | -0,33469 | 1,099286 | 0 | 0 | 1 |
| 90. | 1,166 | -7,652 | -0,20703 | -0,06831 | 1,041625 | 0 | 0 | 1 |

**Uruchomienie dla danych weryfikujących:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** |
| 1. | -1,165 | -1,363 | 0,115481 | 0,575471 | 0,325418 |
| 2. | -0,229 | -0,676 | 0,05773 | 0,638061 | 0,331055 |
| 3. | 0,978 | -1,879 | -0,11339 | 0,712275 | 0,455351 |
| 4. | -1,706 | -8,831 | -0,25999 | -0,10944 | 1,122318 |
| 5. | -2,351 | -2,567 | 0,051205 | 0,358821 | 0,58509 |
| 6. | -5,806 | -1,019 | 1,069085 | 0,04678 | -0,31757 |
| 7. | -0,395 | -2,763 | -0,18172 | 0,512146 | 0,724407 |
| 8. | 0,021 | -5,441 | -0,29052 | -0,0911 | 1,137622 |
| 9. | -3,704 | 0,749 | 1,072001 | 0,092741 | -0,34487 |
| 10. | 1,603 | -2,714 | -0,11385 | 0,610585 | 0,541768 |
| 11. | -0,021 | 1,756 | 0,772765 | 0,327845 | -0,14913 |
| 12. | -1,332 | 2,223 | 1,042506 | 0,135243 | -0,33022 |
| 13. | -2,872 | 3,5 | 1,081309 | 0,071383 | -0,34518 |
| 14. | -3,995 | 4,704 | 1,074225 | 0,062539 | -0,32977 |
| 15. | -4,849 | 6,08 | 1,068449 | 0,059266 | -0,31942 |
| 16. | -0,645 | 4,581 | 1,081149 | 0,085833 | -0,35327 |
| 17. | 2,83 | 4,532 | 0,694648 | 0,37779 | -0,10635 |
| 18. | 1,686 | 3,771 | 0,825801 | 0,303337 | -0,18791 |
| 19. | -7,117 | 3,55 | 1,068045 | 0,059057 | -0,31871 |

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| 20. | -0,021 | 3,107 | 1,068045 | 0,17064 | -0,30855 |
| 21. | 0,583 | 2,125 | 0,689223 | 0,373218 | -0,09676 |
| 22. | 6,181 | 6,915 | 0,27982 | 0,576536 | 0,143442 |
| 23. | 4,162 | 6,006 | 0,713105 | 0,372769 | -0,12167 |
| 24. | 1,228 | 4,901 | 1,042445 | 0,141536 | -0,33381 |
| 25. | -3,309 | 8,241 | 1,069987 | 0,060031 | -0,32212 |
| 26. | -3,454 | 5,613 | 1,073528 | 0,062042 | -0,32847 |
| 27. | -7,7 | -4,262 | 0,839057 | -0,47234 | 0,666375 |
| 28. | -8,99 | -5,76 | 0,801811 | -0,50039 | 0,777653 |
| 29. | -8,907 | -7,726 | 0,406875 | -0,43921 | 0,988905 |
| 30. | -6,305 | -5,245 | 0,310773 | -0,4066 | 1,007651 |
| 31. | -6,097 | -4,483 | 0,522353 | -0,41517 | 0,87532 |
| 32. | -7,991 | -6,522 | 0,483388 | -0,4497 | 0,953651 |
| 33. | -9,406 | -4,213 | 0,878188 | -0,48875 | 0,65664 |
| 34. | -4,536 | -5,859 | -0,32088 | -0,21899 | 1,205431 |
| 35. | -4,578 | -7,259 | -0,37118 | -0,1745 | 1,21516 |
| 36. | 7,18 | 0,872 | 0,092531 | 0,825642 | 0,058034 |
| 37. | 6,722 | -5,736 | -0,07631 | -0,02553 | 0,928498 |
| 38. | 4,537 | 1,683 | -0,0646 | 0,782332 | 0,313064 |
| 39. | 7,991 | -4,778 | -0,01445 | 0,125858 | 0,767464 |
| 40. | 7,887 | -6,817 | -0,06085 | -0,05225 | 0,930097 |

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| 41. | 7,867 | -0,676 | 0,179387 | 0,837172 | -0,04963 |
| 42. | 8,262 | 3,746 | 0,026382 | 0,812364 | 0,153697 |
| 43. | 3,247 | -0,307 | -0,05762 | 0,786552 | 0,296627 |
| 44. | 9,302 | -7,038 | -0,04791 | -0,05082 | 0,917142 |
| 45. | 5,931 | -4,262 | -0,02907 | 0,227313 | 0,71472 |
| 46. | -7,512 | -1,855 | 1,050573 | -0,0688 | -0,22022 |
| 47. | -8,137 | 1,069 | 1,070248 | 0,058683 | -0,3219 |
| 48. | -1,248 | -6,645 | -0,3081 | -0,12147 | 1,159789 |
| 49. | 1,811 | -6,325 | -0,20426 | -0,08549 | 1,070669 |
| 50. | -9,51 | -7,382 | 0,670982 | -0,48168 | 0,864634 |
| 51. | -9,177 | 0,16 | 1,068243 | 0,051658 | -0,31546 |
| 52. | -1,81 | 3,034 | 1,077498 | 0,090346 | -0,35081 |
| 53. | -6,597 | 7,775 | 1,06404 | 0,057167 | -0,3117 |
| 54. | -7,159 | 8,413 | 1,063457 | 0,0569 | -0,31068 |
| 55. | -6,139 | 7,062 | 1,064731 | 0,057487 | -0,31291 |
| 56. | -8,574 | 4,434 | 1,064403 | 0,057329 | -0,31233 |
| 57. | -1,103 | 6,252 | 1,08055 | 0,067707 | -0,34193 |
| 58. | -0,458 | 8,143 | 1,080173 | 0,066948 | -0,34095 |
| 59. | 3,039 | 7,382 | 1,061001 | 0,125428 | -0,34858 |
| 60. | 1,519 | 7,21 | 1,084662 | 0,082811 | -0,35644 |

