|  |
| --- |
| logo.jpg  **Artificial Neural Networks Course**  **Computer Science Department**  **Faculty of Computer and Information Sciences**  **Ain Shams University, Egypt** |
| **A Report of Final Project - MLP**  **By** |

|  |  |
| --- | --- |
| **Team no.: [Team no.4]**  **[Omar Mohamed Abdel-Latif] - [Section no.2]**  **[Mohamed Ahmed Ismail] - [Section no.2]**  **[Abdallah Hassan Ali] - [Section no.2]**  **[Mostafa Zaghloul Abdelrahman] - [Section no.3]** | |
| **Project Title** | |
| ***Head Orientation Recognition*** | |

**2nd Semester 2014\2015**

# **Results**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 1 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 5 |  |  |
|  |  | |  |  | **Accuracy** | 100% |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 5 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 6 |  |  |

|  |  |  |
| --- | --- | --- |
|  | **Accuracy** | 100% |

# **Model 3.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 2 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 3 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 2 |  |  |
|  |  | |  |  | **Accuracy** | 100% |

**Model 4.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 2 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 4 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 6 |  |  |
|  |  | |  |  | **Accuracy** | 100% |

**Model 5.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 2 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 10 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 10 |  |  |
|  |  | |  |  | **Accuracy** | 100% |

# **The Best Model**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 100 | # Neurons | 256 | # Hidden layers | 1 | # Neurons | 3 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 2 |  |  |
|  |  | |  |  | **Accuracy** | 100% |

# **Conclusion**

On the 240-image dataset Multi-layer perceptron produced an accuracy of 100% with principal component analysis on the dataset to reduce the size from 50x50 to 16x16.

The algorithm was very consistent on most of the network configurations producing accuracy more than 98% .

When running on the 12000-image dataset the algorithm produced an accuracy of 97.83% on the 6000 test image with one hidden 17-neuron layer which is far better than the radial basis function's performance that only reached 61%.

MLP is slower than RBF in the training process but is far more consistent and produced better results.