HAND WRITTEN DIGIT RECOGNITION

USING DEEP LEARNING

BATCH-06

Team Members:-

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**Objective:-**

The handwritten digit recognition is the ability of computers to recognize human handwritten digits. It is a hard task for the machine because handwritten digits are not perfect and can be made with many different flavors. So aim of our project is to create a handwritten digit recognition which uses the image of a digit and recognizes the digit present in the image. In this we were taking the MINST dataset , where it has images for training and testing and using a neural network that is convolution neural network to build the model.

**Dataset:-**

This is probably one of the most popular datasets among machine learning and deep learning enthusiasts. The MNIST dataset contains 60,000 training images of handwritten digits from zero to nine and 10,000 images for testing. So, the MNIST dataset has 10 different classes. The handwritten digits images are represented as a 28×28 matrix where each cell contains grayscale pixel value.

**Algorithms:-**

Deep learning algorithms are used in the Handwritten Recognition.

The algorithm that is “Convolution Neural Network”, CNN has become famous among the recent times. CNN is part of deep, feed forward artificial neural networks that can perform a variety of 10 task with even better time and accuracy than other classifiers, in different applications of image and video recognition, recommender system and natural language processing.

**Methodology:-**

We can implement Convolutional neural networks in Python/Matplotlib. In our implementation we will be using python because we have our keras deep learning library built in python . So by using keras models we can implement our network and create a driver program to call the network to take inputs from the data set. The driver program also has learning algorithm , training and testing datasets. MNIST datasets are the best and well known , and easily understood dataset in the computer vision branch and machine learning. After implementing we can find that our network can classify the digit upto >98% accuracy with less training time. This implementation can be done in both CPU or GPU enabled system , but CPU takes more training time than GPU. We will be using 66% of data for training our network and rest of the data to test our network. Each digit is taken as 28 by 28 greyscale image which are available from MNIST dataset. These grey scale pixel intensities fall in the range of 0 to 255 . All digits are presented on black background color with a light foreground colour being white, the digit itself and includes various shades of grey. The code is organized this way, we will define a package name pyimage search and within that module we will create a cnn sub-module which will help us to store the Convolutional neural networks implementation. Then going into our cnn module or folder you should have your networks submodule , this is where the network implementations must be stored. So now create a python file inside that folder which implements our network and define a class inside our file which is our code implementing the LeNet architecture using Python + keras.

**Steps:-**

### Import the libraries and load the dataset

### Preprocess the data

### Create the model

### Train the model

### Evaluate the model

### Create GUI to predict digits