

CS 480: Final Report

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For this project, we are trying to develop an AI to recognize handwritten digits. We have implemented the Convolution Neural Network (CNN) since it is regarded as one of the most powerful supervised deep learning techniques. CNN is different from Regular Neural Network in the sense that Regular Neural Networks are not scalable for larger and complex image classification.

In order to train the model we have used Keras library. The program is trained by feeding 60,000 images from the MNIST database. In addition to this, we also have added extra images in the dataset so that the prediction can be made more accurately. First, an image is taken as input then it is centralized and changed into 784(28x28x1) individual pixels. Then, the two hidden layers are used to train and predict the numbers ranging from 0-9.

The user interface of this project has a blank canvas where users can write/draw the number to be tested. Based on image data produced the program checks and output the accuracy of the predicted number. When the user writes/draws the number to be tested and clicks the recognize button, it is then checked with our model which was trained using the MNIST dataset and extra images that we had added.

Here, we are trying to tackle the problems similar to Differing size, width, the orientation of digits; Similarity between digits such as 1 and 7, 5 and 6, 3 and 8, 2 and 5, 2 and 7, etc and Uniqueness and variety in the handwriting of different individuals. And by adding more images in the MNIST dataset we are trying to increase the accuracy.

However, the prediction is not 100% accurate every time. This might be because of various reasons like the orientation of digits, pace with which the digits are written, improperly saved digits in the dataset itself, and placement of the digits on the GUI canvas. Also, different users have different ways of writing. So the writing might not be clear and the prediction might be wrong.

Each member has a contribution in almost every part. Most of the parts of this project were done together as everyone is in Kirksville.

The description and walkthrough of the code is in a different file named as "readme.pdf".