

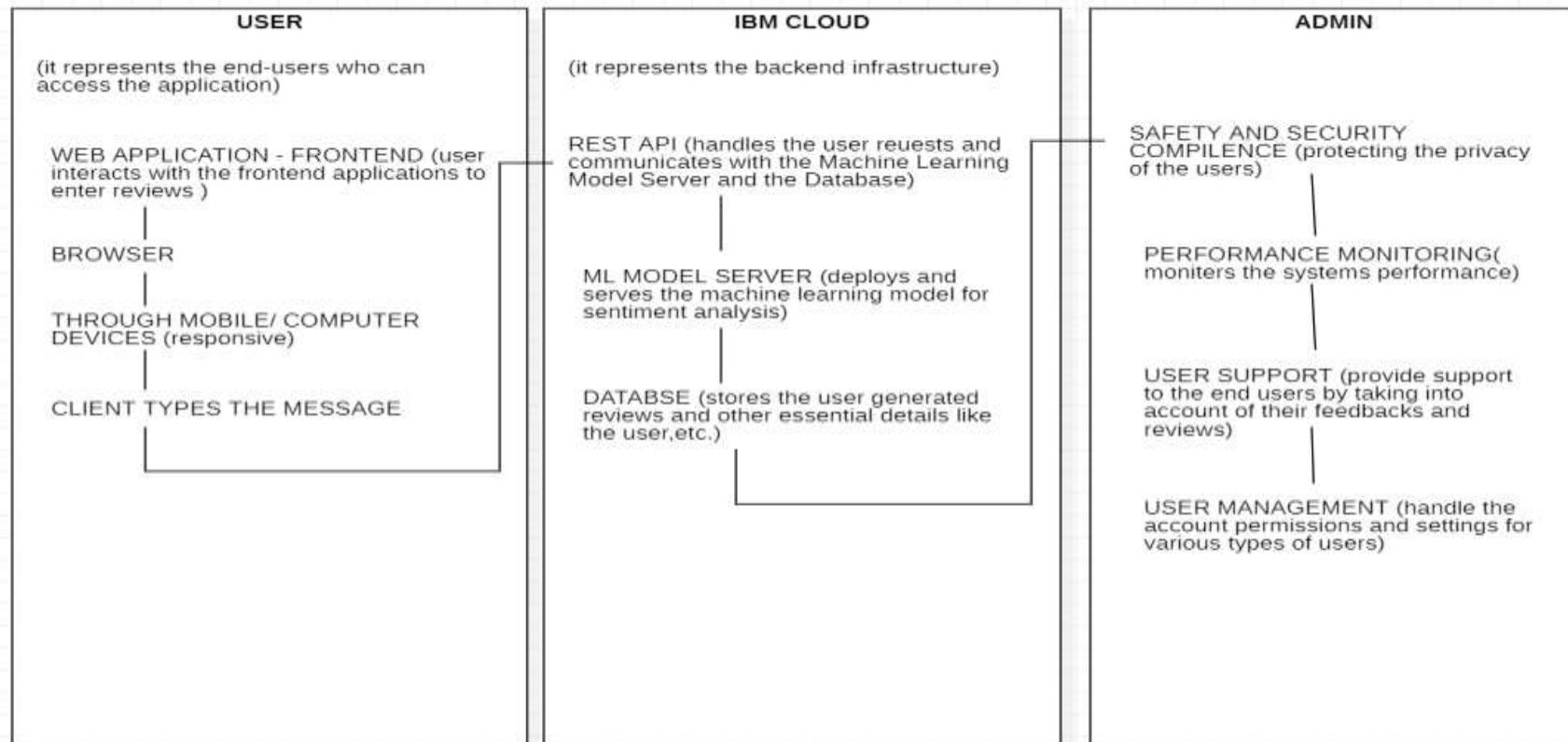
Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	2 nd November, 2023
Team ID	Team-592973
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 column represents end-users accessing your application through web browsers or mobile apps.
- Users interact with the frontend application to input airline reviews and receive sentiment analysis results.

