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

Date	27 October 2022
Team ID	PNT2022TMID12853
Project Name	Predicting the energy output of wind turbine based on weather condition
Maximum Marks	4 Marks

Technical Architecture:

Technical Architecture (TA) is used to design computer systems in a form of IT Architecture. It involves in the development of a technical blueprint regarding to the arrangement, interaction and interdependence of system-relevant requirements are met.
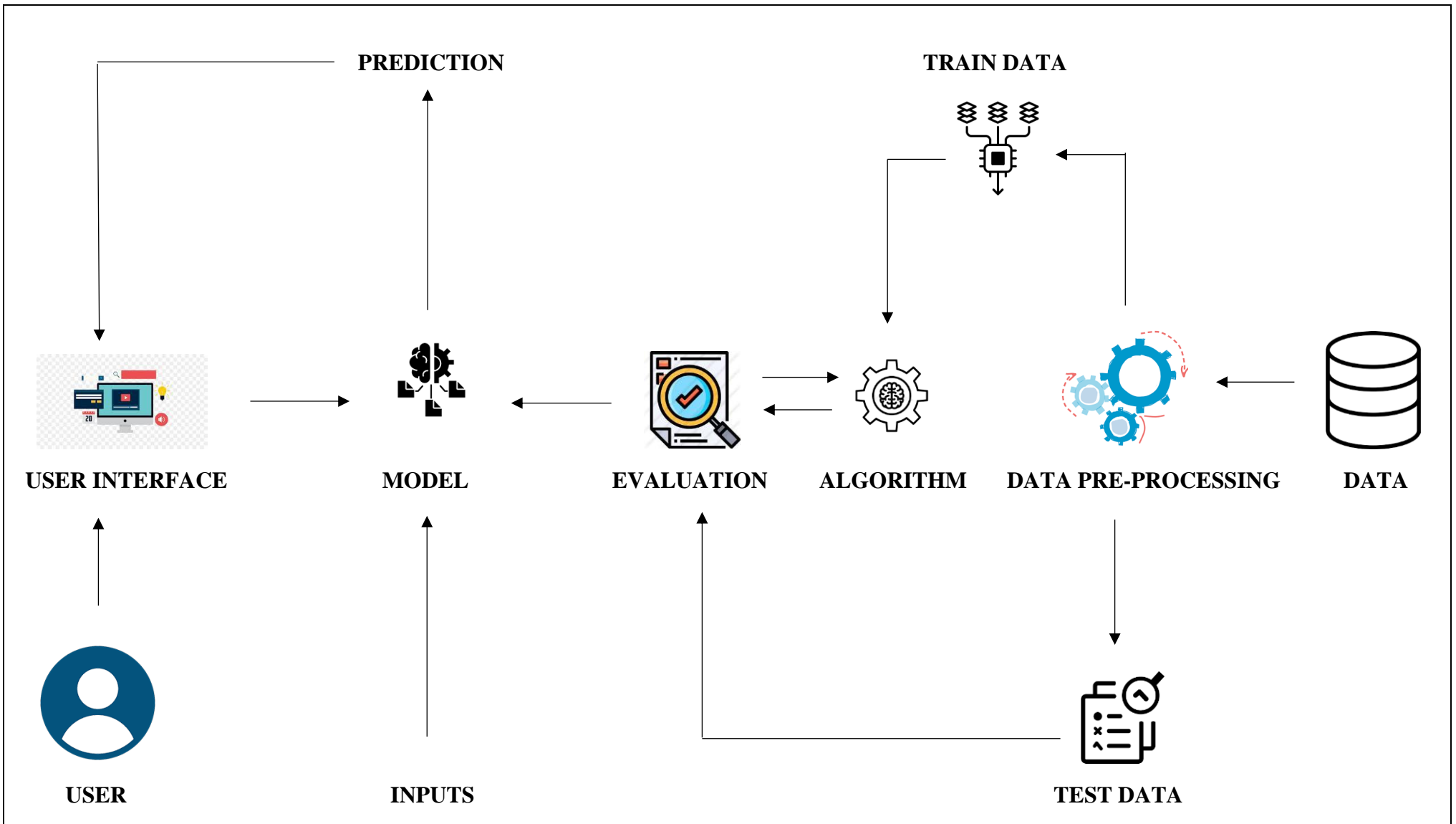
PREDICTION

TRAIN DATA

USER INTERFACE

MODEL

EVALUATION

ALGORITHM

DATA PRE-PROCESSING

DATA

USER

INPUTS

TEST DATA

Table-1: Components & Technologies:

Sl. No	Component	Description	Technology
1.	User Interface	This is used by the user for interacting with the system to know about the services provided by the system.	HTML, CSS, JavaScript
2.	Machine Learning	To build Model	Jupyter Notebook - Python
3.	Watson Studio	To train the model on machine learning tool.	IBM Watson Studio 1.0+
4.	Watson Assistant	We post and get solution for the queries about Watson Studio.	IBM Watson Assistant
5.	Database	Google cloud SQL	MySQL, NoSQL
6.	Cloud Database	Database service on cloud.	IBM DB2, IBM Cloudant
7.	File Storage	Stored in Git hub and local file system.	IBM Block Storage or Other Storage Service or Local Filesystem
8.	Open Weather map	It helps in determining the weather condition and power output of wind turbine.	openweathermap
9.	IBM API	To generate and deploy model on IBM API	IBM API
10.	Machine Learning Model	To improve accuracy, efficiency and System development technologies.	Random forest, Linear Regression, K-Means, Decision tree
11.	Infrastructure (Server / Cloud)	Application Deployment on IBM Watson studio and IBM cloud	IBM cloud

Table-2: Application Characteristics:

Sl. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Frameworks used to create an application.	1. python 2. PyTorch 3. TensorFlow 4. Kaggle
2.	Security Implementations	The website has a web application firewall to prevent from the attackers and the hackers.	e.g., SHA-256, Encryptions, IAM Controls, OWASP etc.
3.	Scalable Architecture	The architecture used here is 3-tier architecture, it carries out the communication between client and server.	3-tier Architecture
Sl. No	**Characteristics**	**Description**	**Technology**
4.	Availability	The model trained using IBM Watson studio. IBM Cloud, API key for both openweathermap and IBM cloud.	IBM cloud, Watson studio, API keys
5.	Performance	We trained the model efficiently to predict output in higher accuracy. These outputs help to improve the wind turbine's energy prediction.	Random Forest Regression, Confusion matrix, Clustering

References:

https://c4model.com/

https://www.sciencedirect.com/science/article/pii/S1364032119304782

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