1. **TU = 0,1 i TT = 0,2; ZPWU = 100%; MW = WŁ**

**Rozwinięcie skrótów:**

**TU** – Tolerancja Uczenia, **TT** – Tolerancja Testowania, **ZPWU** – Zadany Procent Wartości Uczących,

**MW = WŁ** – Mieszanie Wzorców Włączone.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 60. | 2,456 | 0,602 | -0,03917 | 0,90041 | 0,020052 | 0 | 1 | 0 |
| 61. | 3,309 | -0,7 | -0,03417 | 0,913809 | -0,00518 | 0 | 1 | 0 |
| 62. | 4,35 | -1,462 | -0,0213 | 0,940381 | -0,05793 | 0 | 1 | 0 |
| 63. | 4,308 | 1,977 | -0,04079 | 0,898687 | 0,024308 | 0 | 1 | 0 |
| 64. | 5,14 | 0,626 | -0,04003 | 0,901094 | 0,019915 | 0 | 1 | 0 |
| 65. | 5,661 | -0,184 | -0,03756 | 0,906512 | 0,009237 | 0 | 1 | 0 |
| 66. | 6,41 | -1,118 | -0,02802 | 0,926776 | -0,03087 | 0 | 1 | 0 |
| 67. | 6,264 | 3,328 | -0,04114 | 0,898491 | 0,024969 | 0 | 1 | 0 |
| 68. | 7,658 | 1,388 | -0,04079 | 0,899436 | 0,02318 | 0 | 1 | 0 |
| 69. | 7,846 | 0,553 | -0,03983 | 0,901545 | 0,019028 | 0 | 1 | 0 |
| 70. | 8,616 | -0,798 | -0,03222 | 0,917971 | -0,01341 | 0 | 1 | 0 |
| 71. | 7,783 | 5,171 | -0,0411 | 0,898379 | 0,025088 | 0 | 1 | 0 |
| 72. | 8,324 | 4,09 | -0,04121 | 0,898485 | 0,02505 | 0 | 1 | 0 |
| 73. | 8,532 | 2,96 | -0,04117 | 0,898576 | 0,024873 | 0 | 1 | 0 |
| 74. | 8,99 | 1,241 | -0,04067 | 0,899689 | 0,022682 | 0 | 1 | 0 |
| 75. | 9,282 | 6,08 | -0,0412 | 0,898445 | 0,025094 | 0 | 1 | 0 |
| 76. | 9,781 | 2,641 | -0,04114 | 0,898643 | 0,024741 | 0 | 1 | 0 |
| 77. | 9,719 | -1,019 | -0,02883 | 0,925104 | -0,02755 | 0 | 1 | 0 |
| 78. | 8,22 | -1,56 | -0,01676 | 0,949319 | -0,07575 | 0 | 1 | 0 |
| 79. | 5,994 | 1,437 | -0,04083 | 0,89934 | 0,023368 | 0 | 1 | 0 |
| 80. | 3,08 | 1,019 | -0,04005 | 0,89957 | 0,022215 | 0 | 1 | 0 |
| 81. | -9,24 | -9,003 | 0,129202 | 0,000923 | 0,875526 | 0 | 0 | 1 |
| 82. | -7,783 | -7,504 | 0,151671 | -0,02448 | 0,881917 | 0 | 0 | 1 |
| 83. | -6,43 | -6,08 | 0,18084 | -0,09158 | 0,921289 | 0 | 0 | 1 |
| 84. | -5,057 | -4,778 | 0,086094 | -0,20559 | 1,064671 | 0 | 0 | 1 |
| 85. | -3,683 | -3,648 | -0,03461 | -0,06729 | 1,031052 | 0 | 0 | 1 |
| 86. | -1,436 | -3,55 | -0,12672 | 0,160054 | 0,936813 | 0 | 0 | 1 |
| 87. | 0,708 | -3,599 | -0,13596 | 0,091187 | 0,991151 | 0 | 0 | 1 |
| 88. | 2,456 | -3,525 | -0,12076 | 0,187046 | 0,912334 | 0 | 0 | 1 |
