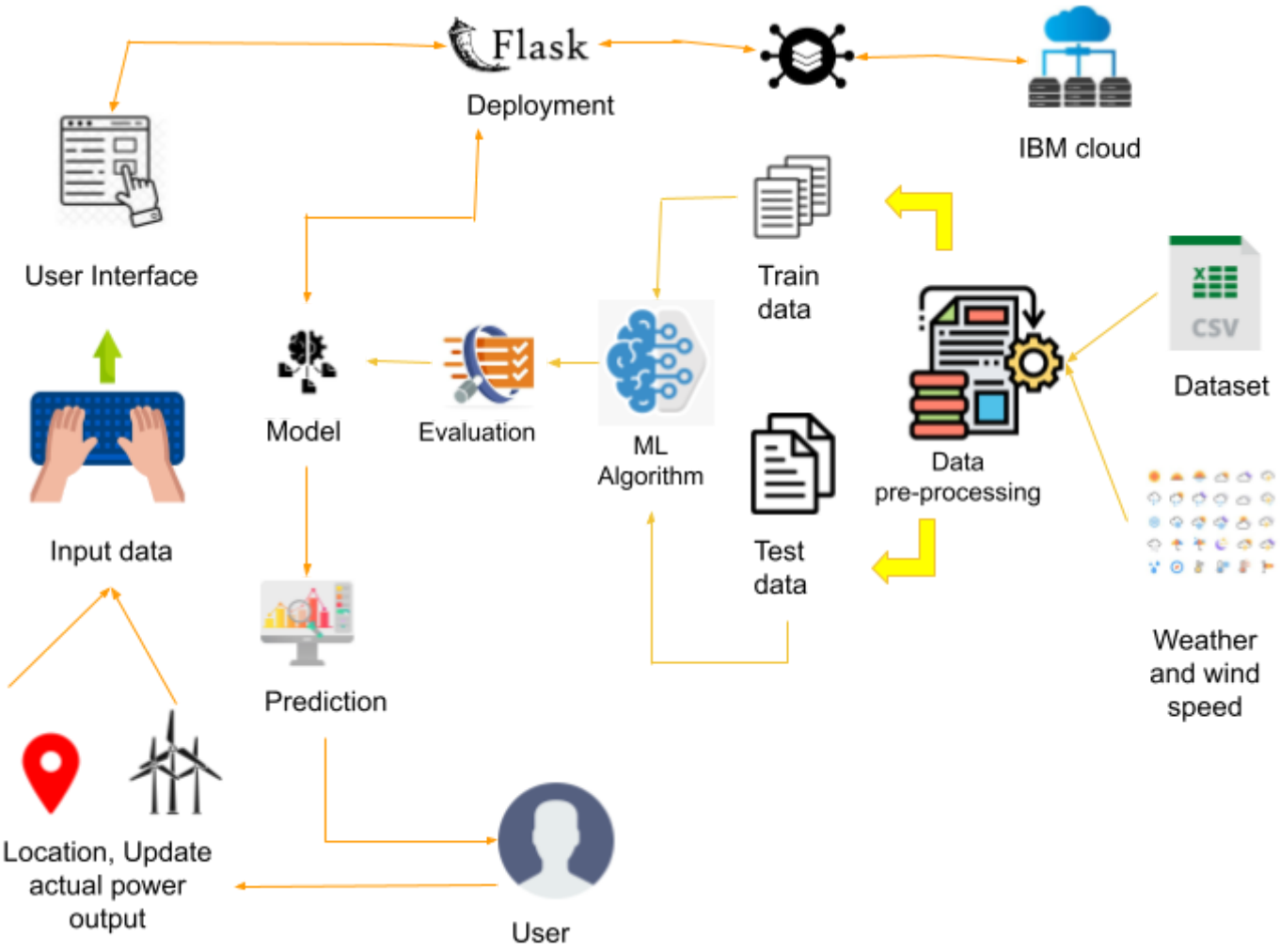
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID31390
Project Name	Project - Predicting the energy output of wind Turbine based on weather condition
Maximum Marks	4 Marks

Technical Architecture:

Guidelines:

- Include all the processes (As an application logic / Technology Block)
- Provide infrastructural demarcation (Local / Cloud)
- Indicate external interfaces (third party API's etc.)
- Indicate Data Storage components / services
- Indicate interface to machine learning models (if applicable)



Technology/Technical Architecture

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Users i.e Wind energy producers interact with the application using User Interface(UI).	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Machine Learning Model Building, Training and Testing	Different machine learning model are built, trained and tested based on inputs and the best performing model will deployed	Python
3.	Deploying the Model	Deploying the model with dataset and APIs	IBM Watson Machine Learning
4.	Prior Notification System	The Prior Notification System will help our customers i.e., Wind energy producers to notify their customers if predicted output can't be generated due to unexpected weather changes, outages, etc	IBM Push Notifications
5.	Database	Used to store dataset	MySQL, NoSQL, etc.
6.	Cloud Database	Used to store predicted value, actual wind power output, weather, wind speed regularly	IBM DB2, IBM Cloudant etc.
7.	File Storage	Storing and maintaining all the data for future use	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Used to get weather for prediction	IBM Weather API.
9.	External API-2	Used for Application and made using API client	API (created in IBM Watson using API client in deployment)
10.	Infrastructure (Server / Cloud)	Application Deployment on server creating using IBM cloud	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	The frameworks used in this project supports python	eg: Tensorflow, Pytorch, Flask, etc

S.No	Characteristics	Description	Technology
2.	Security Implementations	As the project is made of IBM cloud pak, it has security which gets upgraded to be immune to latest threats. Also IAM (Identity and Access Management)of IBM is used for authentication. Users also will be asked to create tough, long passwords and switch on 2-Factor Authentication for account protection.	IBM Cloud-IAM Controls, PakSHA-256, Encryptions, OWASP, 2FA
3.	Scalable Architecture	As data grows upon collecting and storing predicted values, actual output, wind speed and weather in the cloud storage, the prediction software will be able to maintain and utilize these data for making more accurate predictions in the future as it is deployed in IBM cloud	IBM Cloud
4.	Availability	As this project is deployed in cloud, it is globally accessible	IBM Cloud
5.	Performance	As the project is deployed in cloud, it can scaled to less or more users as required based on user-traffic	IBM Cloud

References:

https://c4model.com/

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

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

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