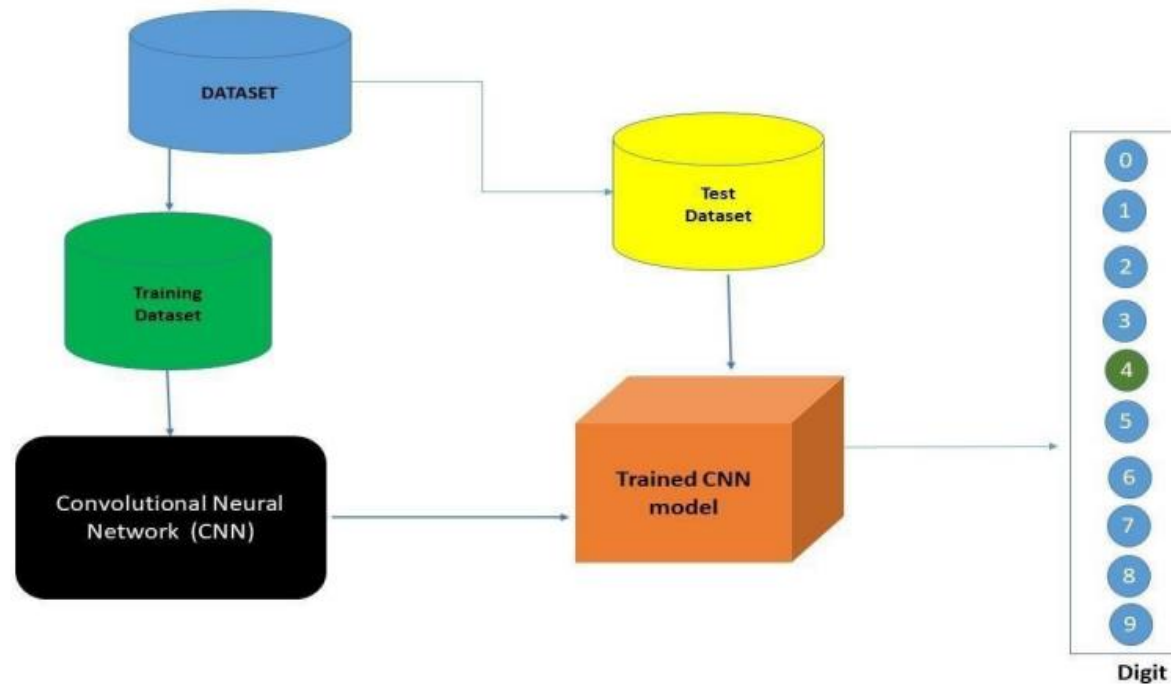# Project Design Phase-II
Technology Stack (Architecture & Stack)

Team ID	PNT2022TMID11500
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
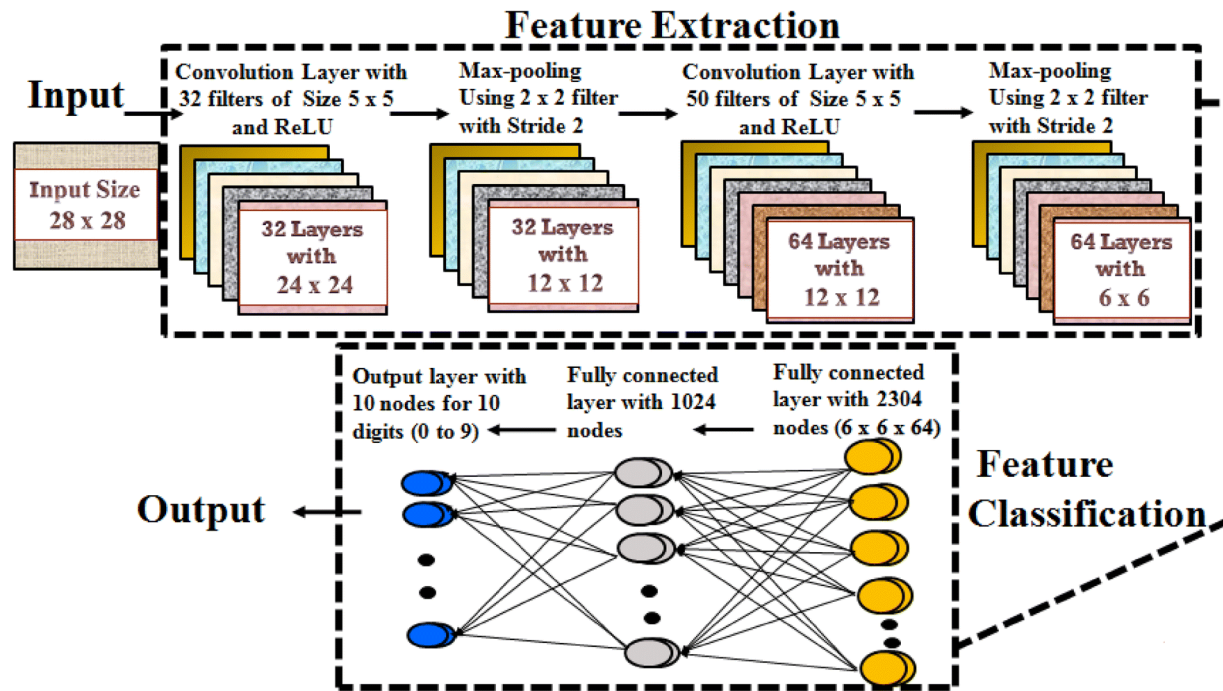
Feature Extraction

Input →

Convolution Layer with 32 filters of Size 5 x 5 and ReLU →

Max-pooling Using 2 x 2 filter with Stride 2 →

Convolution Layer with 50 filters of Size 5 x 5 and ReLU →

Max-pooling Using 2 x 2 filter with Stride 2

Input Size 28 x 28

32 Layers with 24 x 24

32 Layers with 12 x 12

64 Layers with 12 x 12

64 Layers with 6 x 6

Output layer with 10 nodes for 10 digits (0 to 9) ←

Fully connected layer with 1024 nodes ←

Fully connected layer with 2304 nodes (6 x 6 x 64)

Feature Classification

Output ←

Input image → Understanding the data → Model Building → Application Building → Required Output

Table-1: Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Understanding and loading the data, Feature Extraction, Subsampling Layer	Java / Python
3.	Application Logic-2	Creating the model and train the model	IBM Watson STT service
4.	Application Logic-3	Evaluating the model and predicting the result	IBM Watson Assistant
5.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Purpose of External API used in the application	IBM Weather API, etc.
9.	External API-2	Purpose of External API used in the application	Aadhar API, etc.
10.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	e.g., SHA-256, Encryptions, IAM Controls, OWASP etc.

S. No	Characteristics	Description	Technology
3.	Scalable Architecture	To optimize image processing efficacy and response rate for visual ability.	3 – tier, Micro-services
4.	Availability	The features for handwritten digit recognition have been introduced. These features are based on shape analysis of the digit image and extract slant or slope information. They are effective in obtaining good recognition accuracy.	Distributed servers, IBM cloud
5.	Performance	The standard implementations of neural networks achieve an accuracy of ~ (98–99) percent in correctly classifying the handwritten digits.	Number of requests per sec, use of Cache, use of CDN's

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d