| 89. | 3,975 | -3,918 | -0,15897 | -0,10915 | 1,120588 | 0 | 0 | 1 |
| 90. | 5,14 | -5,122 | -0,09092 | 0,049446 | 0,989762 | 0 | 0 | 1 |
| 91. | 6,202 | -6,006 | -0,06522 | 0,131834 | 0,912434 | 0 | 0 | 1 |
| 92. | 6,909 | -6,915 | -0,05675 | 0,159365 | 0,884532 | 0 | 0 | 1 |
| 93. | 7,908 | -7,848 | -0,05425 | 0,167513 | 0,876071 | 0 | 0 | 1 |
| 94. | 8,699 | -8,708 | -0,0536 | 0,169645 | 0,873843 | 0 | 0 | 1 |
| 95. | -4,099 | -5,49 | -0,07927 | 0,075339 | 0,963994 | 0 | 0 | 1 |
| 96. | -1,831 | -5,564 | -0,07822 | 0,089821 | 0,952998 | 0 | 0 | 1 |
| 97. | 0,541 | -5,711 | -0,073 | 0,106671 | 0,937021 | 0 | 0 | 1 |
| 98. | 3,309 | -5,736 | -0,07134 | 0,112047 | 0,931842 | 0 | 0 | 1 |
| 99. | -6,638 | -7,504 | -0,04474 | 0,15302 | 0,879951 | 0 | 0 | 1 |
| 100. | -4,141 | -7,431 | -0,05545 | 0,163552 | 0,880179 | 0 | 0 | 1 |
| 101. | -1,81 | -7,676 | -0,05477 | 0,165808 | 0,87785 | 0 | 0 | 1 |
| 102. | 1,228 | -7,676 | -0,05468 | 0,166107 | 0,877538 | 0 | 0 | 1 |
| 103. | 2,664 | -7,652 | -0,05469 | 0,166096 | 0,877549 | 0 | 0 | 1 |
| 104. | 4,537 | -7,627 | -0,05468 | 0,166122 | 0,877522 | 0 | 0 | 1 |
| 105. | 5,681 | -7,603 | -0,05469 | 0,166084 | 0,877562 | 0 | 0 | 1 |
| 106. | -8,053 | -8,929 | -0,04353 | 0,159272 | 0,873997 | 0 | 0 | 1 |
| 107. | -5,848 | -9,003 | -0,05355 | 0,169705 | 0,873756 | 0 | 0 | 1 |
| 108. | -4,266 | -8,978 | -0,05357 | 0,169727 | 0,873756 | 0 | 0 | 1 |
| 109. | -1,977 | -9,003 | -0,05355 | 0,169794 | 0,873686 | 0 | 0 | 1 |
| 110. | 0 | -9,224 | -0,05348 | 0,170019 | 0,873451 | 0 | 0 | 1 |
| 111. | 1,353 | -9,199 | -0,05348 | 0,170016 | 0,873454 | 0 | 0 | 1 |
| 112. | 2,373 | -9,052 | -0,05351 | 0,169908 | 0,873567 | 0 | 0 | 1 |
| 113. | 4,558 | -8,954 | -0,05353 | 0,169848 | 0,87363 | 0 | 0 | 1 |
| 114. | 5,869 | -8,905 | -0,05354 | 0,169819 | 0,87366 | 0 | 0 | 1 |
| 115. | 6,847 | -8,806 | -0,05357 | 0,169728 | 0,873755 | 0 | 0 | 1 |
| 116. | -0,458 | -6,792 | -0,05807 | 0,155086 | 0,888937 | 0 | 0 | 1 |
| 117. | -2,955 | -6,571 | -0,06007 | 0,148551 | 0,895609 | 0 | 0 | 1 |
| 118. | -5,078 | -6,497 | -0,05868 | 0,14263 | 0,899098 | 0 | 0 | 1 |
| 119. | 2,102 | -6,031 | -0,06585 | 0,129791 | 0,914462 | 0 | 0 | 1 |
| 120. | 4,516 | -6,203 | -0,0628 | 0,139704 | 0,904564 | 0 | 0 | 1 |

