Machine Learning
(BITS F464)

Assignment 2
Artificial Nueral Networks

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Sunglasses Recognizer

Network Structure: The Nueral network consists of 3 layers- the input layer, the hidden layer and the output layer. The input layer has 961 nodes- one for each of 960 input pixels and one to store the dummy variable that stores ‘1.0’ at all times to account for the threshold. The hidden layer has 4 nodes 3 of which take input as outputs of the input layer and one dummny variable to account for the threshold. The output layer has one node which stores the output.

Parameters Used: The folloawing parameters have been used for constructing the nueral network:

Learning rate	0.3
Momentum	0.3
Maximum number of epochs	10000
Minimum error allowed	0.005

Accuracy: The nueral network was tested on training and testing sets and the following accuracies were achieved:

- Training set : 100.0%
- Testing set 1 : 97.05882%
- Testing set 2 : 98.07692%

Face Recognizer

Network Structure: The Nueral network consists of 3 layers- the input layer, the hidden layer and the output layer. The input layer has 961 nodes- one for each of 960 input pixels and one to store the dummy variable that stores ‘1.0’ at all times to account for the threshold. The hidden layer has 21 nodes 20 of which take input as outputs of the input layer and one dummny variable to account for the threshold. The output layer has 20 nodes which represent the various “User IDs” of the people. The node storing the maximum value signinfies that the image is of the person representing that node.

Parameters Used: The folloawing parameters have been used for constructing the nueral network:

Learning rate	0.3
Momentum	0.3
Maximum number of epochs	10000
Minimum error allowed	0.05

Accuracy: The nueral network was tested on training and testing sets and the following accuracies were achieved:

- Training set : 100.0%
- Testing set 1 : 100.0%
- Testing set 2 : 97.5%

Pose Recognizer

Network Structure: The Nueral network consists of 3 layers- the input layer, the hidden layer and the output layer. The input layer has 961 nodes- one for each of 960 input pixels and one to store the dummy variable that stores ‘1.0’ at all times to account for the threshold. The hidden layer has 7 nodes 6 of which take input as outputs of the input layer and one dummny variable to account for the threshold. The output layer has 4 nodes which represent the various “poses” of the people (left,right,straight,up). The node storing the maximum value signifies that the pose of the person is the one which that node represents.

Parameters Used: The folloawing parameters have been used for constructing the nueral network:

Learning rate	0.3
Momentum	0.3
Maximum number of epochs	10000
Minimum error allowed	0.05

Accuracy: The nueral network was tested on training and testing sets and the following accuracies were achieved:

- Training set : 100.0%
- Testing set 1 : 91.366905%
- Testing set 2 : 92.30769%