

REPORT FOR HANDWRITTEN DIGIT RECOGNITION

As a project work for Course

ARTIFICIAL INTELLIGENCE (INT 404)

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INTRODUCTION:-

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 flavours. The handwritten digit recognition is the solution to this problem which uses the image of a digit and recognizes the digit present in the image.

we are going to implement a handwritten digit recognition app using the MNIST dataset. We will be using a special type of deep neural network that is [*Convolutional Neural Networks*](#). In the end, we are going to build a GUI in which you can draw the digit and recognize it straight away

The MNIST 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.

TEAM MEMBERS WITH THEIR ROLE:-

(1)Vijay kumar

Contribution:-

- (1)Coding
- (2)Dataset
- (3)Report
- (4)Train log

(2)Rahul debnath

Contribution:-

- (1)Coding
- (2)Package Needed
- (3)Database
- (4)Report

LIBRARIES:-

(1) pip install numpy:-

NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

(2) tensorflow:-

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks.

(3) keras:-

Keras is an open-source neural-network library written in Python. It is capable of running on top of TensorFlow, Microsoft Cognitive Toolkit, R, Theano, or PlaidML. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible.

(6) PIL:-

PIL is the Python Imaging Library which provides the python interpreter with image editing capabilities.

`PIL.Image.new()` method creates a new image with the given mode and size. Size is given as a (width, height)-tuple, in pixels. The colour is given as a single value for single-band images, and a tuple for multi-band images (with one value for each band).

We can also use colour names. If the colour argument is omitted, the image is filled with zero (this usually corresponds to black). If the colour is `None`, the image is not initialised. This can be useful if you're going to paste or draw things in the image.

Syntax:

`PIL.Image.new(mode, size)`

`PIL.Image.new(mode, size, colour)`

Conclusion:-

we have successfully built a Python deep learning project on handwritten digit recognition app. We have built and trained the Convolutional neural network which is very effective for image classification purposes. Later on, we build the GUI where we draw a digit on the canvas then we classify the digit and show the results.