Problem Solution Fit:

Handwriting digit recognition has an active community of academics studying it. A lot of important work on convolutional neural networks happened for handwritten digit recognition [1,6,8,10]. There are many active areas of research such as Online Recognition, Offline recognition, Real-Time Handwriting Recognition, Signature Verification, Postal-Address Interpretation, Bank-Check Processing, Writer Recognition.

Implementation:

To implement our CNN architecture, we will use MatConvNet. MatConvNet is an implementation of Convolutional Neural Networks (CNN) for MATLAB [12].
It exposes the building blocks of CNN as easy-to-use MATLAB functions, providing routines for computing linear convolutions with filter banks, feature pooling and many more. In this manner, MatConvNet allows fast prototyping of new CNN architectures; at the same time, it supports efficient computation on CPU and GPU allowing to train complex models on large datasets such as Image Net ILSVRC.

Convolutional Neural Networks (CNN) are the current state-of-art architecture for the image classification task. Our proposed 2-D Convolutional Neural Network (CNN) model is designed using MatConvNet backened for the well known MNIST digit recognition task. The whole workflow can be to preparing the data, building and compiling of the model, training and evaluating the model and saving the model to disk to reuse.

Results & Discussion:

Among 10,000 test cases, our model misclassifies total 85 digits after eight epochs which correspond to 99.15% recognition rate. The results are pretty good for such a simple model with CPU training and less training time (about 30 minutes) Although there are some digits which are not a good handwriting, our model will be able to classify them correctly.

Testing accuracy 99.15% implies that the model is trained well for prediction. Training set size affects the accuracy and accuracy increases as the number of data increases. The more data in the training set, the smaller the impact of training error and test error, and ultimately the accuracy can be improved.