



Research Article

Volume-06|Issue-03|2026

Snap2fix: Smart Complaint Management System

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Received: 01.05.2026

Accepted: 11.06.2026

Published: 20.06.2026

CitationButkar, U., Shaikh, S., Sayyed, N., Shaikh, R., Sonawane, S. (2026). Snap2fix: Smart Complaint Management System. *Indiana Journal of Multidisciplinary Research*, 6(3), 25-30.

Abstract: Smart complaint maintenance is a labor-intensive activity. Repairs are delayed as a result, and monitoring issues becomes challenging. A smart maintenance system for college infrastructure is suggested in the current research. The idea is to provide college employees and students with a way to communicate online about issues they are having with water, electricity, and classrooms, among other things. These issues were subsequently brought to the attention of the maintenance supervisors. By reducing paperwork and improving response times, this new method of college infrastructure maintenance makes the campus safer in addition to being better managed.

Keywords: Smart Maintenance System, College Infrastructure, Facility Management, Complaint Management System, Automated Maintenance.

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INTRODUCTION

Snap2Fix is a centralized digital complaint management system designed for universities, campuses, and organizations to efficiently manage maintenance and operational issues. The system enables users to instantly report issues by scanning location based QR codes and ensures real-time tracking, smart routing, and transparent resolution through a structured workflow. Snap2Fix eliminates manual complaint registers and unstructured reporting by providing a fast, trackable, and accountable digital solution.

Problem Statement

College infrastructure is now maintained manually or somewhat technically through systems for keeping phone calls, filing grievances, and keeping written records. In terms of accounting, appropriate maintenance, and centralized maintenance monitoring, these approaches are ineffective. Many of the technology solutions available today for infrastructure maintenance are either too expensive, too complex, or unsuitable for use in educational institutions. An efficient, cost-effective, and centralized maintenance management system is therefore required in order to handle infrastructure complaints effectively and promote efficient maintenance.

GOALS AND OBJECTIVES

Goals

Creating an intelligent or automated standard office environment that enhances productivity, security, and user convenience is the primary goal of the Smart Office Using IoT initiative. The goal of creating an IoT-powered smart office is to boost productivity or minimize human labor when it comes to autonomously operating electrical appliances. Its primary goal is to provide a better version of a traditional or typical workplace setting.

Objectives

- To respond to environmental effects by automating the operation of electrical devices, including fans, lights, and curtains.
- To use a fingerprint sensor to establish secure access (R307).
- To utilize an LCD, monitor to visualize data about availability statuses and environmental conditions in real time.
- To use smart sensors for efficient control mechanisms to prevent cost and energy waste.
- To promote the creation of an intelligent and sustainable workspace idea that might be used in other departments or offices.

LITERATURE SURVEY

Sr. No.	Name of Paper	Working	Year	Demerits
1.	Cross-Platform Mobile Development: React Native vs. Flutter vs. Native Approaches	This paper compares three mobile development approaches: Native Development, React Native, Flutter	March 2025	Implementation requires high initial investment.
2.	Integration of Internet of Things (IoT) Technology in the Management of Educational Facilities and Infrastructure	The integration of IoT technology into the management of educational facilities and infrastructure to enhance efficiency and monitoring.	June 2024	High initial cost of IoT infrastructure deployment
3.	Mobile Incident Management System using React Native	The system is a mobile incident management application built using React Native for cross-platform mobile devices.	July 2023	Minor areas for improvement are acknowledged but not explicitly detailed.
4.	Building a Mobile App with React Native	The paper/tutorial explains how to build a cross-platform mobile app using React Native, focusing on building reusable components with JavaScript and JSX.	July 2023	Some books may become outdated quickly due to rapid React Native evolution.
5.	Facility Management in Education	It emphasizes how effective FM ensures safety, comfort, well-being, proper infrastructure, and technological readiness to support teaching and learning.	2023	Continuous monitoring and evaluation demand significant resources.

