

Lab - 10
CSL2010: Introduction To Machine Learning
AY 2022-23

Neural Network Training With Backpropagation (FNN)

(Due: 10th Nov 2022, 11:59 PM)

General Instructions

1. You need to upload a zip **<Lab10_Your_Roll_No>.zip**, which contains one file for the task in **<Lab10_Your_Roll_No>.py** format and the report for the entire assignment in **<Lab10_Your_Roll_No>.pdf** format.
2. Provide your colab file link in the report. **Make sure that your file is accessible.**
3. Submit a single report mentioning your observations for all the tasks.
4. Report/Cite any resources you have used while attempting the assignment.
5. This is a non-evaluated assignment with mandatory submission.

Dataset

Download the dataset from the link below.

https://drive.google.com/file/d/1s2lhEwbbSAGetVuPpLwLq_wQ8P3Svf0l/view?usp=sharing

1. Using the above dataset, (by taking 'Age' as the target column), implement a backpropagation algorithm for a **feed-forward neural network** with one hidden layer from scratch. Each node in the hidden layer should perform a non-linear activation (one may use sigmoid/ReLU for this). The network should be trained using the **sum-of-squared error** function as the loss function. Initialize the weights of the network randomly from a uniform distribution. The output node should not contain any non-linear activation. Your code should take the number of nodes in the hidden layer as an input parameter.
2. In your analysis, try with different values of the number of nodes in the hidden layer. For each training iteration, record the value of the loss function on the entire validation set and plot it. Try with different stopping criteria (early stopping, fixed number of iterations, and change in the value of loss function).
3. Compare the results (RMSE) of your final model with a linear regression model, and mention it in the report.

Resources:

[Medium Article](#)

[TowardsDataScience Article \(Keras implementation\)](#)