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| logo.jpg  **Computational Intelligence Course**  **Scientific Computing Department**  **Faculty of Computer and Information Sciences**  **Ain Shams University, Egypt** |
| **A Report of Final Project – (MLP)**  **By** |

|  |  |
| --- | --- |
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| **Project Title** | |
| **"*Epilepsy Diagnosis Using EEG Signals*"** | |

**1st Semester 2017\2018**

# **MLP Models (Results)**

Mention all your models (trials) you did in the following table format.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 500 | # Neurons | 20 | # Hidden layers | 1 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 4 |  |  |
| **Learning** **rate** | 0.1 | | **Stopping Criteria** | Number of epochs | **Accuracy** | 60% |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 500 | # Neurons | 20 | # Hidden layers | 3 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 4 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 6 |  |  |
|  |  | | Hidden layer (3) | |  |  |
|  |  | | # Neurons | 1 |  |  |
| **Learning** **rate** | 0.1 | | **Stopping Criteria** | Cross validation | **Accuracy** | 40% |

**Model 3.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 700 | # Neurons | 20 | # Hidden layers | 3 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 4 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 6 |  |  |
|  |  | | Hidden layer (3) | |  |  |
|  |  | | # Neurons | 7 |  |  |
| **Learning** **rate** | 0.1 | | **Stopping Criteria** | Cross validation & MSE(0.007) | **Accuracy** | 60% |

**Model 4.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 700 | # Neurons | 20 | # Hidden layers | 3 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 5 |  |  |
|  |  | | Hidden layer (2) | |  |  |
|  |  | | # Neurons | 3 |  |  |
|  |  | | Hidden layer (3) | |  |  |
|  |  | | # Neurons | 2 |  |  |
| **Learning** **rate** | 0.1 | | **Stopping Criteria** | Cross validation & MSE(0.0789) | **Accuracy** | 40% |

**Model 5.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 50 | # Neurons | 20 | # Hidden layers | 1 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 7 |  |  |
| **Learning** **rate** | 0.001 | | **Stopping Criteria** | MSE(0.0251) | **Accuracy** | 60% |

# **The Best MLP Model**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **# Epochs** | **Input layer** | | **Hidden layers** | | **Output layer** | |
| 500 | # Neurons | 20 | # Hidden layers | 1 | # Neurons | 1 |
|  |  | | Hidden layer (1) | |  | |
|  |  | | # Neurons | 7 |  |  |
| **Learning** **rate** | 0.001 | | **Stopping Criteria** | MSE | **Accuracy** | 60% |

# **Conclusion**

We used 2 classes, First: Neuron and second: layer (layer has list of neuron) then we make a list of layer called BP according to Backpropagation , first layer is input ,last for output and hidden we fill from form.

Using cross validation as a stopping criteria reduces the accuracy by 20% .

The Least mean square stopping condition gives the best accuracy up to 60%.

The number of layers also affects the accuracy as shown in the best model we used only one hidden layer and gave us the best accuracy, while using many layers reduced it.