Analysis of the result of LeNet-5 implementation on MNIST dataset

The LeNet-5 model achieved impressive performance on the MNIST dataset with the given parameters. Over the 15 training epochs, the training loss consistently decreased, reaching a final value of 0.0119, indicating that the model learned the features of the training data effectively.

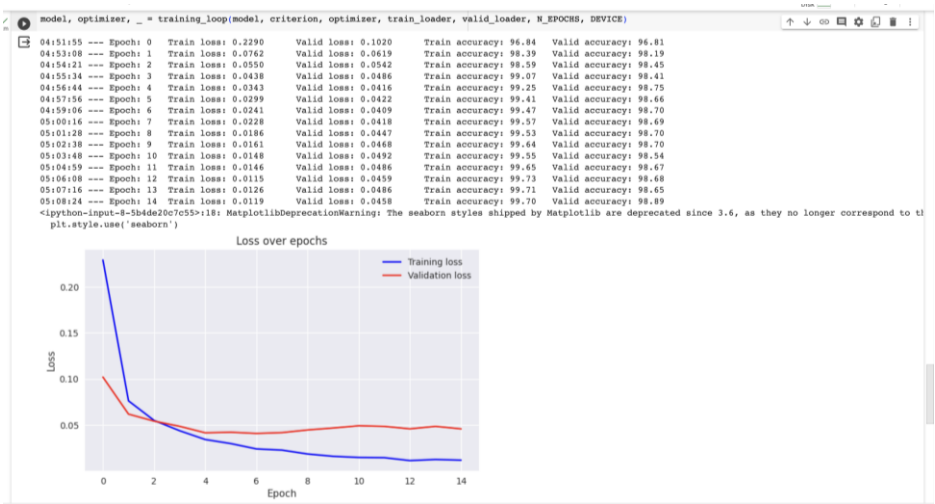

Fig 1: Visualization of loss over epoch

The validation loss also exhibited a similar trend, demonstrating that the model generalized well to unseen data. The training accuracy consistently increased, reaching a remarkable 99.70% by the end of the training process. This high accuracy on the training set suggests that the model learned to classify the training data with great precision. The validation accuracy, at 98.89%, is also notably high, indicating that the model generalized well to new, previously unseen data.

Fig 2: Model prediction on test data

The visualization of predictions further reinforces the model's strong performance. Out of 10 test data points, the model correctly predicted 9 of them. This high accuracy on individual predictions aligns with the overall accuracy metrics obtained during training and validation. In summary, the LeNet-5 model demonstrated excellent learning capabilities on the MNIST dataset, achieving high accuracy and generalization. The visualization of predictions provides

a qualitative confirmation of the model's effectiveness in correctly classifying handwritten digits.