Project Design Phase-II

Solution Requirements (Functional & Non-functional)

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| Date | 16 October 2022 |
| Team ID | PNT2022TMID09867 |
| Project Name | Project - - A Novel Method For Handwritten Digit  Recognition System. |
| Maximum Marks | 4 Marks |

# Functional Requirements:

Following are the functional requirements of the proposed solution.

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| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | Implementation | To import all the modules need for training our model.  Import the libraries and load the MINST dataset. |
| FR-2 | User Registration | Registration through Gmail |
| FR-3 | User Confirmation | Confirmation via Email |
| FR-4 | Pre processing | Model cannot take the image data directly so we need to perform some basic operations and process the data. The CNN model will require one more dimension so we  reshape the matrix to shape (60000,28,28,1) |
| FR-5 | Create and Train the model | Creating CNN model in Python data science project. A CNN model generally consists of convolutional and  pooling layers. Keras will start the training of the model. |
| FR-6 | Evaluation | We have 10,000 images in our dataset. The MNIST dataset is well balanced so we can get around 99%  accuracy. |

# Non-functional Requirements:

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

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| **FR No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | **Usability** | Handwritten character recognition is one of the practically important issues in pattern recognition applications. The applications of digit recognition include in postal mail sorting, bank check  processing, form data entry, etc. |
| NFR-2 | **Security** | Most PC efforts to establish safety include information encryption and passwords, OCR plays an important role for digital libraries, allowing the entry of image textual information into computers by digitization, image restoration, and recognition  methods. |
| NFR-3 | **Reliability** | The overall highest accuracy 90.37% is achieved in  the recognition process by Multilayer Perceptron. |

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| NFR-4 | **Performance** | Most standard implementations of neural networks achieve an accuracy of ~(98–99) percent in correctly  classifying the handwritten digits. |
| NFR-5 | **Availability** | The established CNN model can determine and recognize handwritten digits with high accuracy, as it combines the weights of convolution layers during  feature extraction with fully connected layers. |
| NFR-6 | **Scalability** | High speed, robustness, flexible and suitable for text  and document formats. |