Abstract:

The MNIST database of handwritten digits, available from this page, has a training set of 60,000 examples, and a test set of 10,000 examples. It is a subset of a larger set available from NIST. The digits have been size-normalized and centered in a fixed-size image. It is a good database for people who want to try learning techniques and pattern recognition methods on real-world data while spending minimal efforts on preprocessing and formatting. We have used these datasets to train a model that will evaluate the test data set image and identify the exact number.

Introduction:

The MNIST database is a large database of handwritten digits that is commonly used for training various image processing systems. The database is also widely used for training and testing in the field of machine learning. It was created by "re-mixing" the samples from NIST's original datasets.[6] The creators felt that since NIST's training dataset was taken from American Census Bureau employees, while the testing dataset was taken from American high school students, it was not well-suited for machine learning experiments. Furthermore, the black and white images from NIST were normalized to fit into a 28x28 pixel bounding box and anti-aliased, which introduced grayscale levels.

Result:

Using Adam Optimizer: Model has achieved 98.85% accuracy in epoch 05. Model evaluation with test data is 97%. This table visualizes more pictures about other results.

Steps	Optimizer	Hidden Layers Count	Neurons	Activation (Output)	Accuracy (%)	Test Data Evaluation (%)
1	ADAM	02	256,128	softmax	98.85	98.61
2	SGD	02	256,128	softold	98.76	98.17
3	RMSprop	02	256,128	softmax	98.75	98.17

Discussion:

From the results the difference between the accuracy results and test validation results. When the ‘SGD’ as optimizer and ‘sigmoid’ as activation function in the last layer more accuracy than others. Here limited to 02 hidden layers. If extend more layers it will do more calculation and consume more memory.