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**Work Integrated Learning Programmes Division**

**ML System Optimization**

## S2-23\_AIMLCZG516

**2023 -24**

**Assignment 1 – PS6 [Weightage 10%]**

**Instructions for Assignment Evaluation**

1. Please follow the naming convention as <Group no>\_<PS\_Number>.ipynb.

Eg – for group 1 with PS1 should be named as - Group1\_ PS1.ipynb.

1. Inside each jupyter notebook, you are required to mention your name, Group details and the Assignment dataset you will be working on.
2. Organize your code in separate sections for each task. Add comments to make the code readable.
3. Notebooks without output shall not be considered for evaluation.
4. Delete unnecessary error messages and long outputs.
5. Display the analysis of attributes in one frame rather than one after one. However, special treatment to attributes can be displayed separately.
6. Prepare a jupyter notebook (recommended - Google Colab) to build, train and evaluate the model.
7. Each group consists of up to 4 members. All members of the group will work on the same problem statement.
8. Each group should upload in CANVAS in respective locations under ASSIGNMENT Tab. Assignment submitted via means other than through CANVAS will not be graded.
9. Submission: Files should be uploaded on canvas without zipping them. One is ipynb file and other one html or pdf with output of the ipynb file.

**Problem Statement**

Implement Mini-Batch Gradient Descent and experiment with different batch sizes. Analyze the impact of batch size on the convergence speed and stability of the optimization process. Provide visualizations to support your analysis.

Rubric for Implementing Mini-Batch Gradient Descent

**Criteria:**

* **Implementation of Mini-Batch Gradient Descent** (7 Points):
  + Correctly partitions the dataset into mini-batches.
  + Accurately computes gradients for each mini-batch.
  + Properly updates the parameters using the learning rate.
  + Iterates over multiple epochs.
* **Analysis of Batch Sizes** (3 Points):
  + Experiments with different batch sizes.
  + Analyzes and discusses the impact of batch size on convergence speed and stability.

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