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Automated Meeting Request and Queue Management System for Efficient Administrative Coordination

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Abstract

The Meeting Request Station for College HOD/Principal Meeting Management is a sophisticated automated system designed to streamline the process of scheduling meetings in academic institutions using embedded technology, IoT, and GSM communication. The system addresses the inefficiencies of traditional manual methods by providing a self-service terminal where students and faculty can independently submit meeting requests. Users interact with the station by selecting the purpose of their meeting, scanning a QR code displayed on the screen, and having the details automatically sent via SMS to a central management database. This real-time data transmission allows the HOD/Principal to access and manage meeting requests through a dedicated interface, where they can view requests, prioritize based on queue, and acknowledge or schedule meetings as per their availability. The system ensures that users receive automated SMS notifications about their meeting status, including updates on queue position and acceptance, thus eliminating the uncertainty and delays common in manual scheduling. The integration of an Arduino-based embedded platform with a color display and GSM module provides a cost-effective, scalable, and flexible solution suitable for various institutional requirements. Additionally, the automated nature of the system reduces the administrative burden on staff, who would otherwise need to handle requests manually. By enabling real-time communication and efficient queue management, the Meeting Request Station significantly enhances user experience, providing a structured approach to meeting scheduling. It addresses key challenges such as high administrative workload, lack of real-time updates, and ineffective communication. This system represents a practical and innovative approach to improving meeting management in academic settings, ensuring that scheduling is not only faster and more accurate but also user-friendly and resource-efficient.

INTRODUCTION

Managing meeting requests in educational institutions, especially for high-ranking faculty members like the Head of Department (HOD) or Principal, is often a time-consuming and inefficient process. Traditional approaches to

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scheduling meetings typically involve manual interactions where students, faculty, or other visitors must submit requests through administrative staff or paper-based systems. This method is not only cumbersome but also prone to delays, errors, and scheduling conflicts due to the absence of real-time management tools. As a result, individuals requesting meetings may experience long wait times and uncertainty regarding the status of their requests, while administrative staff are burdened with managing the logistics manually.

To address these challenges, the Meeting Request Station offers an automated solution that integrates embedded systems, Internet of Things (IoT) technology, and GSM communication. The system functions as a self-service terminal, enabling students and faculty to autonomously submit meeting requests outside the HOD/Principal's office. It is designed to resemble a kiosk-like interface, where users can select the purpose of their meeting from a menu using switches, scan a QR code displayed on the screen, and have their request details sent via SMS to a centralized management system. The use of an Arduino-based platform provides a flexible and low-cost approach to implementing this solution, while the GSM module facilitates seamless communication for sending and receiving SMS notifications.

This automated process reduces the administrative workload by eliminating the need for manual record-keeping and follow-up, allowing the HOD/Principal to efficiently manage the meeting queue through a dedicated interface that displays real-time request data. Users receive SMS updates regarding their request status, including queue position and availability notifications, which help minimize waiting times and improve overall user experience. The system's ability to provide real-time information ensures that meetings are scheduled more effectively, and last-minute changes can be communicated promptly.

By replacing traditional manual scheduling with an automated, user-friendly system, the Meeting Request Station significantly enhances the efficiency and reliability of meeting management within academic institutions. It not only streamlines the scheduling process but also optimizes administrative resources, allowing educational institutions to offer a more organized and responsive approach to handling meeting requests. This innovation can be extended to other sectors where queue management and appointment scheduling are critical.

Existing System Problem Statement:

Current manual systems for meeting management in colleges are often inefficient and prone to delays due to the following challenges:

Manual Scheduling: Faculty or staff must manually record requests and inform the HOD/Principal, resulting in longer processing times.

No Real-Time Updates: Users often lack information on their queue status or meeting availability, leading to uncertainty and extended waiting times.

High Administrative Overhead: Handling meeting requests manually increases administrative tasks, potentially leading to errors or lost requests.

Lack of Automation: The existing systems do not provide automated communication or acknowledgment of meeting requests, further slowing down the process.

Innovation:

The proposed Meeting Request Station introduces several innovations:

Embedded System Integration: Uses an Arduino-based system with a color display, switches, and GSM module for real-time communication and queue management.

Self-Service Interface: The station allows users to interact with the system autonomously, similar to an ATM, making the process faster and more efficient.

Automated Queue Management: Automates the scheduling and notification process, providing users with real-time updates on their meeting status and queue position.

GSM-Based Notifications: Leverages GSM technology to send SMS notifications to users, informing them of meeting status updates and reducing the need for manual communication.

LITERATURE REVIEW

Smart queue management system Systems (Khaparde et al., 2019)

Khaparde et al. presented a queue management solution using GSM modules and SMS-based appointment booking. The system employs a MATLAB-based interface for managing appointments and prioritizing patients. It integrates a 16x2 LCD display for queue updates, enabling hospitals to streamline outpatient department (OPD) operations while reducing patient wait times.

Smart Queue Management with Real-Time Tracking (Patki et al., 2020)

The proposed system by Patki et al. incorporates image processing using CNNs and predictive analysis via deep neural networks (DNN). The system counts people in queues, predicts future

waiting times, and updates management in real time. The incorporation of OpenCV for image detection and machine learning for data analysis ensures accurate and efficient queue management.