**Uruchomienie sieci dla danych uczących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  |  | odp. rzeczywista | | | odp.oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,822 | 9,322 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 2. | -8,678 | 8,094 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 3. | -7,2 | 6,669 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 4. | -6,118 | 5,343 | 1,069567 | -0,17638 | 0,039912 | 1 | 0 | 0 |
| 5. | -4,89 | 4,409 | 1,069569 | -0,17637 | 0,039895 | 1 | 0 | 0 |
| 6. | -4,058 | 3,107 | 1,069583 | -0,1763 | 0,039777 | 1 | 0 | 0 |
| 7. | -3,101 | 2,493 | 1,069604 | -0,17619 | 0,039583 | 1 | 0 | 0 |
| 8. | -2,185 | 1,658 | 1,069521 | -0,17553 | 0,038833 | 1 | 0 | 0 |
| 9. | -1,373 | 0,528 | 1,038143 | -0,12636 | 0,033942 | 1 | 0 | 0 |
| 10. | -1,831 | -0,405 | 0,957223 | -0,00349 | 0,019025 | 1 | 0 | 0 |
| 11. | -3,205 | -1,977 | 0,899016 | 0,185673 | -0,09581 | 1 | 0 | 0 |
| 12. | -4,079 | -2,739 | 0,960501 | 0,162806 | -0,15002 | 1 | 0 | 0 |
| 13. | -5,452 | -3,009 | 1,081983 | -0,15877 | -0,00747 | 1 | 0 | 0 |
| 14. | -7,949 | -3,058 | 1,085683 | -0,20189 | 0,044175 | 1 | 0 | 0 |
| 15. | -9,469 | -3,034 | 1,086975 | -0,18506 | 0,017376 | 1 | 0 | 0 |
| 16. | -9,385 | -0,798 | 1,072696 | -0,16137 | 0,013151 | 1 | 0 | 0 |
| 17. | -9,385 | 1,339 | 1,069734 | -0,17559 | 0,03848 | 1 | 0 | 0 |
| 18. | -9,469 | 3,23 | 1,069579 | -0,17632 | 0,039812 | 1 | 0 | 0 |
| 19. | -9,489 | 4,876 | 1,069568 | -0,17637 | 0,039907 | 1 | 0 | 0 |
| 20. | -9,718 | 7,013 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 21. | -7,512 | 5,195 | 1,069567 | -0,17637 | 0,03991 | 1 | 0 | 0 |
| 22. | -5,993 | 2,763 | 1,069592 | -0,17626 | 0,039701 | 1 | 0 | 0 |
| 23. | -4,599 | 0,897 | 1,069905 | -0,17476 | 0,03699 | 1 | 0 | 0 |
| 24. | -5,244 | -0,602 | 1,072166 | -0,16381 | 0,017488 | 1 | 0 | 0 |
| 25. | -6,493 | -1,093 | 1,074498 | -0,15252 | -0,00215 | 1 | 0 | 0 |
| 26. | -7,908 | 0,43 | 1,070171 | -0,17352 | 0,034733 | 1 | 0 | 0 |
| 27. | -7,866 | 2,493 | 1,069602 | -0,17621 | 0,039615 | 1 | 0 | 0 |
| 28. | -8,157 | 3,967 | 1,069571 | -0,17636 | 0,039878 | 1 | 0 | 0 |
| 29. | -6,888 | 3,844 | 1,069572 | -0,17635 | 0,03987 | 1 | 0 | 0 |
| 30. | -6,826 | 0,307 | 1,070299 | -0,17291 | 0,033635 | 1 | 0 | 0 |
| 31. | -3,454 | 0,037 | 1,070254 | -0,17029 | 0,030135 | 1 | 0 | 0 |
| 32. | -5,265 | -2,076 | 1,085765 | -0,08824 | -0,10118 | 1 | 0 | 0 |
| 33. | -6,971 | -2,346 | 1,091338 | -0,06844 | -0,13279 | 1 | 0 | 0 |
| 34. | -7,554 | -1,634 | 1,079305 | -0,12837 | -0,04219 | 1 | 0 | 0 |
| 35. | -8,22 | -1,928 | 1,083313 | -0,10787 | -0,07437 | 1 | 0 | 0 |
| 36. | -8,47 | 6,767 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 37. | -9,448 | 8,192 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 38. | -8,033 | 7,406 | 1,069567 | -0,17638 | 0,039917 | 1 | 0 | 0 |
| 39. | -6,742 | 5,416 | 1,069567 | -0,17638 | 0,039912 | 1 | 0 | 0 |
| 40. | -4,412 | 2,395 | 1,06961 | -0,17617 | 0,039545 | 1 | 0 | 0 |
| 41. | 0,375 | 0,43 | 0,09968 | 0,801957 | 0,020655 | 0 | 1 | 0 |
| 42. | 1,832 | 1,855 | 0,090984 | 0,80429 | 0,025813 | 0 | 1 | 0 |
| 43. | 3,455 | 2,96 | -0,00593 | 0,873709 | 0,02534 | 0 | 1 | 0 |
| 44. | 4,828 | 4,336 | -0,00475 | 0,872755 | 0,025525 | 0 | 1 | 0 |
| 45. | 5,432 | 5,367 | 0,07147 | 0,817902 | 0,026468 | 0 | 1 | 0 |
| 46. | 6,639 | 6,276 | 0,011883 | 0,860895 | 0,025759 | 0 | 1 | 0 |
| 47. | 7,617 | 7,357 | 0,005257 | 0,865618 | 0,025679 | 0 | 1 | 0 |
| 48. | 8,72 | 8,168 | -0,03877 | 0,896742 | 0,025127 | 0 | 1 | 0 |
| 49. | 9,365 | 8,905 | -0,04079 | 0,898158 | 0,025102 | 0 | 1 | 0 |
| 50. | 1,041 | -0,258 | -0,03366 | 0,903852 | 0,009241 | 0 | 1 | 0 |
| 51. | 1,603 | -0,847 | -0,03275 | 0,916354 | -0,01044 | 0 | 1 | 0 |
| 52. | 2,206 | -1,462 | -0,02216 | 0,938653 | -0,0545 | 0 | 1 | 0 |
| 53. | 2,997 | -2,199 | 0,0059 | 0,98856 | -0,15506 | 0 | 1 | 0 |
| 54. | 3,434 | -2,739 | 0,024515 | 0,994815 | -0,17899 | 0 | 1 | 0 |
| 55. | 4,62 | -3,058 | -0,0031 | 0,863231 | 0,040113 | 0 | 1 | 0 |
| 56. | 5,765 | -3,058 | -0,00264 | 0,862016 | 0,041423 | 0 | 1 | 0 |
| 57. | 6,701 | -3,034 | 0,002087 | 0,88036 | 0,010237 | 0 | 1 | 0 |
| 58. | 8,345 | -3,107 | -0,01177 | 0,812189 | 0,121802 | 0 | 1 | 0 |
| 59. | 9,032 | -3,107 | -0,01158 | 0,810963 | 0,123344 | 0 | 1 | 0 |

