Project Design Phase 1

Solution Architecture

Date	06 May 2023
Team ID	NM2023TMID14254
Project name	Go No Queue-Rush Estimator for Corporate Cafeteria

Solution Architecture

The Go No Queue-Rush Estimator for Corporate Cafeteria System comprises several components that work together to provide an efficient and data-driven solution. Here is an overview of the solution architecture:

Entry and Exit Monitoring Devices: The system begins with computer vision devices installed at the entrance and exit points of the cafeteria. These devices utilize cameras and computer vision algorithms to detect and track individuals entering and exiting the cafeteria. The devices capture real-time video footage and transmit it to the central system for processing.

Data Processing and Crowd Estimation: The video footage captured by the entry and exit monitoring devices is processed by the central system. The system employs computer vision algorithms to analyze the footage, count the number of people entering and exiting, and estimate the real-time crowd level inside the cafeteria. This crowd estimation data is continuously updated and stored for further analysis.

Cloud Storage and Data Management: The crowd estimation data, along with other relevant information, is securely stored in the cloud. Cloud storage ensures centralized data management, scalability, and accessibility. The data is organized and structured in a way that facilitates efficient retrieval and analysis.

Mobile Application for Authorities: The cafeteria authorities are provided with a dedicated mobile application that serves as their interface to access the system's functionalities. The mobile application allows authorities to view real-time crowd estimations, historical data, and analytics related to cafeteria usage. It provides a user-friendly interface for easy navigation and interaction with the system.

Notifications and Alerts: The system is equipped with notification and alert mechanisms that can be triggered based on predefined thresholds or unusual crowd patterns. When the crowd levels reach critical points or anomalies are detected, the system generates notifications or alerts, which are sent to the mobile application of the cafeteria authorities. These notifications help authorities take proactive actions to manage crowd levels effectively.

Data Analytics and Insights: The crowd estimation data stored in the cloud can be analyzed to generate insights and trends. The system utilizes data analytics techniques to identify patterns, peak hours, popular food items, and other relevant metrics. These insights empower cafeteria authorities to make data-driven decisions regarding food preparation, menu planning, and resource allocation.

Integration with Existing Systems: The solution architecture allows for integration with existing cafeteria management systems or other relevant applications. This enables seamless data exchange and integration of the Smart Cafeteria Management System with the organization's infrastructure. It ensures compatibility and interoperability with other systems, facilitating efficient operations.

The solution architecture emphasizes real-time data processing, cloud storage for centralized data management, a mobile application for authorities, and integration with existing systems. It enables accurate crowd estimation, efficient data analysis, and informed decision-making for cafeteria management. The architecture can be adapted and customized to meet the specific requirements of different organizations and cafeterias while ensuring scalability and flexibility.

Features:

. Real-time crowd estimation using computer vision technology.

. Cloud-based data storage for centralized and scalable management.

. Mobile application for cafeteria authorities to access real-time data and analytics.

. Real-time notifications and alerts for critical crowd situations.

. Data analytics and insights for peak hours, popular food items, and usage patterns.

. Integration with existing cafeteria management systems or applications.

. Customizable to meet the specific needs of each organization.

. Scalable to manage multiple cafeterias within an organization.

. Enhanced employee experience with reduced waiting times and improved food availability.

. Sustainability-focused by minimizing food wastage.

. Ongoing technical support and maintenance services.

Development Phase:

. Requirement gathering from stakeholders and users.

. System design outlining the architecture and components.

. Software development including computer vision algorithms, cloud storage, and mobile application.

. Hardware setup and integration of entry and exit monitoring devices.

. Configuration of cloud infrastructure for data storage and security.

. Development of a mobile application for cafeteria authorities.

. Testing and quality assurance to ensure functionality and reliability.

. Deployment of the system in the live environment.

. User training and support for smooth adoption. . Ongoing maintenance, updates, and bug fixes

Solution Requirements:

. Accurate crowd estimation using computer vision technology.

. Real-time data processing and analysis.

. Cloud storage for centralized and scalable data management.

. Mobile application for authorities to access crowd estimations and analytics.

. Real-time notifications and alerts for critical crowd situations.

. Integration capabilities with existing cafeteria management systems.

. Customizable to meet the specific needs of each organization.

. Scalable to manage multiple cafeterias within an organization.

. User-friendly interface for easy navigation and interaction.

. Sustainability-focused features to minimize food wastage.

. Ongoing technical support and maintenance services.

Example: Technical Architecture Diagram