

4] MLP

a) Loading the dataset: (Multi-feature digit dataset)

Input Layer:

This dataset consist of features of handwritten numerals (0-9). 2000 patterns are digitized in binary in which 200 patterns are for each class. As we need 3-class dataset we will be taking first 600 patterns.

Hidden Layer:

The output of input layer is given to the hidden layer as input. 3 activation units are used for hidden layer.

Output Layer:

This gives the final prediction.

The feed-forward algorithm:

- 1) Start with initial guess of parameters: w_j
- 2) w_j is used to calculate z^i (output of hidden layer)
- 3) Update the parameters using z^i

Equation for calculating z^i

$$Z = \frac{1}{1 + \exp(-(W^T x))}$$

Equation for updating w_j

$$w_j = w_j - \text{Learning rate} * \sum (h(\theta x^{(j)}) - y^{(j)}) X^{(j)}$$