PROPOSED METHODOLOGY

An application of a web-based system, the Smart Maintenance System for College Infrastructure technique suggestion can be used to enhance the procedure for resolving infrastructure demands on college campuses. The approach is shown here as a cohesive system with useful modules that support efficient communication and prompt problem solving.

User Interface Module

Module for User Interface It gives users—students, instructors, and staff—an interface via which they can file concerns about infrastructure, including problems with the electricity, water, classrooms, and sanitation. The problem type, location, description, and complaint registration date are all included in each complaint. It is a straightforward mechanism for registering complaints.

Centralized Database Module

Centralized Database Module All the submitted complaints are recorded in a centralized database. The database holds information related to users, complaints, maintenance personnel, and the status of the complaints.

It facilitates the storage, retrieval, and updation of the information related to maintenance.

Admin & Task Assignment Module

This module allows the administrator to view complaints registered by all registered customers. The administrator will take up the complaints, depending on the type and location of the complaint, and allocate the work to the maintenance personnel concerned. This module helps in prioritizing the complaints and proper allocation of tasks, which minimizes delay and miscommunication.

Maintenance Staff Module

This module allows the administrator to view complaints registered by all registered customers. The administrator will take up the complaints, depending on the type and location of the complaint, and allocate the work to the maintenance personnel concerned. This module helps in prioritizing the complaints and proper allocation of tasks, which minimizes delay and miscommunication.

Notification & Status Tracking Module

Notification & Status Tracking Module This module will enable the system to send notifications to the user regarding the status of their complaint. This notification to the user will be sent when the complaint is assigned to them, in progress, and when the complaint is resolved.

Monitoring & Reporting Module

Monitoring & Reporting Module The administrator can also monitor different activities undertaken by the system. This is done using the dashboard that is provided. The administrator is also able to know the responses given to problems that are occurring and the performance of the staff. All the data gathered is also useful for decision-making.

System Integration & Automation

System Integration and Automation All the components are integrated, and the Smart Maintenance System result emerges from them. This runs non-stop, handles complaints in real time, and accommodates the efficient coordination of all users, maintenance staff, and administrators, making the processes of maintenance efficient, accountable, and highly automated, with the aim of ensuring the efficient management of the entire campus infrastructural resources.

System Design

The architecture of the Smart Maintenance System for College Infrastructure consists of three major layers, namely the Frontend Layer, Application Layer, and Database Layer. This is very important in the efficient processing of requests and in the smooth flow of communication.

- **Frontend Layer** This layer is responsible for providing an interface through which different types of users interact with the system. These include students, staff, technicians, and administrators. The layer contains mobile and web applications that were built through React Native.
- **Application Layer** This is the backend layer, which oversees controlling the essential logic of the system, the interaction between the frontend and database, and the various operations. This makes sure that requests are properly processed while the correct responses are sent to the user interface.
- **Database Layer** This layer uses Supabase (PostgreSQL) for secure cloud-based data management. SQLite can be used for caching applications. This layer stores all information that pertains to users, maintenance requests, infra details, reports, etc.

The presence of these different layers enables an effective and cohesive structure whose objective is the integration of multiple and effective user interfaces and backend capabilities. The established structure facilitates

the adoption and implementation of effective and transparent maintenance activities. This enables the creation of an environment that is cohesive and unimpeded for the different entities involved, whether they be the student body, the staff, or the administration. This makes it an important development in the creation of the Smart Maintenance System.

Algorithm

1. System Initialization:

The system starts with all required components. A web application is built using Next.js and a mobile application developed using React Native are launched to provide user interfaces. The backend relates to the help of Supabase, which handles database operations.

The database is arranged with important entities such as Users, Complaints, Roles, and Departments. And, Firebase Cloud Messaging (FCM) is started to enable real time push notifications.

2. User Roles Definition:

- The system defines multiple user roles to ensure proper access control and task distribution:
- User (Student/Staff): Submitting complaints.
- Technician: Manages and resolves assigned complaints.
- Admin: Handles complaint assignment and monitoring.
- Super Admin: Manages complex cases and handles exceptions.

