Project Design Phase-II

Technology Stack (Architecture & Stack)

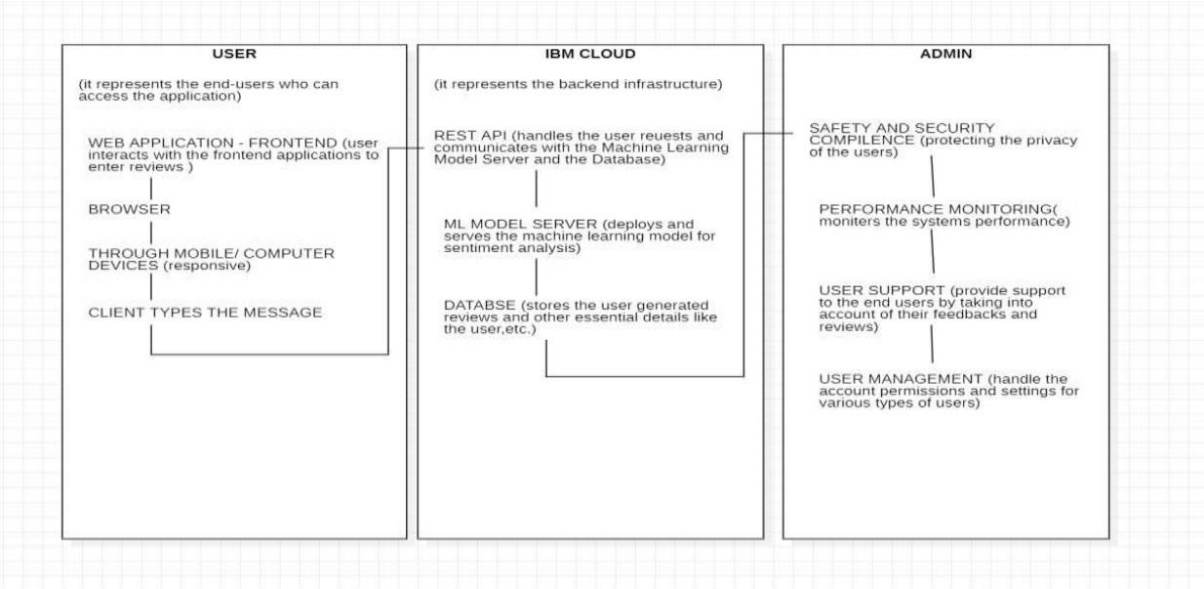
Team ID : 592662

Project Name : AIRLINE REVIEW CLASSIFICATION USING MACHINE LEARNING

Maximum Marks : 4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2:



USER:

- **This section signifies individuals accessing your application via web browsers or mobile apps.**
- **End-users engage with the frontend application to input their airline reviews and receive results from sentiment analysis.**

IBM CLOUD:

- **REST API: Manages user requests and serves as a communication link between the Machine Learning Model Server and the Database.**
- **ML Model Server: Deploys and operates the machine learning model responsible for sentiment analysis.**
- **Database: Stores user-generated data like reviews and associated metadata or administrative settings.**

ADMIN:

- **Security and Compliance: Ensures data security and adherence to privacy regulations. Admins oversee security measures like access controls, encryption, and auditing.**
- **Review Monitoring: Admins access and evaluate the data gathered from users' airline reviews. They analyze trends and spot potential issues or areas for enhancement based on sentiment analysis.**
- **User Support: Admins assist end-users with application-related issues, queries, or feedback. They may use the Admin interface to respond to user inquiries.**
- **User Management: Admins handle the creation, modification, and oversight of user accounts, including roles and access levels. They manage account permissions and settings for various user categories, such as regular users and fellow administrators.**

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Interface facilitating user interaction (e.g., Web UI, Mobile App, Chatbot)	HTML, CSS, JavaScript
2	Data Collection	Gathering airline reviews from diverse sources like online platforms, social media, or customer feedback forms	Web scraping tools, APIs, data collection scripts (Python, Node.js)
3	Data Preprocessing	Cleaning and preparing collected data: text cleaning, special character removal, lowercase conversion, tokenization	Python, regular expressions, data cleaning libraries
4	Feature Extraction	Converting preprocessed text data into numerical features for machine learning models	Scikit-Learn
5	Machine Learning Models	Development of sentiment analysis models: Logistic Regression, Naive Bayes, SVM, Decision Trees, Random Forests, Deep Learning (e.g., LSTM, CNN)	Scikit-Learn, TensorFlow, Keras
6	Model Training and Evaluation	Splitting data, training the model, and evaluating performance metrics like accuracy, precision, recall, F1 score, ROC-AUC	TensorFlow Model Evaluation library
7	Database	Data types, configurations, etc.	MySQL, NoSQL, etc.
8	Model Deployment	Deploying trained models in production to classify real-time airline reviews	Flask, AWS Lambda, Azure Functions
9	Monitoring and Maintenance	Implementing monitoring for model performance tracking, periodic retraining with new data, and addressing concept drift	Data pipelines
10	Security and Privacy	Implementing security measures to safeguard user data, ensuring compliance with data protection regulations	Encryption techniques
11	Feedback Loop	Creating a loop for users to provide feedback on model predictions for improvement	Data analysis tools, customer feedback platforms (e.g., Zendesk, Intercom)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Identification of utilized open-source frameworks and their technologies	Technology leveraging Open-source frameworks
2	Security Implementations	Implemented security measures like access controls, firewalls, encryption methods, OWASP compliance	Encryption methods, OWASP compliance, Access controls
3	Scalability	Implemented security measures like access controls, firewalls, encryption methods, OWASP compliance	Google Kubernetes Engine, Load balancing (Nginx, HAProxy)
4	Accessibility	Ensuring system capacity for increased user and review volume without performance decline	Screen readers, accessible design practices
5	Cross-platform Compatibility	Features facilitating use for individuals with disabilities	Responsive design, cross-platform app development frameworks (React Native, Flutter)
6	Offline Mode	Capability for app usage and results retrieval without internet connectivity	Progressive Web App (PWA) technologies, client-side caching
7	Multilingual Support	Enabling analysis and classification of reviews in multiple languages	Natural Language Processing (NLP) libraries with multilingual models (NLTK, Multilingual BERT), language detection libraries
8	Content Moderation	Tools for managing user-generated content to align with guidelines	Content moderation services (e.g., Google Perspective API, Amazon Recognition)
9	Content Moderation	Providing insights into user behavior, review trends, and system performance	Reporting libraries (Tableau, Power BI)
10	Customization and Personalization	Allowing users to tailor their experience and receive personalized recommendations	Recommendation engines (collaborative filtering, content-based filtering), user profiles, user-specific preferences