

**Project Design Phase-II**  
**Solution Requirements (Functional & Non-functional)**

Date	03 October 2022
Team ID	PNT2022TMID13012
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum Marks	4 Marks

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	MNIST Dataset	The Modified National Institute of Standards and Technology dataset (MNIST) database of handwritten digits has a training set of 60,000 examples, and a test set of 10,000 examples.
FR-2	Data preprocessing	Improves the image by doing some operations to the input image to prepare it for segmentation.
FR-3	GUI	Enables the user to insert a handwritten image and receive the digits in digital form. designed to facilitate virtualization.
FR-4	Image Data	The ability of a computer to recognise human handwritten digits from various sources, such as images, documents, touch screens, etc., and classify them into ten recognised classes is known as handwritten digit recognition (0-9). This has received a great deal of research in the field of deep learning.
FR-5	Digit Classifier Model	Utilize the MNIST collection of handwritten digits to train a convolutional network to predict a digit from an image. Assemble the data for training and validation first.
FR - 6	Evaluation	Ensure that the digit is correctly recognised by the model and produces the accurate output.
FR - 7	Website	The code, graphics, and other components of a website are made available online by web hosting. Every website is hosted by a server. The amount of server space provided to a website depends on the hosting type. The four primary types of hosting are shared, dedicated, VPS, and reseller.

### Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	To accurately recognise and comprehend handwritten digits mechanically.
NFR-2	<b>Security</b>	<ul style="list-style-type: none"><li>● In addition to classifying the digit, the algorithm also generates a full description of the instantiation parameters, which could disclose details like the writing style.</li><li>● The generative models are capable of segmentation driven by recognition.</li></ul>
NFR-3	<b>Reliability</b>	<ul style="list-style-type: none"><li>● The neural network makes use of the samples to automatically determine rules for reading handwritten digits. By increasing the number of training instances, the network may also learn more about handwriting and hence improve its accuracy.</li><li>● To recognize handwritten numbers, a variety of methods and algorithms can be employed, including Deep Learning/CNN, SVM, Gaussian Naive Bayes, KNN, Decision Trees, Random Forests, etc.</li></ul>
NFR-4	<b>Performance</b>	High, as deep learning models are created using artificial neural networks that are trained on the training set of images. employing the CNN algorithm for quick prediction.
NFR-5	<b>Availability</b>	Anyone can quickly access the system through a web application, making it very accessible for desktop and mobile browsers.
NFR-6	<b>Scalability</b>	Works with various other datasets with different languages and writing styles.