**Project Design Phase-II**
**Technology Stack (Architecture & Stack)**

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|---|---|
| Date | 17 October 2022 |
| Team ID | PNT2022TMID53497 |
| Project Name | Project – A Novel Method for Handwritten Digit Recognition System |
| Maximum Marks | 4 Marks |

**Technical Architecture:**

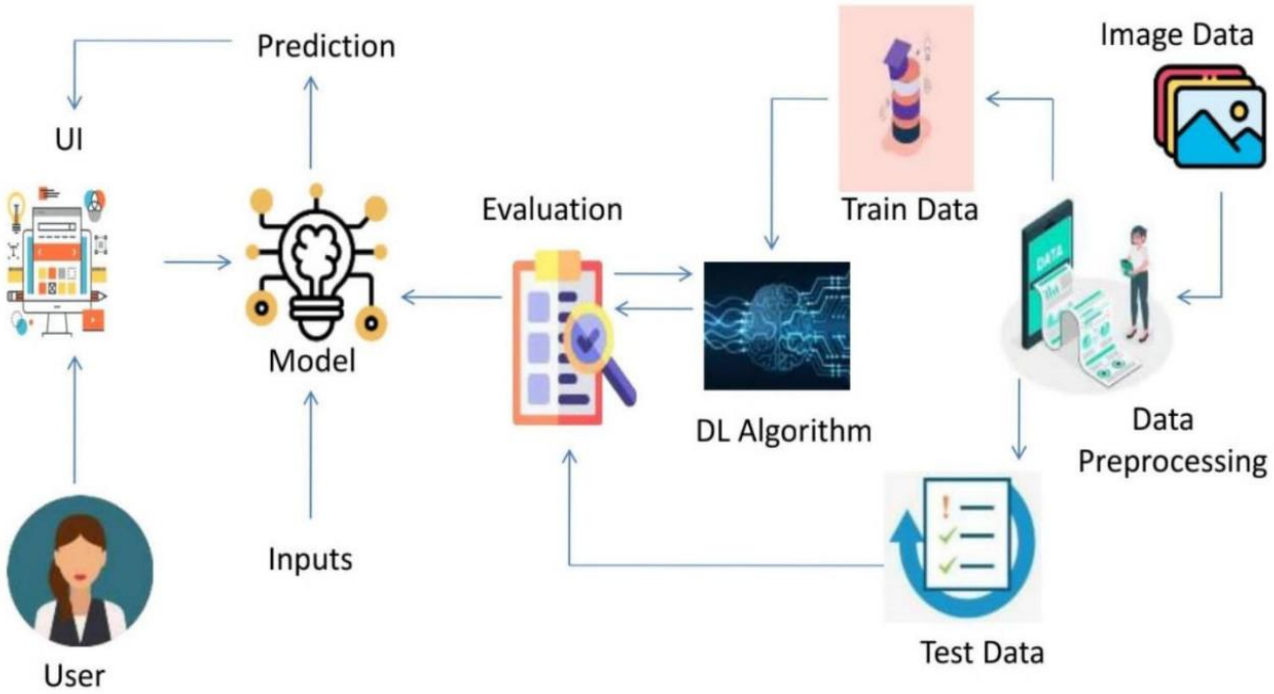

**Table-1: Components & Technologies:**

| S.No | Component | Description | Technology |
|---|---|---|---|
| 1. | User Interface | Web UI, Mobile App, Desktop Application | HTML, CSS, JavaScript, Python |
| 2. | Application Logic-1 | Make GUI | HTML, CSS |
| 3. | Application Logic-2 | Importing Libraries for Digit Recognition | Python, Flask |
| 4. | Application Logic-3 | Train the model on IBM | IBM Watson Cloud |
| 5. | Prediction | Predict the digit on the image | CNN |
| 6. | Cloud Database | Database Service on Cloud | IBM Watson Cloud, IBM Cloudant, IBM DB2 |
| 7. | File Storage | File storage requirements | Local Filesystem |
| 8. | Machine Learning Model | Purpose of Machine Learning Model is to train and test the data and predict the user input | Object Recognition Model |
| 9. | Neural Network | Automatically infer rules for recognizing handwritten digits | Convolutional Neural Network. |

**Table-2: Application Characteristics:**

| S.No | Characteristics | Description | Technology |
|---|---|---|---|
| 1. | Open-Source Frameworks | Enables developers to develop complex code and web application quickly | Jupyter, Anaconda Navigator, Flask framework |
| 2. | Security Implementations | After predicting the data, we don’t store any data so we can’t manipulate it in future | Encryption |
| 3. | Scalable Architecture | The scalability of architecture (3 – tier, Micro-services) because it supports high workloads | Python and IBM Cloud |
| 4. | Availability | Readily available which enables the IT infrastructure to function when some components fail | Convolutional Neural Network, IBM Cloud |
| 5. | Performance | Neural networks achieve an accuracy of 98-99% in classifying the handwritten digits correctly and quickly | Convolutional Neural Network, Python |