3. Initial Conditions Setup:

Before the workflow starts, the system marks the default conditions:

- Complaint status is marked as not submitted
- Technician status is marked as to be available.

4. Main Workflow Execution:

• QR-Based Complaint Submission:

Users start the process by scanning a location using QR code. This action opens a complaint form with filled location details on a web browser. The user provides a description, selects the complaint type, and uploads an image if it is necessary.

Once submitted, the complaint is stored in the database, and its status is updated to submitted. A confirmation email is sent to the user.

• Smart Routing Logic:

After submission, the system identifies the correctly department:

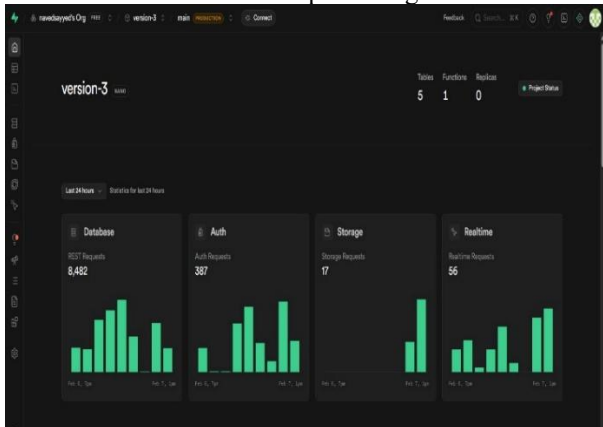
- If the complaint type matches fixed categories, it is directly assigned to the department.
- If the type is marked as "Other," routing is applied.
- If the AI system has low confidence, the complaint is increased to the Super Admin. The complaint status is then updated to routed.

- **Admin Task Assignment:**
The admin reviews the routed complaint and assigns it to the available technician. The complaint status is updated to assigned, and a push notification is sent to the technician via FCM.
- **Maintenance Action:**
The technician accesses the mobile application; sees assigned tasks and starts work. The status is updated to progress during execution. After completing the task, the technician uploads proof (such as an image) and updates the complaint status to completed.
- **Notification and Tracking**
Once the complaint is resolved:
 - The admin receives a real time notification.
 - The user is notified through email.
 - The user can track the complaint status through a tracking link provided by the system.
- **Reporting and Monitoring**
The admin monitors system performance by analyzing resolution times and generating reports. The system also tracks pending and completed complaints, enabling efficient decision-making and performance evaluation.

5. End

Implementation

1. User Interface and Complaint Registration:



The Smart Maintenance System is a web-based application that provides various interfaces for students, staff members, technicians in charge of maintenance, and administrators. It allows students and staff to log in and report issues, while choosing the category, specifying the location, and providing a short description.

This system frontend implements the following technologies: HTML, CSS, and JavaScript, making it user-friendly and highly compatible with most devices.

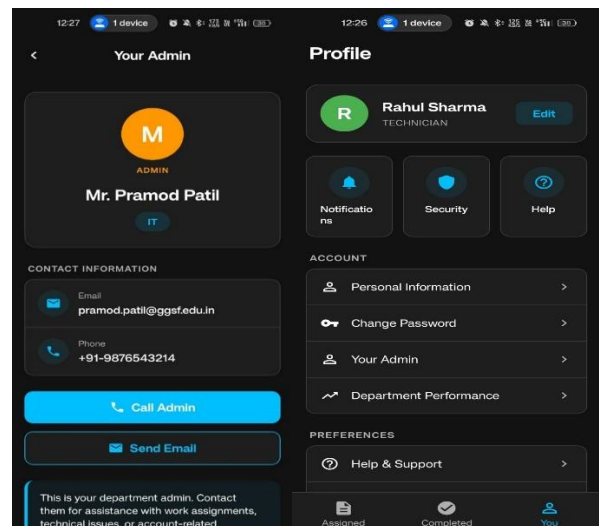
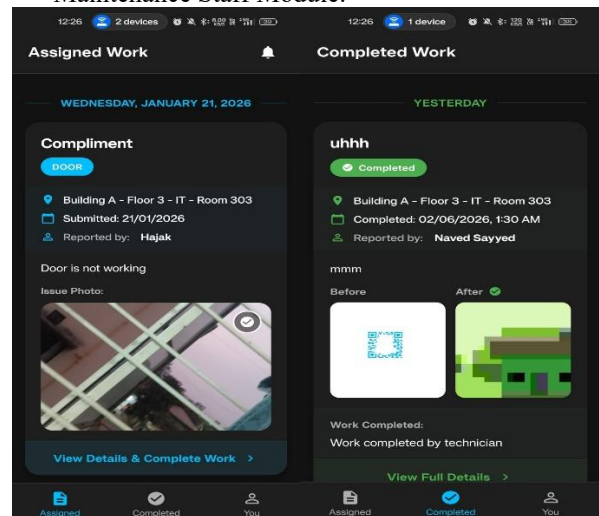
2. Backend Processing and Request Management:

