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CampusFix A Smart Complaint Management System

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A B S T R A C T:

Campus maintenance complaints are often handled manually, causing delays, improper technician assignment, and limited transparency. This paper presents **CampusFix**, a smart web-based complaint management system that automates complaint registration, assignment, tracking, resolution, and closure. Its key feature is automated technician assignment based on **complaint category, technician specialization, and active workload**. The system also provides role-based access, notifications, complaint history, file attachments, and status tracking. CampusFix is implemented using **React, FastAPI, and Supabase**, with JWT-based authentication. Testing shows that the system provides an efficient and transparent approach to campus complaint management while reducing manual effort.

Keywords: Smart Campus, Complaint Management, Automated Assignment, Technician Specialization, Workload Management, FastAPI, Supabase.

Introduction

Educational institutions continuously receive complaints concerning campus infrastructure and services, including electrical faults, plumbing problems, classroom facilities, sanitation, network connectivity, laboratory equipment, and other maintenance-related issues. Timely identification and resolution of such complaints are important for maintaining a safe, functional, and comfortable environment for students and staff. However, many institutions continue to rely on conventional mechanisms such as verbal communication, physical registers, emails, phone calls, or informal messaging applications.

Although these methods provide basic ways to report an issue, they generally lack a unified mechanism for tracking the complete lifecycle of a complaint. A student may submit a complaint without receiving sufficient information regarding its current status, assigned personnel, or expected resolution. Administrative personnel may also experience difficulties in identifying responsible staff, monitoring pending complaints, and maintaining historical records. Consequently, complaints may be delayed, overlooked, duplicated, or resolved without proper documentation.

Digital complaint management systems provide an opportunity to overcome these limitations by centralizing complaint registration, assignment, monitoring, and resolution. A web-based system can provide students with a convenient mechanism for submitting complaints while enabling administrators and maintenance personnel to process them systematically. In addition, maintaining complaint history can support accountability and provide useful information for identifying recurring issues.

To address these requirements, this paper presents **CampusFix**, a smart campus complaint management system that provides an integrated platform for complaint registration and resolution. The system follows a role-based approach involving three primary roles: student, staff, and administrator. Students can submit and monitor complaints, administrators can manage departments and staff and assign complaints, and staff members can process assigned complaints and update their status.

The proposed system manages complaints through a defined lifecycle consisting of **Pending, Assigned, In Progress, Resolved, and Closed** states. Additional operations such as rejection and cancellation are handled according to the complaint state and user role. The system also maintains complaint history and provides feedback mechanisms after resolution.

Related Work

Digital grievance and complaint management has been explored in several application domains, including educational institutions, public services, municipalities, and organizational environments. Traditional grievance mechanisms generally depend on manual registration and communication, which can result in delayed processing and limited transparency. The transition toward web-based and mobile-based systems has attempted to improve complaint registration and tracking.

Several online grievance systems provide users with a mechanism to submit complaints and monitor their status. Such systems demonstrate that centralized digital registration can improve accessibility and reduce dependence on physical records. However, many basic implementations primarily focus on complaint submission and do not provide complete integration of departmental assignment, staff management, complaint history, notifications, and feedback.

Web-based complaint management approaches have also been developed for institutional and public-service environments. These systems commonly provide administrator dashboards for monitoring complaints and assigning them to responsible personnel. While such approaches improve administrative visibility, their workflows may not be directly optimized for campus environments where complaints can originate from classrooms, laboratories, hostels, electrical facilities, sanitation services, and other campus locations.

Role-based access control is another important requirement in complaint management systems. Students should primarily be able to submit and monitor their own complaints, whereas staff should access complaints assigned to them and administrators should manage users, departments, and assignments. Integrating these access levels into a single system improves security and prevents unauthorized operations.

A further limitation observed in many basic complaint systems is the lack of a complete complaint lifecycle. A system that only records a complaint and changes it to a final resolved state provides limited information about the actual processing stages. CampusFix therefore introduces intermediate states such as assignment and in-progress processing, allowing the progress of a complaint to be tracked more precisely.

Based on the reviewed approaches, there remains a need for a campus-focused system that combines centralized complaint registration, role-based access, department-based assignment, lifecycle tracking, complaint history, notifications, and feedback within one platform. CampusFix is designed to address these requirements through an integrated complaint management workflow.

