PROJECT DESIGN PHASE-II

SOLUTION REQUIREMENTS (FUNCTIONAL AND NON-FUNCTIONAL)

Date	22nd September 2023
Team ID	Team-592973
Project Name	AIRLINE REVIEW CLASSIFICATION USING MACHINE LEARNING
Maximum Marks	4 Marks

SOLUTION ARCHITECTURE:

FUNCTIONAL REQUIREMENTS:

The following are the key functional requirements for the automated airline review sentiment analysis system which can be categorized into the following categories:

FR No.	FUNCTIONAL REQUIREMENT(EPIC)	SUB REQUIREMENT(STORY/SUB-TASK)
FR-1.	DATA COLLECTION	• The system must collect data from various platforms like- review websites, social media, customer feedback form, etc.
FR-2.	DATA PRE-PROCESSING	• Text cleaning and preprocessing should remove noises such as HTML tags, and special characters • If the data is in multiple languages, it should include language detection and translation capabilities. • The system must extract information from reviews and contexts.
FR-3.	DATA STORAGE	• The reprocessed data must be stored in a structured database for efficient retravel and analysis.
FR-4.	SENTIMENT ANALYSIS	• The system must classify the sentiment of each review into various categories like positive, neutral, negative etc. • The system must utilize NLP (Natural Language Processing (techniques and machine learning models for sentiment analysis.
FR-5.	FEEDBACK CATEGORIZATION	• The system must be able to categorize reviews like in-flight experience, baggage landing, customer service, etc. • The system must use clustering or top modelling algorithm for efficient classification.
FR-6.	USER AUTHENTICATION AND AUTHORIZATION	• Implement user authentication and authorization to control system access and protect user data.
FR-7.	WEB INTERFACE AND RESPONSIVENESS	• Provide a user-friendly web interface for airlines and staff to interact with the system. • Include dashboards for monitoring sentiment analysis results and categorized feedback. • Enable airlines to respond to customer feedback directly from the platform.

FR-8.	APIs	• Develop APIs to allow integration with other airline systems for accessing sentiment analysis results and categorized feedback.
FR-9.	REPORTING AND INSIGHTS	• Generate reports and visualizations that provide insights into customer sentiment and trends.
FR-10.	NOTIFICATION SYSTEM	• Implement a notification system to alert airlines' staff or management about critical feedback that requires immediate attention. • Notifications can be sent via email, SMS, or in-app messages.
FR-11.	SCALABILITY	• The system should be designed to scale as the volume of data and users grows, potentially using cloud-based solutions.
FR-12.	SECURITY	• Ensure robust security measures to protect user data and maintain data privacy. • Encryption, access controls, and compliance with data protection regulations (e.g., GDPR) are necessary.
FR-13.	CONTINUOUS TRANING AND IMPROVEMENT	• Periodically retrain the sentiment analysis models to adapt to evolving language and feedback trends.
FR-14.	DATABACK UP AND RECOVERY	• Regularly backup the data and implement disaster recovery plans to prevent data loss.
FR-15.	MONITORING AND ALERTS	• Set up system monitoring to track performance and health. • Implement alerts for anomalies or issues.
FR-16.	COMPILENCE	• Ensure that the system complies with aviation industry regulations and data protection laws.
FR-17.	INTEGRATION	• Integrate the system with existing airline management and customer relationship systems for a holistic view of customer feedback and operational performance.
FR-18.	TESTING AND QUALITY ASSURANCE	• Conduct rigorous testing, including unit testing, integration testing, and user acceptance testing to ensure system reliability and accuracy.
FR-19.	DOCUMENTATION	• Create comprehensive documentation that covers the architecture, data flows, and system components for reference and future maintenance.
FR-20.	MAINTENANCE AND SUPPORT	• Provide ongoing maintenance, support, and updates to ensure the system's reliability and accuracy.

NON- FUNCTIONAL REQUIREMENTS:

Non-functional requirements describe the qualities and characteristics that the automated airline review sentiment analysis system should possess. These requirements focus on aspects like performance, scalability, security, and usability.

The following are the key non-functional requirements for the automated airline review sentiment analysis system which can be categorized into the following categories:

NFR No.	NON-FUNCTIONAL REQUIREMENT(EPIC)	SUB REQUIREMENT(STORY/SUB-TASK)

NFR-1.	USABILITY	• User-Friendly Interface: The web interface should be intuitive and user-friendly for airline staff. • Accessibility: Ensure that the system is accessible to individuals with disabilities. • Multilingual Support: If applicable, support multiple languages for user interfaces and customer feedback analysis.
NFR-2.	SECURITY	• Data Security: Ensure data encryption during transmission and storage to protect sensitive information. • User Authentication: Implement secure user authentication and authorization mechanisms. • Compliance: Adhere to data protection regulations (e.g., GDPR) and aviation industry security standards. • Vulnerability Assessment: Regularly perform security audits and vulnerability assessments.
NFR-3.	RELIABILITY	• Fault Tolerance: The system should be resilient to hardware or software failures, minimizing service interruptions. • Data Integrity: Ensure the accuracy and integrity of data throughout the processing pipeline. • Backup and Recovery: Implement a robust data backup and recovery strategy to prevent data loss.
NFR-4.	PERFORMANCE	• Response Time: The system should provide near real-time sentiment analysis and categorization of reviews. • Throughput: The system should handle a high volume of concurrent requests and data processing. • Scalability: The architecture must support horizontal scalability to accommodate growing data and user loads. • Availability: The system should have a high availability rate, with minimal downtime for maintenance and updates.
NFR-5.	AVAILABILITY	• High Availability: The system should aim for a minimum of 99.9% availability, ensuring it is accessible to users at almost all times. • Monitoring and Alerting: Utilize monitoring tools to detect service disruptions or anomalies and trigger automatic alerts to the system administrators. • Disaster Recovery: Develop a comprehensive disaster recovery plan that includes offsite backups, data restoration procedures, and clear guidelines for system recovery in case of catastrophic failures. • Scheduled Downtime: Schedule maintenance and updates during off-peak hours to minimize disruption to users,

		with advanced notification of downtime.
NFR-6.	SCALABILITY	• Load Balancing: Implement load balancers to evenly distribute incoming traffic across multiple servers or instances to ensure optimal system performance. • Database Scalability: Ensure the database system is capable of scaling horizontally to manage growing data volumes and concurrent requests. • Caching: Implement caching mechanisms to reduce the load on the database and improve response times, particularly for frequently accessed data.