Project Design Phase-II

SOLUTION REQUIREMENTS (FUNCTIONAL AND NONFUNCTIONAL)

Team ID : 592662

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. 1: DATA COLLECTION

- **The system should gather data from diverse platforms such as review websites, social media, and customer feedback forms.**

FR No. 2: DATA PRE-PROCESSING

- **Clean and preprocess text by removing noise like HTML tags and special characters.**
- **Include language detection and translation capabilities for multilingual data.**
- **Extract information from reviews and contexts.**

FR No. 3: DATA STORAGE

- **Store reprocessed data in a structured database for efficient retrieval and analysis.**

FR No. 4: SENTIMENT ANALYSIS

- **Classify review sentiments into categories like positive, neutral, and negative.**
- **Utilize Natural Language Processing (NLP) techniques and machine learning models for sentiment analysis.**

FR No. 5: FEEDBACK CATEGORIZATION

- **Categorize reviews based on aspects like in-flight experience, baggage handling, and customer service using clustering or top modeling algorithms.**

FR No. 6: USER AUTHENTICATION AND AUTHORIZATION

- **Implement authentication and authorization measures to control system access and safeguard user data.**

FR No. 7: WEB INTERFACE AND RESPONSIVENESS

- **Develop a user-friendly web interface for airlines and staff interaction.**
- **Include dashboards for monitoring sentiment analysis results and categorized feedback.**
- **Enable direct responses from airlines to customer feedback via the platform.**

FR No. 8: APIs

- **Create APIs for integration with other airline systems to access sentiment analysis results and categorized feedback.**

FR No. 9: REPORTING AND INSIGHTS

- **Generate reports and visualizations to offer insights into customer sentiment and trends.**

FR No. 10: NOTIFICATION SYSTEM

- **Implement a notification system to alert airline staff or management about critical feedback via email, SMS, or in-app messages.**

FR No. 11: SCALABILITY

- **Design the system to scale with growing data and user volumes, potentially using cloud-based solutions.**

FR No. 12: SECURITY

- **Ensure robust security measures like encryption, access controls, and compliance with data protection regulations (e.g., GDPR) to protect user data.**

FR No. 13: CONTINUOUS TRAINING AND IMPROVEMENT

- **Periodically retrain sentiment analysis models to adapt to evolving language and feedback trends.**

FR No. 14: DATA BACKUP AND RECOVERY

- **Regularly back up data and establish disaster recovery plans to prevent data loss.**

FR No. 15: MONITORING AND ALERTS

- **Set up system monitoring to track performance and health and implement alerts for anomalies or issues.**

FR No. 16: COMPLIANCE

- **Ensure system compliance with aviation industry regulations and data protection laws.**

FR No. 17: INTEGRATION

- **Integrate the system with existing airline management and customer relationship systems for a comprehensive view of customer feedback and operational performance.**

FR No. 18: TESTING AND QUALITY ASSURANCE

- **Conduct rigorous testing (unit, integration, user acceptance) to ensure system reliability and accuracy.**

FR No. 19: DOCUMENTATION

- **Create comprehensive documentation covering system architecture, data flows, and components for future reference and maintenance.**

FR No. 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. 1: USABILITY

- **User-Friendly Interface: Ensure an intuitive web interface for airline staff.**
- **Accessibility: Guarantee accessibility for users with disabilities.**
- **Multilingual Support: If applicable, support multiple languages for interfaces and feedback analysis.**

NFR No. 2: SECURITY

- **Data Security: Encrypt data during transmission and storage for protection.**
- **User Authentication: Implement secure authentication and authorization.**
- **Compliance: Adhere to GDPR and aviation industry security standards.**
- **Vulnerability Assessment: Regularly perform security audits and vulnerability assessments.**

NFR No. 3: RELIABILITY

- **Fault Tolerance: Ensure system resilience to hardware or software failures, minimizing service interruptions.**
- **Data Integrity: Guarantee data accuracy and integrity throughout processing.**
- **Backup and Recovery: Implement robust strategies to prevent data loss.**

NFR No. 4: PERFORMANCE

- **Response Time: Provide near real-time sentiment analysis and review categorization.**
- **Throughput: Handle high volumes of concurrent requests and data processing.**
- **Scalability: Support horizontal scalability for growing data and user loads.**
- **Availability: Aim for high availability with minimal downtime for maintenance and updates.**

NFR No. 5: AVAILABILITY

- **High Availability: Aim for a minimum 99.9% availability for user accessibility.**
- **Monitoring and Alerting: Use monitoring tools to detect disruptions and trigger automatic alerts.**
- **Disaster Recovery: Develop a comprehensive plan for offsite backups and system recovery in case of failures.**
- **Scheduled Downtime: Schedule maintenance during off-peak hours, notifying users in advance.**

NFR No. 6: SCALABILITY

- **Load Balancing: Employ load balancers for optimal traffic distribution across servers or instances.**
- **Database Scalability: Ensure horizontal scaling capability for managing growing data volumes.**
- **Caching: Implement caching mechanisms to reduce database load and enhance response times for frequently accessed data.**