Table I. Comparison of Existing Approaches and CampusFix

Feature	Traditional	Basic Online System	CampusFix
Digital Complaint Submission	✗ No	✓ Yes	👍 Yes
Complaint Tracking	✗ No	◑ Partial	✓ Yes
Department Assignment	Manual	✓ Yes	👍 Yes
Role-Based Access	✗ No	✓ Yes	✓ Yes
Staff Management	✗ No	◑ Partial	✓ Yes
Complaint History	✗ No	◑ Partial	✓ Yes
Notifications	✗ No	✓ Limited	✓ Yes
Feedback	✗ No	✓ Limited	✓ Yes
Structured Lifecycle	✗ No	✓ Limited	✓ Yes

Evaluation of Systems

PROBLEM STATEMENT AND RESEARCH GAP

A. Problem Statement

The primary problem addressed in this work is the inefficient management of campus complaints through fragmented and predominantly manual communication mechanisms. When complaints are submitted through registers, verbal requests, emails, or informal messages, there is no unified mechanism for maintaining complaint records and monitoring their progress.

The absence of centralized tracking creates several problems. Students may not receive sufficient information about the current status of their complaints. Administrators may find it difficult to identify the responsible department or staff member, particularly when multiple complaints are received simultaneously. Staff members may also lack a systematic list of assigned complaints and their priorities. Furthermore, without a maintained complaint history, administrators cannot easily determine recurring problems or evaluate complaint-resolution performance.

Therefore, the required system should provide a centralized platform capable of registering complaints, identifying the responsible department, assigning complaints to staff, tracking progress, maintaining historical records, and collecting feedback after resolution.

B. Research Gap

Existing digital complaint management solutions have demonstrated the benefits of online complaint registration and tracking. However, many solutions concentrate on individual aspects such as registration or administrative monitoring rather than providing a complete campus-oriented workflow.

The identified gap is the lack of an integrated system that combines role-based access, department-specific assignment, staff management, complaint lifecycle tracking, resolution remarks, notifications, history, and feedback within a single platform designed for educational institutions.

CampusFix addresses this gap by integrating these functions into a structured workflow. The system separates responsibilities among students, administrators, and staff while maintaining the complete lifecycle of each complaint. This approach improves traceability and provides a clearer mechanism for monitoring unresolved and resolved complaints.

PROPOSED SYSTEM

CampusFix is proposed as a centralized web-based complaint management system for educational institutions. The system is designed around three primary user roles: student, staff, and administrator. Each role is provided with functionality according to its responsibilities in the complaint-resolution process.

Students act as complaint initiators. After authentication, a student can submit a complaint by providing information such as title, description, location, and relevant attachment. The system records the complaint and provides a reference number that can be used to track its progress. Students can view their submitted complaints and monitor status updates throughout the resolution process.

Administrators act as system managers. They can manage staff members and departments, monitor submitted complaints, and assign complaints to appropriate staff members. Department-based assignment helps ensure that complaints are routed to personnel with relevant responsibilities.

Staff members act as complaint handlers. Assigned staff can review complaint details, accept or reject assignments, update the progress of complaints, and provide remarks describing the resolution. This provides a structured communication path between the complaint initiator and the responsible personnel.

The proposed complaint lifecycle consists of the following major states: Pending, Assigned, In Progress, Resolved, and Closed. A complaint may also be rejected when it cannot be accepted by the assigned personnel, while eligible pending complaints can be cancelled according to system rules. The lifecycle provides a clear representation of complaint progress.

C. Functional Components

The major functional components of CampusFix include authentication, complaint management, department management, staff assignment, status management, notifications, complaint history, and feedback management.

D. Role-Based Operations

Role-based authorization ensures that each user can perform only the operations associated with their role. Students manage their complaints, staff members manage assigned complaints, and administrators perform system-level management and assignment operations.

E. Complaint Traceability

Each complaint is associated with a unique reference identifier and maintained history. Changes in complaint status and relevant actions can therefore be tracked throughout the lifecycle, improving accountability and transparency.

