Ideation Phase

Literature Survey

Project Name:- A Novel Handwritten Method For Digit Recognition System

Abstract:-

A popular demonisation of the capability of deep learning techniques is object recognition in image data.

The “hello world” of object recognition for machine learning and deep learning is the MNIST dataset for handwritten digit recognition

In this post, you will discover how to develop a deep learning model to achieve near state-of-the-art perfomance on the MNIST handwritten digit recognition task in python using the keras deep learning library.

Description Of The MNIST Handwritten Digit Recognition Problem

The MNIST problem is dataset developed by yann LeCun,Corinna Cortes,and christopher burges for evaluating machine learning models on the handwritten digit classification problem.

The dataset was constructed from a number of scanned document datasets available from the National Institute of Standards and Technology (NIST). This is where the name for the dataset comes from, the Modified NIST or MNIST dataset.

Loading the MNIST Dataset in Keras

The Keras deep learning library provides a convenient method for loading the MNIST dataset.

The dataset is downloaded automatically the first time this function is called and stored in your home directory in `~/.keras/datasets/mnist.npz` as an 11MB file.
This is very handy for developing and testing deep learning models.

Baseline Model with Multi-Layer Perceptrons

Do you really need a complex model like a convolutional neural network to get the best results with MNIST?

You can get very good results using a very simple neural network model with a single hidden layer. In this section, you will create a simple multi-layer perceptron model that achieves an error rate of 1.74%. You will use this as a baseline for comparing more complex convolutional neural network models.

Simple Convolutional Neural Network for MNIST

Now that you have seen how to load the MNIST dataset and train a simple multi-layer perceptron model on it, it is time to develop a more sophisticated convolutional neural network or CNN model.

Keras does provide a lot of capability for creating convolutional neural networks.
In this section, you will create a simple CNN for MNIST that demonstrates how to use all the aspects of a modern CNN implementation, including Convolutional layers, Pooling layers, and Dropout layers.

Resources on MNIST

The MNIST dataset is very well studied. Below are some additional resources you might want to look into.

- The Official MNIST dataset webpage
- Rodrigo Benenson's webpage that lists state-of-the-art results
- Kaggle competition that uses this dataset (check the scripts and forum sections for sample code)
- Read-only model trained on MNIST that you can test in your browser (very cool)

Conclution:-

In this post, you discovered the MNIST handwritten digit recognition problem and deep learning models developed in Python using the Keras library that are capable of achieving excellent results.