**Uruchomienie dla danych testujących:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | | odp. oczekiwana | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** | **Kod klasy** | | |
| 1. | -9,697 | 9,175 | 1,062902 | -0,06364 | -0,10597 | 1 | 0 | 0 |
| 2. | -8,636 | 8,045 | 1,056531 | -0,03187 | -0,12189 | 1 | 0 | 0 |
| 3. | -7,991 | 7,259 | 1,042696 | 0,037765 | -0,15435 | 1 | 0 | 0 |
| 4. | -7,221 | 6,718 | 1,03296 | 0,086967 | -0,1756 | 1 | 0 | 0 |
| 5. | -6,076 | 5,613 | 1,032522 | 0,089179 | -0,17652 | 1 | 0 | 0 |
| 6. | -4,932 | 4,483 | 1,03311 | 0,08621 | -0,17528 | 1 | 0 | 0 |
| 7. | -3,912 | 3,034 | 1,048058 | 0,010706 | -0,1421 | 1 | 0 | 0 |
| 8. | -2,996 | 2,518 | 1,036092 | 0,071111 | -0,16888 | 1 | 0 | 0 |
| 9. | -2,143 | 1,462 | 1,042999 | 0,033105 | -0,15143 | 1 | 0 | 0 |
| 10. | -1,269 | 0,626 | 0,991053 | 0,082699 | -0,12023 | 1 | 0 | 0 |
| 11. | -1,748 | -0,381 | 0,88635 | 0,080598 | 0,003862 | 1 | 0 | 0 |
| 12. | -3,371 | -0,061 | 1,062199 | -0,06662 | -0,10244 | 1 | 0 | 0 |
| 13. | -4,62 | 0,872 | 1,063856 | -0,0684 | -0,10351 | 1 | 0 | 0 |
| 14. | -6,888 | 3,746 | 1,063678 | -0,06749 | -0,10399 | 1 | 0 | 0 |
| 15. | -8,262 | 3,992 | 1,063902 | -0,0686 | -0,10341 | 1 | 0 | 0 |
| 16. | -9,406 | 3,157 | 1,06393 | -0,06874 | -0,10334 | 1 | 0 | 0 |
| 17. | -9,385 | 1,265 | 1,063931 | -0,06875 | -0,10334 | 1 | 0 | 0 |
| 18. | -6,742 | 0,258 | 1,063931 | -0,06875 | -0,10334 | 1 | 0 | 0 |
| 19. | -7,866 | 0,332 | 1,063931 | -0,06875 | -0,10334 | 1 | 0 | 0 |
| 20. | -8,22 | -2,027 | 1,063764 | -0,06993 | -0,10173 | 1 | 0 | 0 |
| 21. | -7,367 | -1,732 | 1,063888 | -0,06901 | -0,10297 | 1 | 0 | 0 |
| 22. | -6,659 | -1,167 | 1,063921 | -0,06876 | -0,10331 | 1 | 0 | 0 |
| 23. | -5,39 | -0,626 | 1,063883 | -0,0687 | -0,10331 | 1 | 0 | 0 |
| 24. | -4,287 | -2,739 | 0,926638 | 0,013604 | 0,022279 | 1 | 0 | 0 |
| 25. | -3,329 | -1,977 | 0,868116 | 0,085934 | 0,019908 | 1 | 0 | 0 |
| 26. | -6,867 | -2,297 | 1,063301 | -0,07256 | -0,09798 | 1 | 0 | 0 |
| 27. | -9,177 | -0,798 | 1,063931 | -0,06875 | -0,10334 | 1 | 0 | 0 |
| 28. | -7,471 | 5,195 | 1,062501 | -0,06165 | -0,10699 | 1 | 0 | 0 |
| 29. | -8,532 | 6,767 | 1,059906 | -0,04873 | -0,11354 | 1 | 0 | 0 |
| 30. | -9,531 | 4,778 | 1,063919 | -0,06869 | -0,10337 | 1 | 0 | 0 |
| 31. | 6,722 | 6,178 | 0,007498 | 0,857589 | 0,092442 | 0 | 1 | 0 |
| 32. | 7,679 | 7,259 | 0,015292 | 0,854459 | 0,088994 | 0 | 1 | 0 |
| 33. | 8,741 | 7,971 | -0,02399 | 0,870269 | 0,106656 | 0 | 1 | 0 |
| 34. | 9,261 | 8,634 | -0,02631 | 0,871206 | 0,107723 | 0 | 1 | 0 |
| 35. | 5,681 | 5,416 | 0,037475 | 0,845563 | 0,079322 | 0 | 1 | 0 |
| 36. | 4,87 | 4,385 | 0,009071 | 0,856957 | 0,091744 | 0 | 1 | 0 |
| 37. | 3,684 | 2,985 | -0,00714 | 0,863477 | 0,098994 | 0 | 1 | 0 |
| 38. | 2,04 | 1,977 | 0,059288 | 0,836742 | 0,070096 | 0 | 1 | 0 |
| 39. | 0,479 | 0,504 | 0,08806 | 0,795659 | 0,08975 | 0 | 1 | 0 |
| 40. | 1,062 | -0,135 | -0,00391 | 0,830301 | 0,13433 | 0 | 1 | 0 |
| 41. | 1,582 | -0,798 | -0,00314 | 0,819959 | 0,145308 | 0 | 1 | 0 |
| 42. | 2,393 | -1,486 | -0,00724 | 0,828502 | 0,139517 | 0 | 1 | 0 |
| 43. | 2,997 | -2,1 | -0,00654 | 0,82595 | 0,142009 | 0 | 1 | 0 |
