MACHINE INTELLIGENCE AND EXPERT SYSTEMS

EC60091

AUTUMN SEMESTER - 2018

Computer Assignment on Neural Network

1. The below data shows the prediction of the gender of a person depending upon the height, weight, shoe-size of the person where 0 represents the male gender and 1 represents the female gender.

Height	Weight	Shoe-size	Gender
1.81	0.80	0.44	0
1.77	0.70	0.43	0
1.60	0.60	0.38	1
1.54	0.54	0.37	1
1.66	0.65	0.40	0
1.90	0.90	0.47	0
1.75	0.64	0.39	1
1.77	0.70	0.40	1
1.59	0.55	0.37	1
1.71	0.75	0.42	0
1.81	0.85	0.43	0

Implement the above problem using a Neural Network with

- No. of Nodes in input layer: 3
- No. of Hidden layers: 1
- No. of Nodes in hidden layer: 3 or 4
- No of node in output layer:1
- Output: 1(Female) or 0 (Male)

Loop:

- Implement forward propagation
- Compute loss
- Implement backward propagation to get the gradients
- Update parameters (gradient descent)

Activation Function:

- Output layer: Sigmoid Function
- Hidden layer: ReLU Function ($R(x)=max(0.x)$)

Choose learning rate, η=0.2.

Use sigmoid activation function with threshold 0.5 i.e.

$$output = \begin{cases} 1 \; if \; prediction > 0.5 \\ 0 \qquad otherwise \end{cases}$$

Cost function= Square error function=$(prediction - target)^2$

Weight update as: $w^{k+1} = w^k + \Delta w \qquad where \; \Delta w = -\eta \frac{\partial E}{\partial w}$

- Classify two new data
  - [1.63, 0.60, 0.37]
  - [1.75, 0.72, 0.41]