**REPORT**

**CS 6375**

**Assignment 3**

**Team Members:**

**HARSH PANKAJKUMAR BHALANI (hpb170030)**

**MAITRI DHARMENDRAKUMAR SHAH (mxs172030)**

Number of free late days used: 0

Pre-processing strategy:

* First of all, the file is read and stored in a data frame.
* The rows which contain null values are get and then they are dropped.
* Then, categorical data is converted to numerical data.
* After that, each column is standardized.
* And then, data is stored at given location of a file.

Here, for all data set

Splitting Factor = 80

Max iteration = 500

Alpha (training rate) = 0.001

Momentum = 0.9

Car Evaluation Dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| No. of hidden layers | Neurons | Error in training dataset | Error in testing dataset |
| 2 | (5,5) | 0.978679655279 | 1.08483525593 |
| 3 | (5,6,8) | 0.978451555955 | 1.08477506195 |
| 2 | (4,3) | 0.978541622337 | 1.0850543858 |
| 2 | (8,9) | 0.97761155009 | 1.0841835917 |
| 3 | (8,9,9) | 0.978466606634 | 1.08474682276 |
| 3 | (4,3,3) | 0.978458504175 | 1.08474623438 |
| 4 | (5,5,5,5) | 0.978456137324 | 1.08474870163 |
| 4 | (2,3,5,7) | 0.978456017544 | 1.08474865463 |
| 3 | (5,5,5) | 0.978459962086 | 1.08474818305 |
| 4 | (4,4,5,5) | 0.978456334485 | 1.0847483445 |

Best set of parameters:

Number of hidden layers = 3

Neurons = (5,6,8)

Accuracy in training dataset = 100 – 0.978451555955 = 99.021548444045

Accuracy in testing dataset = 100 - 1.08477506195 = 98.91522493805

Iris Dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| No. of hidden layers | Neurons | Error in training dataset | Error in testing dataset |
| 2 | (5,5) | 0.776092871259 | 2.23223958104 |
| 3 | (5,6,8) | 0.781606981728 | 2.104011807 |
| 2 | (4,3) | 0.780608947386 | 2.13832563665 |
| 2 | (8,9) | 0.775921834017 | 2.23920320964 |
| 3 | (8,9,9) | 0.778073900069 | 2.19492990727 |
| 3 | (4,3,3) | 0.786276664252 | 2.03006923491 |
| 4 | (5,5,5,5) | 0.778734033103 | 2.17264750502 |
| 4 | (2,3,5,7) | 0.78079197591 | 2.12327851132 |
| 3 | (5,5,5) | 0.781900544801 | 2.09910622961 |
| 4 | (4,4,5,5) | 0.778988926754 | 2.16587212126 |

Best set of parameters:

Number of hidden layers = 2

Neurons = (8,9)

Accuracy in training dataset = 100 – 0.775921834017= 99.224078165983

Accuracy in testing dataset = 100 - 2.23920320964 = 97.76079679036

Adult Census Income Dataset:

|  |  |  |  |
| --- | --- | --- | --- |
| No. of hidden layer | Neuron | Error in training dataset | Error in testing dataset |
| 2 | (5,5) | 0.697850554293 | 0.68618286259 |
| 3 | (5,6,8) | 0.996514082399 | 1.01379307855 |
| 2 | (4,3) | 0.996413014258 | 1.01371248187 |
| 2 | (8,9) | 0.690757040929 | 0.678672775768 |
| 3 | (8,9,9) | 0.996454128814 | 1.01373477719 |
| 3 | (4,3,3) | 0.996531832604 | 1.01381371978 |
| 4 | (5,5,5,5) | 0.996521191402 | 1.01380228102 |
| 4 | (2,3,5,7) | 0.996521444328 | 1.01380246857 |
| 3 | (5,5,5) | 0.996526353604 | 1.01380812086 |
| 4 | (4,4,5,5) | 0.996520763767 | 1.01380180323 |

Best set of parameters:

Number of hidden layers = 2

Neurons = (8,9)

Accuracy in training dataset = 100 – 0.690757040929 = 99.309242959071

Accuracy in testing dataset = 100 - 0.678672775768 = 99.321327224232