MCA572– Neural Networks and Deep Learning

V MCA

23-09-2024

Regular lab Question – 2

1. **Exploring Activation Functions in Neural Networks**

Objective:

To explore and compare different activation functions used in artificial neural networks and understand their impact on the output of a neural network.

Scenario:

You are tasked with implementing and visualizing various activation functions to observe how they transform inputs and affect the output. You will also train a simple neural network using these activation functions and evaluate their performance.

Lab Tasks:

1. **Implement and Visualize Activation Functions:**
    - Implement the following activation functions in Python:
        - **Step Function**
        - **Sigmoid Function (Binary and Bipolar)**
        - **Tanh Function**
        - **ReLU Function**
    - Visualize each activation function using matplotlib/seaborn/bokeh to observe how they map input values to output values.

2. Implement a Simple Neural Network:

- Create a simple neural network with one hidden layer using each activation function (sigmoid, tanh, and ReLU).
- Train the network on a binary classification task (e.g., XOR problem) using a small dataset.
- Compare the performance of the neural network with different activation functions.

Program Evaluation Rubrics

Evaluation Criteria	
5 marks	**C1-Implementation, Correctness and Complexity**
2 marks	**C2-Documentation and Visualization**
3 marks	**C3-Concept Clarity and Explanation**

General Instructions

1. The file you have to save with your name, last 3 digits of register number and program number “Aaron_201_Lab1”.
2. The implemented code you have to upload in Github and in the Google Classroom in the given scheduled time.
3. Failure to upload within the allotted time will result in the loss of all marks for the corresponding lab exercise.