PROJECT TITLE : A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

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PROJECT - OBJECTIVES

The main objective of this Project is to develop the tools that can help people to recognize the handwritten notes. In this project we are going to introduce the method that gives the smooth services to the people to recognize the handwritten digit.

Handwriting recognition is one of the compelling research works going on because every individual in this world has their own style of writing. It is the capability of the computer to identify and understand handwritten digits or characters automatically.

Because of the progress in the field of science and technology, everything is being digitalized to reduce human effort. Hence, there comes a need for handwritten digit recognition in many real-time applications.

MNIST data set is widely used for this recognition process and it has 70000 handwritten digits. We use Artificial neural networks to train these images and build a deep learning model. Web application is created where the user can upload an image of a handwritten digit. this image is analyzed by the model and the detected result is returned on to UI.

There are different techniques that can be used to recognize handwritten characters. Two techniques researched in this paper are Pattern Recognition and Artificial Neural Network (ANN).

Both techniques are defined and different methods for each technique is also discussed. Bayesian Decision theory, Nearest Neighbor rule, and Linear Classification or Discrimination is types of methods for Pattern Recognition.

Shape recognition, Chinese Character and Handwritten Digit recognition uses Neural Network to recognize them. Neural Network is used to train and identify written digits. After training and testing, the accuracy rate reached 99%. This accuracy rate is very high.

Character recognition is becoming more and more important in the modern world. It helps humans ease their jobs and solve more complex problems. An example is handwritten character recognition which is widely used in the world.

This system is developed for zipcode or postal code recognition that can be employed in mail sorting. This can help humans to sort mails with postal codes that are difficult to identify. For more than thirty years, researchers have been working on handwriting recognition.

Over the past few years, the number of companies involved in research on handwriting recognition has continually increased. The advance of handwriting processing results from a combination of various elements, for example: improvements in the recognition rates, the use of complex systems to integrate various kinds of information, and new technologies such as high quality high speed scanners and cheaper and more powerful CPUs.

Some handwriting recognition system allows us to input our handwriting into the system. This can be done either by controlling a mouse or using a third-

party drawing tablet. The input can be converted into typed text or can be left as an "ink object" in our own handwriting.

We can also enter the text we would like the system to recognize into any Microsoft Office program file by typing. We can do this by typing 1s and 0s. This works as a Boolean variable.

Handwriting recognition is not a new technology, but it has not gained public attention until recently. The ultimate goal of designing a handwriting recognition system with an accuracy rate of 100% is quite illusionary, because even human beings are not able to recognize every handwritten text without any doubt.

For example, most people can not even read their own notes. Therefore there is an obligation for a writer to write clearly. In this, both Pattern Recognition and Neural Networks will be defined. Examples of types of Pattern Recognition and Neural Networks will be discussed.

The advantages of using Neural Networks to recognize handwritten characters will be listed. Finally, Artificial Neural Networks, using back-Propagation method will be used to train and identify handwritten digits.

BY THE END OF THIS PROJECT YOU WILL:
- Know fundamental concepts and techniques of the Artificial Neural Network and Convolutional Neural Networks.
- Gain a broad understanding of image data.
- Work with sequential type of modeling.
- Work with keras capabilities.
- Work with image processing techniques.
- Know how to build a web application using the Flask framework.