Report

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Assignment 4: MNIST Classification with CNN

Q1: Number of parameters at each layer

The number of parameters for each layer in the CNN model:

- Convolutional_Layer_1: **80**
- Pooling_Layer_1: **0**
- Convolutional_Layer_2: **1168**
- Pooling_Layer_2: **0**
- Flatten_layer: **0**
- Dense_layer_1: **100480**
- dropout_3: **0**
- Output_layer: **1290**

Q2: Size of final extracted feature vector:

The size of the final extracted feature vector from the Flatten layer is **784**

Q3: Accuracy of CNN on training and test sets:

- Training Accuracy: **99.98%**
- Test Accuracy: **98.88%**

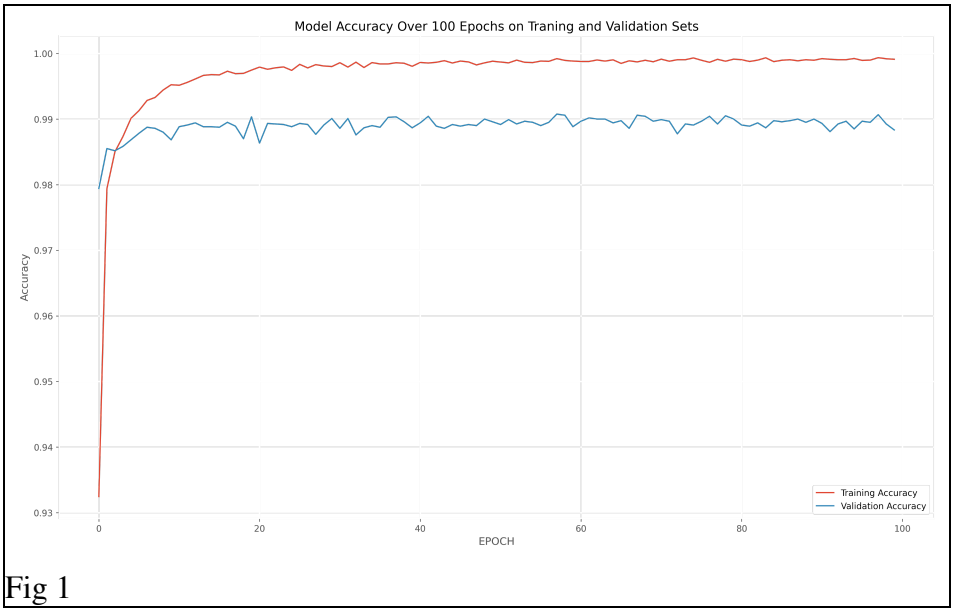

Fig 1

Q4: Confusion matrix:

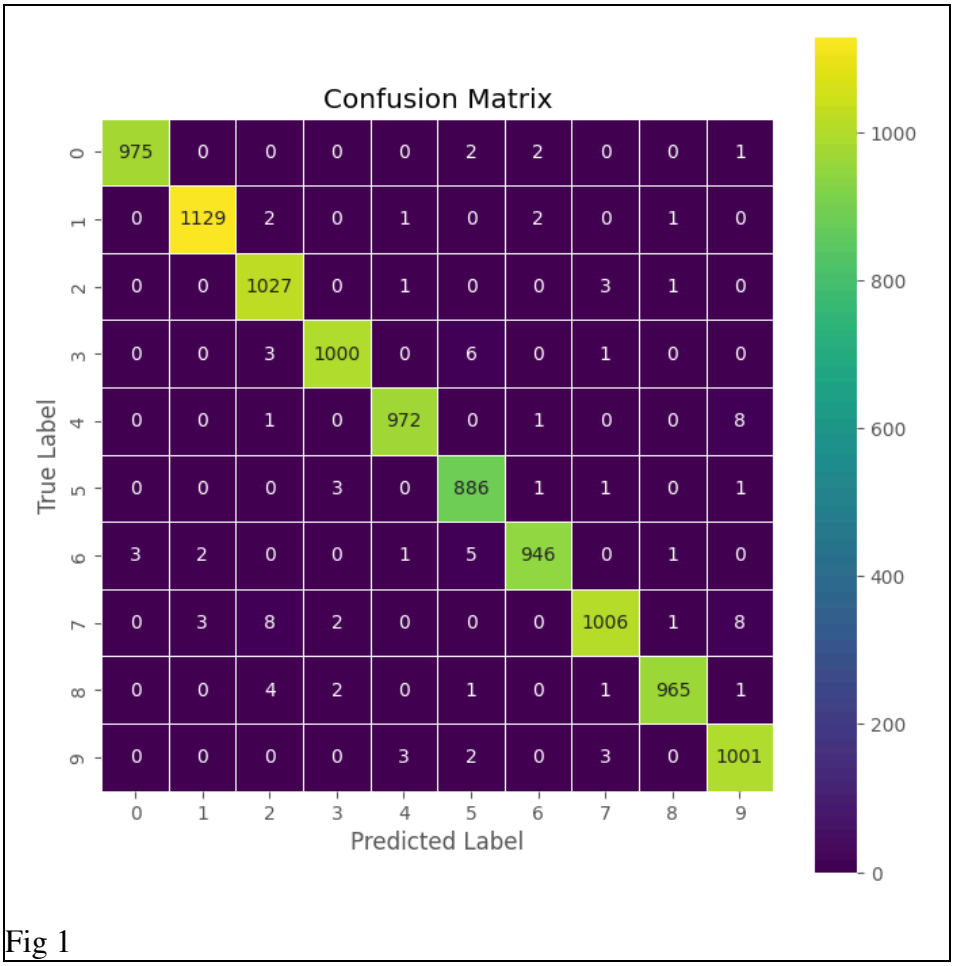

Fig 1

Q5: Extract feature vectors and apply kNN

The kNN (k=5, Euclidean distance) test accuracy on the extracted flattened feature vectors is **98.21%**

Q6: Apply PCA to test feature vectors and represent in 2D

Fig 1

Q7: Repeat with 10 principal components and apply kNN

The kNN (k=5, Euclidean distance) test accuracy on the 10-dimensional PCA-reduced feature vectors is **96.42%**