| 44. | 3,538 | -2,69 | -0,00718 | 0,811107 | 0,163404 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 45. | 4,35 | -1,584 | -0,0266 | 0,870199 | 0,109216 | 0 | 1 | 0 |
| 46. | 5,681 | -0,282 | -0,02721 | 0,871563 | 0,108144 | 0 | 1 | 0 |
| 47. | 5,14 | 0,577 | -0,02721 | 0,871566 | 0,108141 | 0 | 1 | 0 |
| 48. | 6,098 | 1,388 | -0,02721 | 0,87157 | 0,108138 | 0 | 1 | 0 |
| 49. | 7,658 | 1,363 | -0,02721 | 0,871571 | 0,108138 | 0 | 1 | 0 |
| 50. | 8,99 | 1,191 | -0,02721 | 0,871571 | 0,108138 | 0 | 1 | 0 |
| 51. | 8,574 | 2,862 | -0,02721 | 0,871571 | 0,108138 | 0 | 1 | 0 |
| 52. | 8,262 | 4,041 | -0,02721 | 0,871569 | 0,108136 | 0 | 1 | 0 |
| 53. | 6,16 | 3,279 | -0,02712 | 0,871531 | 0,108093 | 0 | 1 | 0 |
| 54. | 4,433 | 2,027 | -0,02692 | 0,871451 | 0,108004 | 0 | 1 | 0 |
| 55. | 3,33 | 1,167 | -0,02669 | 0,871325 | 0,107935 | 0 | 1 | 0 |
| 56. | 2,373 | 0,43 | -0,02585 | 0,870114 | 0,108589 | 0 | 1 | 0 |
| 57. | 5,827 | -3,034 | -0,03934 | 0,83014 | 0,186472 | 0 | 1 | 0 |
| 58. | 6,597 | -3,009 | -0,03791 | 0,837519 | 0,173739 | 0 | 1 | 0 |
| 59. | 6,431 | -1,216 | -0,02721 | 0,871553 | 0,108159 | 0 | 1 | 0 |
| 60. | 8,283 | -1,56 | -0,02722 | 0,871541 | 0,108195 | 0 | 1 | 0 |
| 61. | -4,953 | -4,851 | 0,062169 | -0,15463 | 1,045384 | 0 | 0 | 1 |
| 62. | -3,683 | -3,722 | 0,065051 | -0,0666 | 0,974629 | 0 | 0 | 1 |
| 63. | -1,228 | -3,623 | 0,01249 | 0,027681 | 0,933686 | 0 | 0 | 1 |
| 64. | 0,541 | -3,623 | 0,01597 | 0,044679 | 0,917231 | 0 | 0 | 1 |
| 65. | 2,477 | -3,623 | 0,006161 | 0,103785 | 0,881672 | 0 | 0 | 1 |
| 66. | 3,933 | -4,016 | -0,08139 | 0,105367 | 0,971677 | 0 | 0 | 1 |
| 67. | 5,057 | -5,073 | -0,09406 | 0,069435 | 1,007025 | 0 | 0 | 1 |
| 68. | 6,035 | -5,932 | -0,10054 | 0,08877 | 1,001008 | 0 | 0 | 1 |
| 69. | 6,743 | -6,866 | -0,08406 | 0,038924 | 1,016884 | 0 | 0 | 1 |
| 70. | 7,742 | -7,775 | -0,08839 | 0,05179 | 1,012802 | 0 | 0 | 1 |
| 71. | 8,449 | -8,634 | -0,07723 | 0,018992 | 1,02319 | 0 | 0 | 1 |
| 72. | 0,562 | -5,785 | -0,0266 | -0,11579 | 1,065656 | 0 | 0 | 1 |
| 73. | -1,748 | -5,711 | -0,02659 | -0,1158 | 1,065658 | 0 | 0 | 1 |
| 74. | -0,603 | -6,596 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 75. | -2,83 | -6,62 | -0,02659 | -0,11581 | 1,065664 | 0 | 0 | 1 |
| 76. | -4,162 | -5,613 | -0,0246 | -0,11673 | 1,065206 | 0 | 0 | 1 |
| 77. | -5,119 | -6,522 | -0,02446 | -0,11681 | 1,065183 | 0 | 0 | 1 |
| 78. | -4,162 | -7,554 | -0,02658 | -0,11581 | 1,065662 | 0 | 0 | 1 |
| 79. | -6,68 | -7,48 | -0,01776 | -0,11992 | 1,06367 | 0 | 0 | 1 |
| 80. | -7,7 | -7,431 | 0,087092 | -0,16529 | 1,040068 | 0 | 0 | 1 |
| 81. | -0,041 | -9,199 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 82. | 1,499 | -9,101 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 83. | 2,435 | -9,003 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 84. | 4,745 | -7,578 | -0,0271 | -0,11458 | 1,065276 | 0 | 0 | 1 |
| 85. | -7,929 | -8,806 | -0,01979 | -0,11898 | 1,064128 | 0 | 0 | 1 |
| 86. | -5,848 | -8,978 | -0,02657 | -0,11582 | 1,065659 | 0 | 0 | 1 |
| 87. | -4,016 | -8,929 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 88. | -1,935 | -7,701 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |
| 89. | -6,201 | -6,055 | 0,065559 | -0,15644 | 1,044917 | 0 | 0 | 1 |
| 90. | 1,166 | -7,652 | -0,0266 | -0,11581 | 1,065665 | 0 | 0 | 1 |