Hospital Queue Management Systems (Baballe et al., 2022)

Baballe et al. proposed the E-Queue system to improve patient satisfaction by addressing overcrowding in emergency departments. The system integrates a smartphone application, cloud-based database, and internet-based information sharing to provide real-time updates on queue statuses. The research emphasized designing a comprehensive system to help patients utilize waiting time productively while enabling hospitals to manage their queues effectively.

IoT-based Queue Management for Educational Labs (Rajole et al., 2024)

This study developed an IoT-driven queue management system to streamline access to college laboratories. By leveraging RFID for user authentication and Raspberry Pi for data processing, the system optimizes lab usage. Real-time data synchronization with a Student ERP system and LCD displays provides immediate updates, enhancing security, efficiency, and the user experience.

AI-Enhanced Appointment Scheduling in Healthcare (Ikhe et al., 2024)

Ikhe et al. introduced a healthcare management system that uses IoT sensors and AI algorithms for real-time appointment scheduling. With RFID technology in doctors' cabins and an intelligent scheduling algorithm, the system minimizes wait times, optimizes resource allocation, and enhances patient satisfaction. A user-friendly web portal ensures an interactive experience, demonstrating scalability for large healthcare facilities.

METHODOLOGY AND WORKING PRINCIPLE

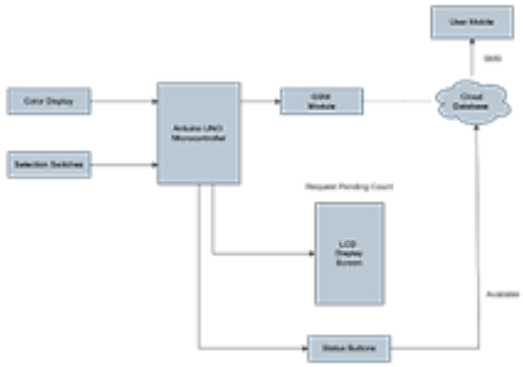

Fig 1: Block Diagram

The working methodology for the Meeting Request Station for College HOD/Principal Meeting Management is structured into key phases to ensure efficient operation. The system setup involves placing a Meeting Request Station outside the HOD/Principal's office, comprising an Arduino Uno microcontroller, a color display, selection switches, a QR code scanner, and a GSM module for communication. Users interact with the system by selecting a meeting purpose using physical switches. The display presents predefined meeting options along with corresponding QR codes. Once a selection is made, the user scans the QR code, which triggers an automated SMS to the management system containing the meeting request details, including the purpose and user's contact information. The data handling and queue management system process the request, storing details such as the timestamp and contact number in a database.

The HOD/Principal accesses the queue through a dedicated interface, where they can acknowledge, schedule, or reject requests. Real-time status updates and notifications keep users informed. If the HOD/Principal is available, the display at the Meeting Request Station shows an "Available" status. If a request is acknowledged but pending, the system assigns a queue number and sends an SMS to the requester, indicating their position. Upon acceptance, an additional SMS is sent with the meeting time or further instructions. The system ensures real-time communication, effective queue management, and structured data logging for administrative tracking. By integrating hardware and software components, the system streamlines meeting scheduling, reduces administrative workload, and enhances communication efficiency within the institution.

APPLICATION AND ADVANTAGES

Applications:

The system can be applied in various contexts, including:

- Educational Institutions: Automating meeting requests for faculty members, administrators, and students in schools, colleges, and universities.
- Corporate Offices: Managing appointments with executives or department heads in business environments.
- Healthcare Facilities: Scheduling appointments with doctors or specialists while managing patient queues.
- Government Offices: Handling meeting requests with officials or department heads in a more structured manner.

Advantages:

- Improved Efficiency: Automates scheduling and notifications, reducing delays.
- Real-Time Updates: Provides instant queue status and meeting availability.
- Reduced Administrative Overhead: Minimizes manual tasks and errors.
- Enhanced User Convenience: Allows autonomous interaction via a self-service interface.
- Streamlined Communication: Uses GSM for automated notifications and transparency.
- Cost-Effective Solution: Combines affordable hardware with efficient functionality.
- Scalability and Adaptability: Easily extendable for various institutions and scenarios.
- Minimized Waiting Time: Reduces delays with real-time queue tracking.
- Increased Transparency: Enables users to monitor their queue and meeting schedules.
- Modernized Administration: Aligns with digital transformation goals in education.

RESULT & DISCUSSION

The implementation of the Meeting Request Station significantly enhances the efficiency of scheduling meetings with the HOD/Principal. The system successfully automates request handling, reducing manual intervention and improving response times. Real-time SMS notifications ensure seamless communication, keeping users informed about their request status. The queue management system effectively organizes meeting requests, preventing overcrowding and scheduling conflicts. The integration of QR code-based validation streamlines the request process, ensuring accuracy and security. The system's performance in handling multiple requests demonstrates its reliability and scalability. Overall, the project improves administrative efficiency, enhances user experience, and provides a structured, transparent meeting management solution.

CONCLUSION

The Meeting Request Station for College HOD/Principal Meeting Management provides a practical solution for automating meeting scheduling in academic institutions. By integrating embedded systems with IoT and GSM technology, the system reduces administrative workload, improves communication, and enhances user experience. This innovation addresses the inefficiencies of manual scheduling systems by automating notifications, managing queues in real-time, and providing timely status updates to users. Implementing such systems can significantly streamline meeting management processes, making them more efficient and user-friendly.

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