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

Date	10 October 2022
Team ID	PNT2022TMID30135
Project Name	Project - TRIP BASED FUEL CONSUMPTION PREDICTION
Maximum Marks	4 Marks

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Website	User interacts with the prediction model through website to predict the fuel consumption	HTML, CSS, JavaScript, Bootstrap
2.	Cloud Database	The model is provided with data from IBM cloud database	IBM Cloud DB, ibm_db(python package)
3.	API	Used to extend the service to other applications	Flask Application
4.	JWT & Sessions	It is used for Handling JSON web tokens(signing, verifying,decoding)	PyJWT, Flask-Sessions
5.	Machine Learning Model	This model is developed to predict the fuel consumption using ML algorithms	Sklearn, Algorithms - SVM & MLR
6.	Data processing	Data is pre-processed and used for training the model which is then used for prediction.	Pandas, Numpy, Matplotlib

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Backend Framework, CSS Styling framework, Relational Database	PyJWT, Flask, Bootstrap, IBM Cloud DB
2.	Security Implementations	Session Handling, Request authentication using JWT Tokens, Traffic Encryption	HS-256, Encryptions, SSL Certs
3.	Scalable Architecture	Support for Multiple Sample prediction using Excel File	Pandas, Numpy
4.	Availability	Availability is increased by Load Balancers in Cloud VPS	IBM Cloud Hosting
5.	Performance	The application is expected to handle up to 10000 predictions per second	Load Balancers, Distributed Servers

Technology Architecture:

Kubernetes Cluster

Presentation Layer

RESTful API

Nginx pod

ReactJS App

Axios | Material UI | Mobx

Formik, Yup

Security Layer

PyJWT

Google IAM API

Middle Level Layer

Data Processing

Outliers | Encoding | Scaling

Modelling & Predition

Algorithm

Support Vector Machine | Linear Regression

Open Source Framworks

numpy | pandas | sklearn | Matplotlib

Data Layer

IBMdb2

IBM Database

Flask Application