**Experimental analysis and results**

On analyzing the network with changes in the above-mentioned parameters, the following results were observed:

MSE and R for different training algorithms and learning rates when momentum constant = 0.5:

|  |  |  |
| --- | --- | --- |
|  | lr = 0.4 | |
| MSE | R |
| trainlm | 1.2896e-05 | 0.99999 |
| trainrp | 0.94984 | 0.039834 |
| trainbr | 0.95117 | 0.27044 |

|  |  |  |
| --- | --- | --- |
|  | lr = 0.7 | |
| MSE | R |
| trainlm | 2.1451e-07 | 1 |
| trainrp | 0.83275 | 0.35307 |
| trainbr | 0.82365 | 0.36689 |

|  |  |  |
| --- | --- | --- |
|  | lr = 1.0 | |
| MSE | R |
| trainlm | 3.2279e-08 | 1 |
| trainrp | 0.85373 | 0.32032 |
| trainbr | 0.94976 | 0.76494 |

MSE and R for different training algorithms and momentum constants when learning rate = 1.0:

|  |  |  |
| --- | --- | --- |
|  | mc = 0.3 | |
| MSE | R |
| trainlm | 1.5752e-07 | 1 |
| trainrp | 0.85494 | 0.31833 |
| trainbr | 0.49751 | 0.72209 |

|  |  |  |
| --- | --- | --- |
|  | mc = 0.5 | |
| MSE | R |
| trainlm | 3.2279e-08 | 1 |
| trainrp | 0.85373 | 0.32032 |
| trainbr | 0.94976 | 0.76494 |

|  |  |  |
| --- | --- | --- |
|  | mc = 0.9 | |
| MSE | R |
| trainlm | 8.9203e-08 | 1 |
| trainrp | 0.86104 | 0.30809 |
| trainbr | 1.0808 | 0.74177 |

MSE and R for different number of nodes nodes in the hidden layers, after fixing a training algorithm, learning rate and momentum constant:

|  |  |  |
| --- | --- | --- |
|  | trainlm; lr = 1.0; mc = 0.5 | |
| MSE | R |
| [15, 20] | 1.5752e-07 | 1 |
| [25, 30] | 6.261e-08 | 1 |
| [30, 35] | 3.1143e-09 | 1 |

From the above experimental analysis, we can conclude that the best architecture for the given network and dataset is achieved using Levenberg-Marquardt training algorithm, learning rate = 1.0, momentum constant = 0.5, number of nodes in hidden layer 1 = 30, and number of nodes in hidden layer 2 = 35. This is because of minimum mean square error (very close to the set error goal of 1e-9) and regression value being 1 under these settings.