Project Design Phase-I
Proposed Solution

Date	16 October 2022
Team ID	PNT2022TMID47631
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum Marks	2 Marks

Proposed Solution Template:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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 digitized to reduce human effort. Hence, there comes a need for handwritten digit recognition in many real-time applications. Most of the banks are still relying on manual cheque processing which is both time consuming and error prone. Handwriting recognition systems with reliable accuracy can make an impact in these business fields.
2.	Idea / Solution description	The 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. We opt to use multi-layer neural networks as deep NN. Due to the fact that data is Image, the best type of neural network satisfying our goal is **Convolutional Neural Networks**. As we have to do for most of the data, normalization plays an important role in our process. Before doing any tasks, pre-processing images (our data-set) is highly recommended. Consequently better accuracy will be achieved by pre-processed data. After pre-processing and normalizing, the prepared data set could be used as input to our deep convolutional neural network. Then deep NN will be run and fit to our data and the result will be produced by that.
3.	Novelty / Uniqueness	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 to the UI. One of the major decisions had to be made was choosing

		the suitable programming language satisfying our goal for extracting knowledge from our data. After some searching the suitable decision has been made by selecting Python as the project programming language. Due to the fact that, a lot of tools and frameworks are available for Python to create powerful Artificial Neural Networks. Also IBM Watson helps to predict future outcomes,automate complex processes,and optimize user's time. And also the result accuracy will be increased from 70% which is the accuracy of the test results that the previous developed codes produced.
4.	Social Impact / Customer Satisfaction	Can ensure road safety by identifying the owner of the speeding vehicle by using the registration number of that vehicle. Can automate data entry jobs and speed up cheque approval process
5.	Business Model (Revenue Model)	Can collaborate with banks to speedup the cheque approval process which improves customer experience.
6.	Scalability of the Solution	This project will help us to detect digits more precisely. Also we can develop this model to recognize alphabets.