**Uruchomienie dla danych weryfikujących:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L.p |  | | odp. rzeczywista | | |
|  | **x1** | **x2** | **Klasa1** | **Klasa2** | **Klasa3** |
| 1. | -1,165 | -1,363 | 0,184405 | 0,46562 | 0,320596 |
| 2. | -0,229 | -0,676 | 0,133749 | 0,547203 | 0,292297 |
| 3. | 0,978 | -1,879 | 0,102104 | 0,560367 | 0,309025 |
| 4. | -1,706 | -8,831 | -0,0266 | -0,11581 | 1,065665 |
| 5. | -2,351 | -2,567 | 0,176902 | 0,453232 | 0,342146 |
| 6. | -5,806 | -1,019 | 1,063884 | -0,06871 | -0,1033 |
| 7. | -0,395 | -2,763 | 0,12144 | 0,467251 | 0,384004 |
| 8. | 0,021 | -5,441 | -0,02659 | -0,11577 | 1,065636 |
| 9. | -3,704 | 0,749 | 1,063525 | -0,06711 | -0,10407 |
| 10. | 1,603 | -2,714 | 0,105982 | 0,521765 | 0,346513 |
| 11. | -0,021 | 1,756 | 0,903838 | 0,40845 | -0,23805 |
| 12. | -1,332 | 2,223 | 0,988111 | 0,304885 | -0,25703 |
| 13. | -2,872 | 3,5 | 0,994176 | 0,279534 | -0,24901 |
| 14. | -3,995 | 4,704 | 0,991495 | 0,292432 | -0,25351 |
| 15. | -4,849 | 6,08 | 0,983028 | 0,332662 | -0,26725 |
| 16. | -0,645 | 4,581 | 0,977854 | 0,356783 | -0,27531 |
| 17. | 2,83 | 4,532 | 0,898641 | 0,421774 | -0,24128 |
| 18. | 1,686 | 3,771 | 0,944813 | 0,385305 | -0,26076 |
| 19. | -7,117 | 3,55 | 1,063821 | -0,0682 | -0,10362 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 20. | -0,021 | 3,107 | 0,975325 | 0,358489 | -0,27388 |
| 21. | 0,583 | 2,125 | 0,848231 | 0,456661 | -0,22016 |
| 22. | 6,181 | 6,915 | 0,482527 | 0,659423 | -0,08867 |
| 23. | 4,162 | 6,006 | 0,925611 | 0,400894 | -0,25254 |
| 24. | 1,228 | 4,901 | 0,977196 | 0,357488 | -0,27508 |
| 25. | -3,309 | 8,241 | 0,977868 | 0,356775 | -0,27532 |
| 26. | -3,454 | 5,613 | 0,978768 | 0,352591 | -0,27393 |
| 27. | -7,7 | -4,262 | 0,977295 | -0,44868 | 0,746666 |
| 28. | -8,99 | -5,76 | 0,974822 | -0,45051 | 0,755035 |
| 29. | -8,907 | -7,726 | 0,56183 | -0,3259 | 0,922174 |
| 30. | -6,305 | -5,245 | 0,518163 | -0,31273 | 0,934611 |
| 31. | -6,097 | -4,483 | 0,824094 | -0,40232 | 0,828557 |
| 32. | -7,991 | -6,522 | 0,745309 | -0,38012 | 0,862196 |
| 33. | -9,406 | -4,213 | 0,979261 | -0,44904 | 0,744692 |
| 34. | -4,536 | -5,859 | -0,0239 | -0,11706 | 1,065055 |
| 35. | -4,578 | -7,259 | -0,02651 | -0,11585 | 1,065645 |
| 36. | 7,18 | 0,872 | -0,02721 | 0,871571 | 0,108138 |
| 37. | 6,722 | -5,736 | -0,14542 | 0,235767 | 0,952754 |
| 38. | 4,537 | 1,683 | -0,02712 | 0,87153 | 0,108095 |
| 39. | 7,991 | -4,778 | -0,16298 | 0,300119 | 0,929611 |
| 40. | 7,887 | -6,817 | -0,14706 | 0,241402 | 0,950853 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 41. | 7,867 | -0,676 | -0,02721 | 0,87157 | 0,108139 |
| 42. | 8,262 | 3,746 | -0,02721 | 0,87157 | 0,108137 |
| 43. | 3,247 | -0,307 | -0,02678 | 0,870673 | 0,108797 |
| 44. | 9,302 | -7,038 | -0,16172 | 0,292704 | 0,933204 |
| 45. | 5,931 | -4,262 | -0,15511 | 0,299173 | 0,920844 |
| 46. | -7,512 | -1,855 | 1,063857 | -0,06923 | -0,10267 |
| 47. | -8,137 | 1,069 | 1,063931 | -0,06875 | -0,10334 |
| 48. | -1,248 | -6,645 | -0,0266 | -0,11581 | 1,065665 |
| 49. | 1,811 | -6,325 | -0,02662 | -0,11576 | 1,065649 |
| 50. | -9,51 | -7,382 | 0,923695 | -0,43411 | 0,783971 |
| 51. | -9,177 | 0,16 | 1,063931 | -0,06875 | -0,10334 |
| 52. | -1,81 | 3,034 | 0,983859 | 0,328594 | -0,26585 |
| 53. | -6,597 | 7,775 | 0,99252 | 0,287507 | -0,2518 |
| 54. | -7,159 | 8,413 | 1,010458 | 0,199824 | -0,22021 |
| 55. | -6,139 | 7,062 | 0,986423 | 0,316626 | -0,26182 |
| 56. | -8,574 | 4,434 | 1,063893 | -0,06856 | -0,10344 |
| 57. | -1,103 | 6,252 | 0,97784 | 0,356905 | -0,27536 |
| 58. | -0,458 | 8,143 | 0,977837 | 0,356918 | -0,27537 |
| 59. | 3,039 | 7,382 | 0,977665 | 0,357072 | -0,27529 |
| 60. | 1,519 | 7,21 | 0,977833 | 0,356922 | -0,27536 |

