PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

LITERATURE SURVEY

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Domain: Artificial Intelligence (AI)

Project: A Novel Method for Handwritten Digit Recognition System

Phase 2 Description: Ideation Phase (Literature Survey, Empathize, Defining Problem Statement, Ideation)

A NOVEL METHOD FOR HANDWRITTEN DIGIT RECOGNITION SYSTEM

ABSTRACT:

- The handwritten digit recognition is the capability of computer applications to recognize the human handwritten digits.

- It is a hard task for the machine because handwritten digits are not perfect and can be made with many different shapes and sizes.

- The handwritten digit recognition system is a way to tackle this problem which uses the image of a digit and recognizes the digit present in the image.

- Convolutional Neural Network model created using tensor flow library over the MNIST dataset to recognize handwritten digits.

- Handwritten Digit Recognition is the capability of a computer to fete the mortal handwritten integers from different sources like images, papers, touch defenses, etc, and classify.

- them into 10 predefined classes (0-9). This has been a Content of bottomless- exploration in the field of deep literacy.

- Number recognition has numerous operations like number plate recognition, postal correspondence sorting, bank check processing, etc.

- In Handwritten number recognition, we face numerous challenges because of different styles of jotting of different peoples as it is not an Optic character recognition.

- This exploration provides a comprehensive comparison between different machine literacy and deep literacy algorithms for the purpose of handwritten number recognition.

- For this, we've used Support. Vector Machine, Multilayer Perceptron, and Convolutional.

- Neural Network. The comparison between these algorithms is carried out on the base of their delicacy, crimes, and testing- training time corroborated by plots and maps that have been constructed using matplotlib for visualization.

WORKING:

> We have planned to develop a model that recognizes the handwritten digits (from Images). A computer cannot directly confirm a what the image refers to. So, we will use here MNIST dataset where we split 80% for training the model and 20% for testing the model. Then the trained model can be used to recognize the handwritten digit by getting input in the form of image and displays the digit. The ultimate goal is to recognize human handwriting. This approach is not restricted by digits alone, we can further improve by enabling model predict the human handwritten messages.

COMPONENTS REQUIRED:

NUMPY AND PANDAS:

> These library are used to handle data and collect data from various sources, group them together. And also Numpy allows various mathematical operations on n-

Dimensional data. Numpy is base module for building up various data handling modules.

➢ **It is built on top of Numpy.** Pandas will be used to collect data and join the data that are in different file format. We can also Perform **ETL** (Exploratory data analysis). We can perform Descriptive and inferential statistic with this module.

MATPLOLIB AND SEABORN:

➢ These module are used for data visualization. To bring insights from data. Rather than going with numbers visualization will give clear insights and trend of the data. For example, can determine which **feature**

correlates to the **target** feature. Seaborn was built on top of matplotlib. 3D plots can also be visualized.

TENSORFLOW AND KERAS:

➤ Tensor flow was created by the Google. In Tensor flow 2.0, Keras was combined with tensor flow which made this lot more powerful. Tensor flow is a free and open-source software library for Machine Learning and Artificial Intelligence. It can be used for wide range of tasks but has a particular focus on training and inference of deep neural network.

ADVANTAGES:

> ➢ Large volumes of handwritten documents can be classified as Digit.

> ➢ Accurate prediction are made and classified accordingly.

> ➢ The system not only produces a classification of the digit but also a rich description of the instantiation parameters which can yield information such as the writing style.

> ➢ The generative models can perform recognition driven segmentation.

> ➢ The method involves a relatively small number of parameters and hence training is relatively easy and fast.

- Unlike many other recognition schemes, it does not rely on some form of pre-normalization of input images, but can handle arbitrary scalings, translations and a limited degree of image rotation.

DISADVANTAGES:

- Low resolution image might affect the training.
- Bad Handwriting does not produce good output.
- The method is that it requires much more computation than more standard OCR techniques.

REFERENCE:

PAPER 1 - A NOVEL METHOD FOR HAND WRITTEN DIGIT RECOGNITION USING DEEP LEARNING.

PUBLISHER: Rohini M (Assistant Professor), Dr. Surendran D (Assistant Professor)

REFERENCE -

http://troindia.in/journal/ijcesr/vol6iss6part2/32-36.pdf

PAPER 2 - A NOVEL METHOD FOR HAND WRITTEN DIGIT RECOGNITION WITH NEURAL NETWORKS.

REFERENCE -

https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.228.158&rep=rep1&type=pdf

PAPER 3 – A NOVEL HANDWRITTEN DIGIT CLASSIFICATION SYSTEM BASED ON CONVOLUTIONAL NEURAL NETWORK APPROACH.

REFERENCE -

https://www.researchgate.net/publication/354755659_A_Novel_Handwritten_Digit_Classification_System_Based_on_Convolutional_Neural_Network_Approach