VSB ENGINEERING COLLEGE, KARUR

Computer Science and Engineering

IBM NALAIYA THIRAN

Project Design Phase-I

Proposed Solution Template

Date	07 October 2022
Team ID	PNT2022TMID33390
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in 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 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
2.	Idea / Solution description	Character recognition plays an important role in the modern world. It can solve more complex problems

		and humans' job easier. An example is handwritten character recognition. Hand written digit recognition is highly nonlinear problem. Recognition of handwritten numerals plays an active role in day to day life now days. Office automation, e-governors and many other areas, reading printed or handwritten documents and convert them to digital media is very crucial and time consuming task. So the system should be designed in such a way that it should be capable of reading handwritten numerals and provide appropriate response as humans do. Handwritten digits recognition becomes increasingly important in the modern world due to its practical applications in our daily life.
3.	Novelty / Uniqueness	By use of Artificial Neural Network we can recognize the Hand Written Digits.
4.	Social Impact / Customer Satisfaction	Artificial Neural Network system is used to recognize ten different handwritten digits. These are digits from zero to nine. Here, back-propagation neural network is used to train all the data.
5.	Business Model (Revenue Model)	While training a deep learning model, we need to alter the weights of each epoch and minimize the loss function. An optimizer is a function or algorithm that adjusts the neural network's properties such as weights and learning rate. As a result, it helps to reduce total loss and enhance accuracy of your model. Adaptive Moment Estimation (Adam) leverages the power of adaptive learning rates methods to find individual learning rates for each parameter Loss functions are a measure of how well your model predicts the predicted outcome
6.	Scalability of the Solution	Recognition of handwritten digit is one of the popular problem associated with computer vision applications. The goal of our research work is to develop scalable Neural Network(NN) and

		Convolutional Neural Network (CNN) model that would be able to recognize and determine the handwritten digits from its image. Capability of developing the new algorithms and improve the existing algorithms is determined by the accuracy and speed factor for training and testing the models. In this context, performance of the GPUs and CPUs for handwritten digit system and effects of accelerating the training models have been analyzed. The training and testing has been conducted from publicly available MNIST handwritten database. Web based, offline and online handwritten digit recognition system is developed by using Convolutional Neural Network.