Report: Effect of Batch Size on Training Performance

Overview:

This report discusses how changing the batch size affects the training performance of a logistic regression model.
Different batch sizes were tested — **1, 2, 4, 8, 16, 32, 64, and 200** — while keeping the same learning rate (**0.01**) and number of epochs (**100**).
The focus was on observing how the **training loss** and **accuracy** behave with different batch sizes.

Discussion:

When the **batch size is small**, the model updates its weights more frequently during each epoch, which helps it adjust faster and reach lower loss values.
As the **batch size increases**, the updates become less frequent, making the training process smoother but slower to converge.
The **loss value** increases with larger batches because the model receives fewer parameter updates per epoch.
The **accuracy** stayed relatively stable (around **86–88%**), indicating that the model maintained good performance, although the **convergence efficiency slowed down noticeably**.

Conclusion:

Smaller batch sizes provide better learning efficiency and lower training loss, while larger batch sizes result in slower convergence and slightly higher loss.
Choosing a **moderate batch size (around 8–16)** gives a good balance between speed and accuracy.