The backend part of the system handles user authentication, complaints, task allocation, and updates. When a person complains, it goes into the database with a certain request ID. The administrator checks all the complaints received by the company. Depending on the kind of problem, he/she assigns it to the maintenance technician.

3. Database Management:

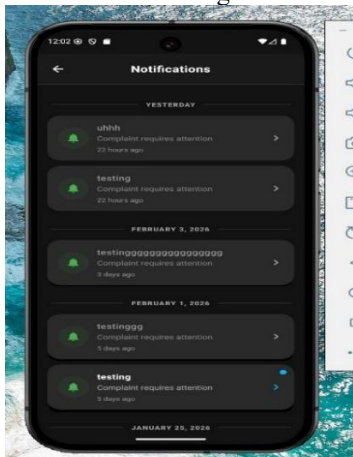
A relational database system will be created to store the details of users, infrastructure, maintenance requests, and complaint status. Data tables for users, infrastructure, and maintenance requests will be created to store the related data in a unified and systematic way.

• Maintenance Staff Module:



The maintenance technician can access the system to see the assigned tasks via a special interface. The technician also has the privilege to change the status of the completion of the assigned tasks by changing the complaint status to In Progress or Resolved. The status will be updated immediately.

- Notification and Monitoring:



In addition, it has an automatic notification system that takes place when there is a change in the status of a complaint. This can be an assignment or resolution. Users get updates through the interface, which remains very clear. The administrator module has some features, which include monitoring and reporting. These features help in tracking the performance of the maintenance activity, common issues, and resource utilization.

Advantages

1. Offers a central platform for reporting and managing infrastructure maintenance issues.
2. Reduces manual paperwork and communication delays.
3. Improves response time by properly assigning tasks.
4. Increases transparency by allowing users to check their complaint status.
5. It assists managers in monitoring maintenance activities and staff.
6. This solution is cost-effective and best suited for educational institutions.

Disadvantages

- Requires internet connectivity for real-time access and updates.
- Users and staff may be required to undergo a series of initializations.
- The performance of this system relies on the maintenance of the database and server.
- There is limited automation since the process depends on the users to detect the issue.

Future Scope

- Integration of IoT sensors for automatic detection of infrastructure faults.
- Mobile app development for easier access and real-time notifications.
- Use of artificial intelligence to predict maintenance problems.
- Integration with college ERP systems for unified campus management.
- Improved analytics and reporting for long-term infrastructure planning.

Application

- Educational Institutions: The system can be implemented in schools, colleges, and universities, which can improve maintenance operations and address any issues with the infrastructures in these institutions quickly
- Corporate Offices: These can be useful in managing maintenance requests and issues in large corporations to ensure efficient and comfortable operations.
- Hospitals and Healthcare Center: Can aid in monitoring and addressing maintenance concerns for health care centers by providing a clean, safe, and operational environment for patients and employees.

CONCLUSION

The Smart Maintenance System for College Infrastructure provides an efficient and organized method of managing issues related to school maintenance. By automating the whole process of reporting the issues and tasks assigned to tackle the problems, the system ensures transparency and accountability within the system.

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