**Implementing Optimization Techniques on Neural Network Backpropagation**

Individual report by Aditya Nayak

1. **Introduction:**

Neural networks are a type of machine learning model that is inspired by the structure and function of the human brain. They consist of layers of interconnected nodes, or neurons, that process information and make predictions based on input data. Neural networks have become increasingly popular in recent years due to their ability to learn complex patterns and relationships in data. They have been applied to a wide range of fields, including image and speech recognition, natural language processing, and even game playing.

Optimization algorithms are a key component of neural network training, as they are used to adjust the weights and biases of the network to minimize the error between the predicted output and the actual output. There are several types of optimization algorithms used in neural networks, including gradient descent, stochastic gradient descent, and Adam.

1. **Project work Description:**

To execute our project, the tasks assigned to me were as follows:

1. Responsible for dataset collection.
2. Gather three datasets.
3. Make the datasets in proper format and ready to implement on the network.
4. Implement the variable learning rate algorithm using momentum on the neural network optimization.
5. **Results:**
6. **Summary:**
7. **References:**
   1. “[Neural Network Design](https://hagan.okstate.edu/NNDesign.pdf)” (2nd Ed), by Martin T Hagan, ISBN 0971732116
   2. Henry P. Gavin (2022), “[The Levenberg-Marquardt algorithm for nonlinear least squares curve-fitting problems](https://people.duke.edu/~hpgavin/ExperimentalSystems/lm.pdf)”, Duke University, Department of Civil & Environmental Engineering.
   3. Rauf Bhat (2020), “[Gradient Descent with Momentum](https://towardsdatascience.com/gradient-descent-with-momentum-59420f626c8f)”, Towards Data Science.
   4. I. Khan et al (2020), "[Design of Neural Network with Levenberg-Marquardt and Bayesian Regularization Backpropagation for Solving Pantograph Delay Differential Equations](https://ieeexplore.ieee.org/abstract/document/9154452)" in IEEE Access, vol. 8, pp. 137918-137933, doi: 10.1109/ACCESS.2020.3011820.