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- REST API: This component handles user requests and communicates with the Machine Learning Model Server and the Database.
- ML Model Server: This part is responsible for deploying and serving the machine learning model used for sentiment analysis.
- Database: It stores user-generated data, such as reviews, and any relevant metadata or admin configurations.

ADMIN:

- Security and Compliance: The Admin component is responsible for ensuring data security and compliance with privacy regulations. Admins implement and manage security measures, such as access controls, encryption, and auditing.
- Review Monitoring: Admins can access and review the data collected from users' airline reviews. They can analyze trends and identify potential issues or areas for improvement based on the sentiment analysis results.
- User Support: Admins can provide support to end-users by assisting with issues, questions, or feedback related to the application. They may also use the Admin interface to respond to user inquiries.
- User Management: Admins can create, modify, and manage user accounts, including user roles and access levels. They can also handle account permissions and settings for different types of users, such as regular users and other administrators.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript .
2.	Data Collection	Gathering airline review data from various sources, such as online review platforms, social media, or customer feedback forms.	Web scraping tools, APIs, data collection scripts (Python, Node.js).
3.	Data Preprocessing	Cleaning and preprocessing the collected data, including text cleaning, removing special characters, converting text to lowercase, and tokenization.	Python, regular expressions, data cleaning libraries.
4.	Feature Extraction	Converting the preprocessed text data into numerical features for machine learning models.	Scikit-Learn
5.	Machine Learning Models	Developing machine learning models for sentiment analysis. Options include Logistic Regression, Naive Bayes, Support Vector Machines (SVM), Decision Trees, Random Forests, or Deep Learning models (e.g., LSTM, CNN)	Scikit-Learn, TensorFlow, Keras
6.	Model Training and Evaluation	Splitting the data into training and testing sets, training the model, and evaluating its performance using metrics like accuracy, precision, recall, F1 score, and ROC-AUC.	TensorFlow Model Evaluation library).
7.	Database	Data Type, Configurations etc.	MySQL, NoSQL, etc.
8.	Model Deployment	Deploying the trained model in a production environment to classify real-time airline reviews.	Flask, AWS Lambda, Azure Functions.
9.	Monitoring and Maintenance	Implementing monitoring to track the model's performance, collecting new data to retrain the model periodically, and addressing concept drift.	Data pipelines
10.	Security and Privacy	Implementing security measures to protect sensitive user data and reviews and ensure compliance with relevant data protection regulations	Encryption techniques
11.	Feedback Loop	Creating a feedback loop for users to provide feedback on the model's predictions, which can be used to improve the model.	data analysis tools, customer feedback platforms (e.g., Zendesk, Intercom).

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementations	List all the security / access controls implemented, use of firewalls etc.	Encryptions, OWASP etc.
3.	Scalability	Scalability ensures the system can handle an increasing number of users and reviews without performance degradation.	Google Kubernetes Engine), Load balancing (Nginx, HAProxy)
4.	Accessibility	Accessibility features ensure that the application is usable by individuals with disabilities.	screen readers, accessible design practices.
5.	Cross-platform Compatibility	Cross-platform compatibility ensures that the user interface works seamlessly on different devices and operating systems.	Responsive design, cross-platform app development frameworks (React Native, Flutter)
6.	Offline Mode	Offline mode allows users to use the application and receive results even when not connected to the internet.	Progressive Web App (PWA) technologies, client-side caching
7.	Multilingual Support	Multilingual support enables the system to analyze and classify reviews in various languages.	Natural Language Processing (NLP) libraries with multilingual models (NLTK, Multilingual BERT), language detection libraries.
8.	Content Moderation	Content moderation tools help filter and manage user-generated content to ensure compliance with guidelines and policies.	Content moderation services (e.g., Google Perspective API, Amazon Recognition)
9.	Data Analytics and Reporting	Data analytics and reporting provide insights into user behavior, review sentiment trends, and system performance.	Reporting libraries (Tableau, Power BI).
10.	Customization and Personalization	This feature allows users to customize their experience and receive personalized recommendations.	Recommendation engines (collaborative filtering, content-based filtering), user profiles, user-specific preferences.