1. **Wnioski.**

Analizując zebrane dane można stwierdzić, iż przy wysokich wskaźnikach tolerancji uczenia (TU) oraz tolerancji testowania (TT) sieć uczyła się szybko – wartość epok nie przekroczyła liczby 2. Pomimo zerowej ilości błędnych decyzji uruchomienie sieci wykazało słabe dopasowanie danych do wartości oczekiwanych, np.: dla wartości TU=0.4 oraz TT=0.4 dla rekordu o danych wejściowych: (x1: -9.822; x2: 9.322) otrzymano odpowiedź: (0.215663, 0.40733, 0.328522) dla odpowiedzi oczekiwanej: (1 0 0). Jak można zauważyć wartości odpowiedzi rzeczywistej są bardzo odległe od wartości dla odpowiedzi oczekiwanej.

W przypadku ustawienia niskich wskaźników tolerancji uczenia (TU) oraz tolerancji testowania (TT) należało zastosować dodatkową warstwę ukrytą, ponieważ sieć nie potrafiła się nauczyć. Proces uczenia trwał w nieskończoność – ilość epok oraz iteracji ciągle rosła. Dzięki zastosowaniu jednej warstwy ukrytej sieć uczyła się nieco wolniej od sieci z ustawionymi niskimi wskaźnikami TU i TT, lecz liczba epok najczęściej oscylowała w zakresie od 500 do 10 i sieć potrafiła ukończyć proces uczenia. Uruchomienie sieci wykazało dokładne dopasowanie danych do wartości oczekiwanych, np.: dla wartości TU=0.2 oraz TT=0.2 dla rekordu o danych wejściowych: (x1: -9.822; x2: 9.322) otrzymano odpowiedź: (1.05771, 0.07774, -0.33224) dla odpowiedzi oczekiwanej: (1,0,0). Na tej podstawie można stwierdzić, iż odpowiedzi są bardzo bliskie wartościom oczekiwanym.

Analizując odpowiedzi rzeczywiste do odpowiedzi oczekiwanych można wywnioskować, iż najlepszy system otrzymywano najczęściej przy włączonym mieszaniu wzorców, czyli dzięki mieszaniu rekordów danych. Dzięki temu sieć efektywniej uczyła się i zwraca efektywniejsze wyniki w przeciwieństwie do uczenia z wyłączonym mieszaniem wzorców. Różnice można zaobserwować analizując odpowiedzi rzeczywiste dla niskich wskaźników tolerancji uczenia (TU) oraz tolerancji testowania (TT). Przykładowo dla TU=0.1 oraz TT=0.2 dla ZPWU (Zadany Procent Wzorców Uczących w tolerancji)=50% wartość LWTPT (Liczba Wzorców Testowych Poza Tolerancją) wynosiła dla uczenia sieci w mieszaniem włączonym: 16, a z wyłączonym 90. Istotnym jest fakt, iż LWUPT (Liczba Wzorców Uczących Poza Tolerancją) dla uczenia mieszaniem wyłączonym jest zwykle o wiele niższa niż LWTPT, co jest problematyczne, ponieważ sieć uczy się tylko danych uczących i nie pozyskuje zdolności do klasyfikowania danych testowych.

Zmieniając ustawienia zadane dla wskaźnika ZPWU dla danego procesu uczenia sieci można zauważyć, iż najlepsze wyniki sieć osiągała dla ZPWU równego 100%. Dla takiego przypadku uzyskiwano najczęściej wartości równe najlepszemu systemowi lub bardzo zbliżone, np. LWUPT = 1, LWTPT=0 lub LWUPT=LWTPT=0.

Reasumując można wywnioskować, że dla uzyskania najlepszego systemu należy stosować niskie współczynniki tolerancji uczenia (TU) oraz tolerancji testowania (TT). Wartość zadanego procentu wzorców uczących (ZPWU) powinna wynosić 100%. Dla takich danych prawidłowym rozwiązaniem jest dodanie warstwy ukrytej do topologii uczonej sieci.