Project Design Phase-I
Solution Architecture

Date	19 September 2022
Team ID	PNT2022TMID12895
Project Name	Machine Learning-Based Predictive Analytics for Aircraft Engine
Maximum Marks	4 Marks

Solution Architecture:

- The dataset containing historical sensor data related to an aircraft engine is loaded from a CSV file into Python using anyone of the machine learning libraries available (sklearn).
- This loaded data is then pre-processed and split into training and testing data in a specific proportion.
- A number of machine learning models are created using different algorithms to identify the best performing one among them.
- Since this is a classification problem, classification models like Logistic Regression, J-48, Naïve Bayes, Random Forest, and Decision tree classifiers are used.
- The training data is then passed to all of the chosen models to train the model based on the historical sensor data to predict aircraft engine failures.
- All of the models are evaluated based on accuracy and a report is drawn.
- The model with the highest accuracy is chosen and implemented in the final product.
- A web application is created using Flask, a light-weight python web framework, and is then hosted on an IBM Cloud server.
- This server is made to host and run the trained machine learning model as well.
- Sensor data entered by users in the Flask web application are then sent to the trained machine learning model to predict the chances of engine failure.
- The classification model then classifies the engine as safe (1) or unsafe (0) based on the parameters the user enters.
- This solution can help reduce the risk of catastrophic mid-air engine failures, potential subsequent fatalities, and help improve the public's confidence in air travel.
- Given below is the proposed solution's architecture diagram

Solution Architecture Diagram:

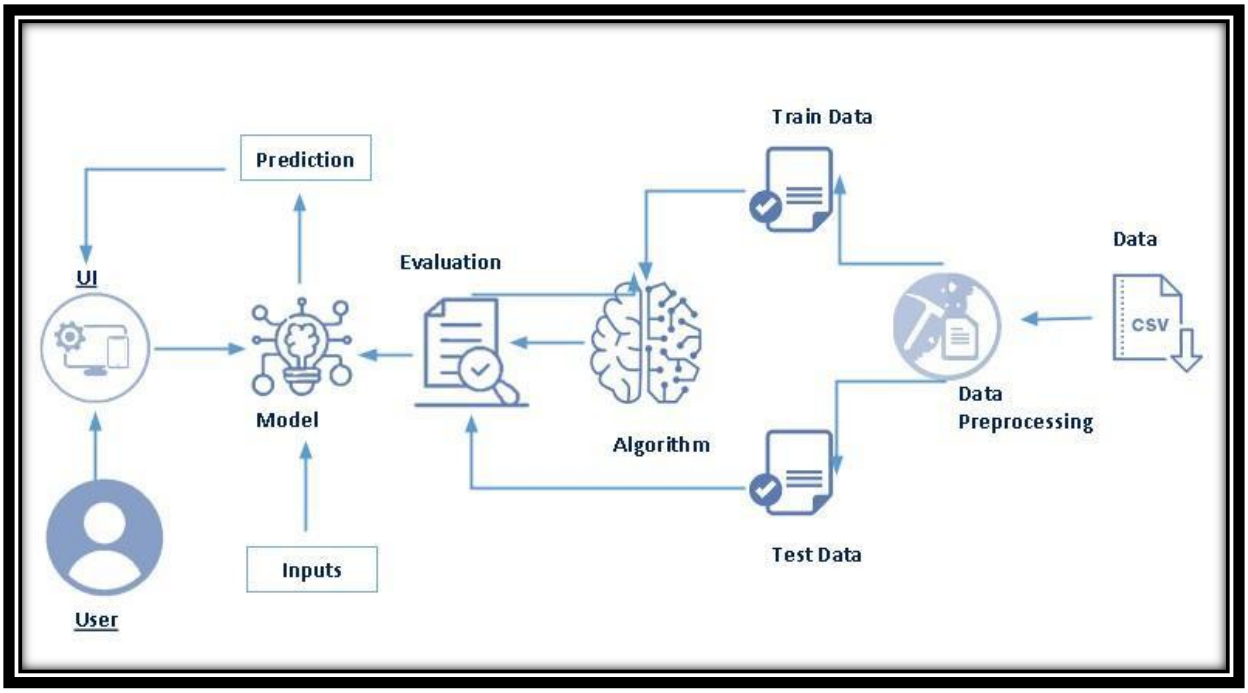

Fig 1: Architecture and data flow of the Machine Learning-Based Predictive Analytics for an Aircraft Engine