

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

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

### Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

### Topic: A Novel Method for Handwritten Digit Recognition System

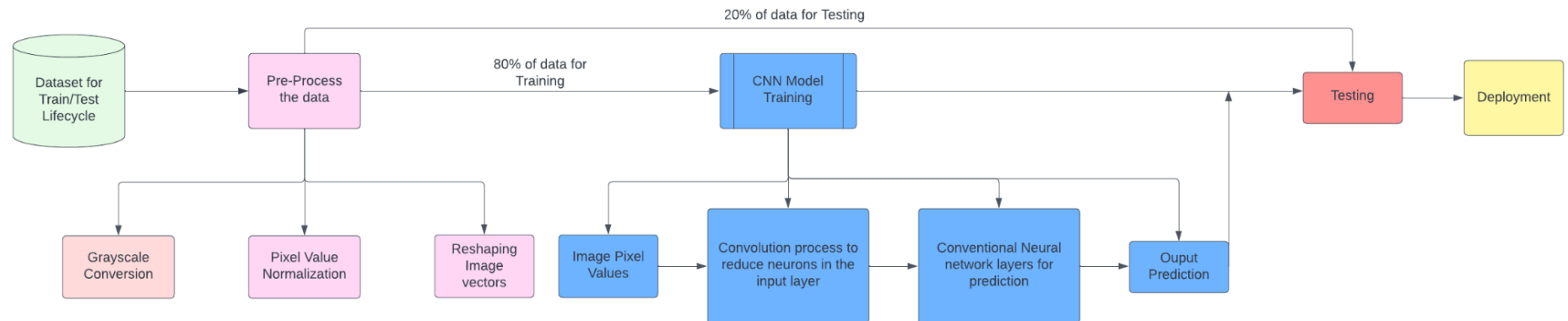
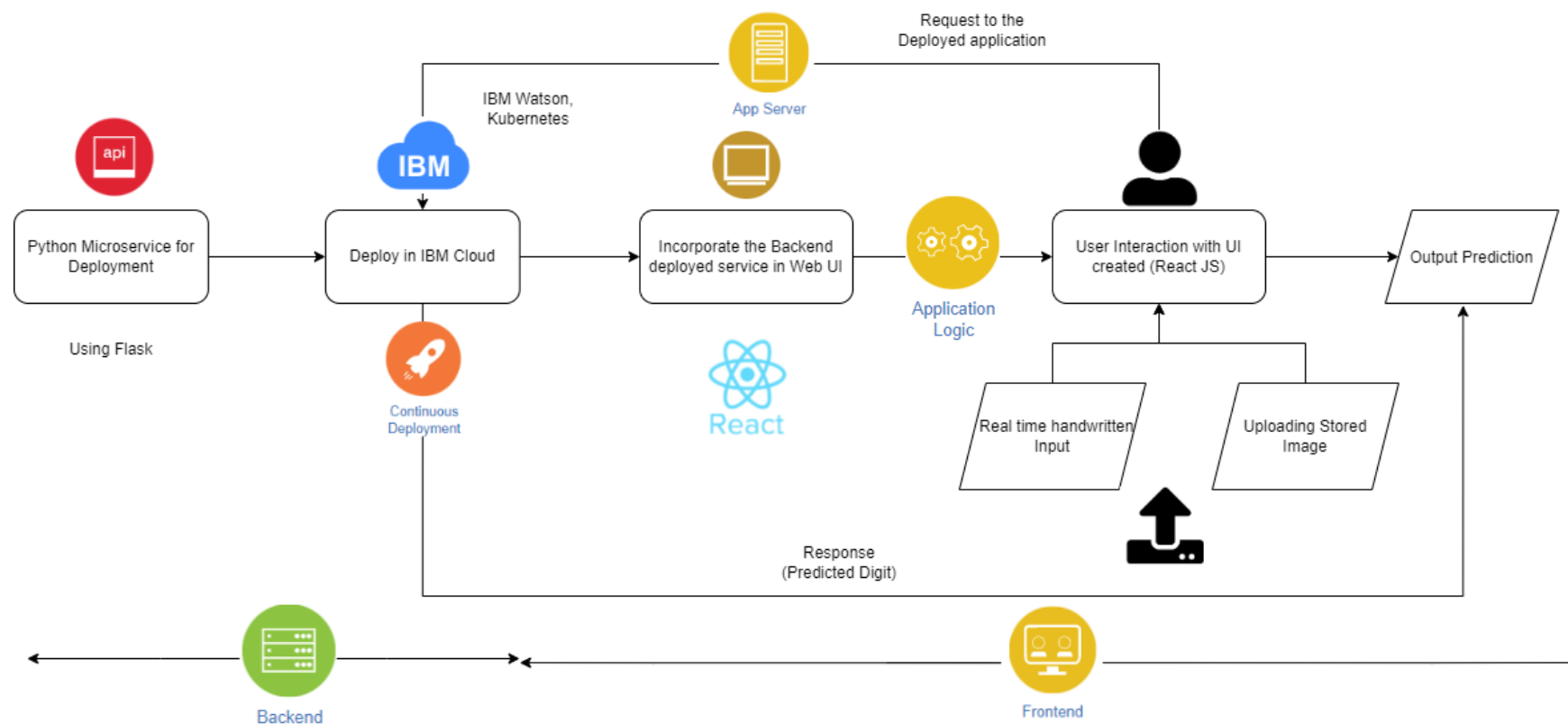


Fig 1. Machine learning Model Architecture



**Fig 2. Model Deployment and Application Architecture**

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

S.No	Component	Description	Technology
1.	User Interface	User interacts with the application using the GUI provided, either through real time writing or uploading images from drive, local etc.	React Js, CSS, JavaScript
2.	Application Logic-Pre processing	Pre-processing the data	Python

3.	Application Logic-Model Training and Testing	Training the model on the processed data	Python
4.	Application Logic-3	Deploying the application on IBM cloud and incorporating customer care using Assistant	IBM Watson STT service, IBM Watson Assistant
5.	Database	To store user credentials and image information	MySQL, NoSQL, etc.
6.	Cloud Database	Process data quickly and efficiently during response	IBM DB2, IBM Cloudant etc.
7.	File Storage	Storing the data for training as well as user information	IBM Block Storage or Other Storage Service or Local Filesystem
8.	Machine Learning Model	To recognize digits from handwritten data	Object Recognition Model, etc.
9.	Infrastructure (Server / Cloud)	Application Deployment on Cloud	Local, Cloud Foundry, Kubernetes, etc.

**Table-2: Application Characteristics:**

S.No	Characteristics	Description	Technology
1.	Security Implementations	Various security / access controls implementations have been done for protecting user data	SHA-256, Encryptions, IAM Controls, OWASP etc.
2.	Scalable Architecture	The application can be easily scaled up to handle increased traffic. The model deployed can also be scaled to multiple languages based on increased training on differing data	3-tier, Microservices, Python
3.	Availability	The application will be highly available because of the light weight processing on the frontend. The cloud deployment of the model will help in making quick predictions on the user data	IBM Cloud
4.	Performance	Standard CNN implementations (CNN VGG-16) on MNIST data can easily give 98-99 % accuracy on the training data, hence, almost classifies every single handwritten digit correctly.	Python, Performance metrics