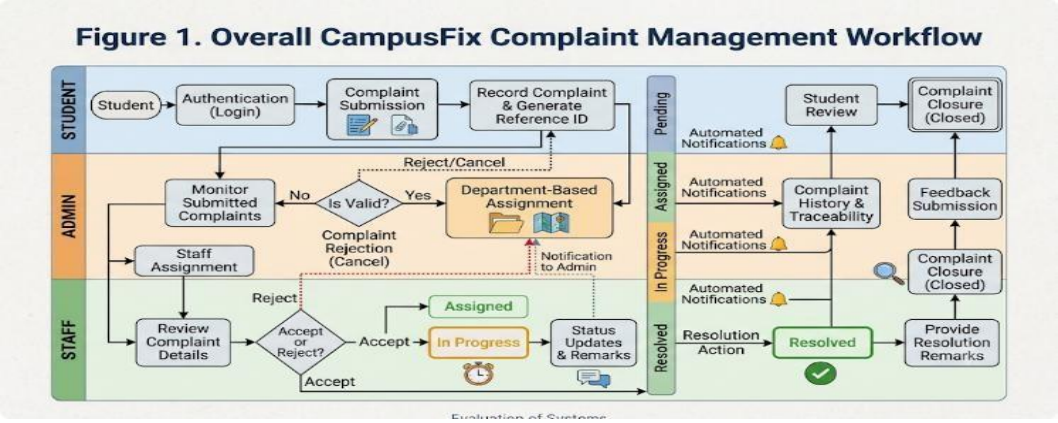


Figure1:Overall CampusFix Complaint Management Workflow

SYSTEM ARCHITECTURE AND METHODOLOGY

CampusFix follows a layered client-server architecture in which the frontend communicates with backend services through APIs and the backend interacts with the database for persistent storage. The architecture separates presentation, application, authentication, and data management responsibilities.

F. Presentation Layer

The presentation layer provides web interfaces for students, staff, and administrators. The interface dynamically provides functionality based on the authenticated user's role. Students are provided with complaint submission and tracking features, staff members are provided with assigned complaint management features, and administrators are provided with management and assignment features.

G. Application Layer

The application layer implements the core business logic of CampusFix. It processes authentication requests, validates user input, manages complaints, performs staff assignment, controls status transitions, records remarks, and handles feedback. REST-based API endpoints provide communication between the frontend and backend services.

H. Authentication and Authorization

Authentication verifies the identity of users before allowing access to protected operations. The system uses OTP-based verification during account registration and provides password-based authentication for subsequent access. Role-based authorization is applied to protected operations so that students, staff, and administrators receive appropriate permissions.

Security mechanisms such as password hashing, input validation, OTP expiration, and rate limiting are incorporated to reduce common authentication and misuse risks.

I. Database Layer

The database stores information required for the complete complaint management process. Major entities include users, profiles, departments, complaints, assignments, feedback, notifications, complaint history, and email verification records.

The complaints entity maintains the core information associated with each complaint, while assignments connect complaints with responsible staff members. Complaint history provides a record of lifecycle changes, and feedback stores student responses after resolution.

J. Complaint Processing Methodology

When a student submits a complaint, the system validates the provided information and stores the complaint with an initial pending status. The administrator can review the complaint and assign it to an appropriate staff member. After accepting the assignment, the staff member can process the complaint and update its status to indicate progress.

After completing the required work, the staff member records appropriate resolution remarks and marks the complaint as resolved. The complaint can subsequently move to the closed state based on the system workflow. This sequence provides traceability from initial submission to final closure.

K. Notification and History Mechanism

Notifications provide users with relevant updates about complaint actions and status changes. The history mechanism maintains important events associated with a complaint, enabling administrators and users to understand how the complaint progressed through the system.

Methodology

The overall methodology follows a sequential process: user authentication, complaint submission, validation, departmental assignment, staff processing, status update, resolution, closure, and feedback. This structured process minimizes ambiguity in responsibility and provides a consistent workflow for complaint handling.

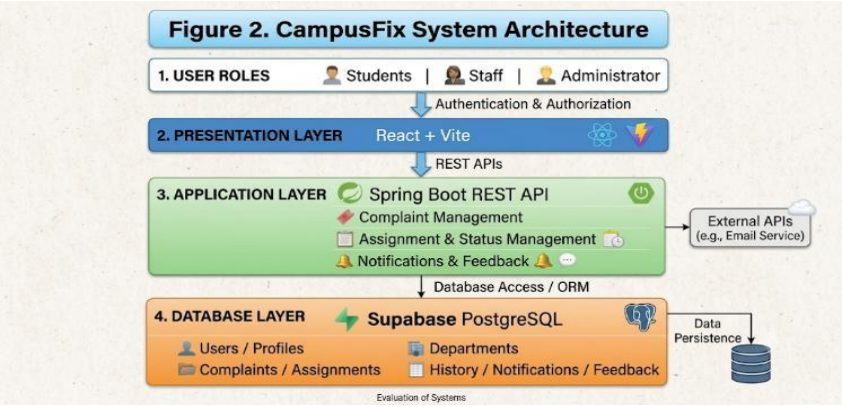


Figure2: CampusFix System Architecture

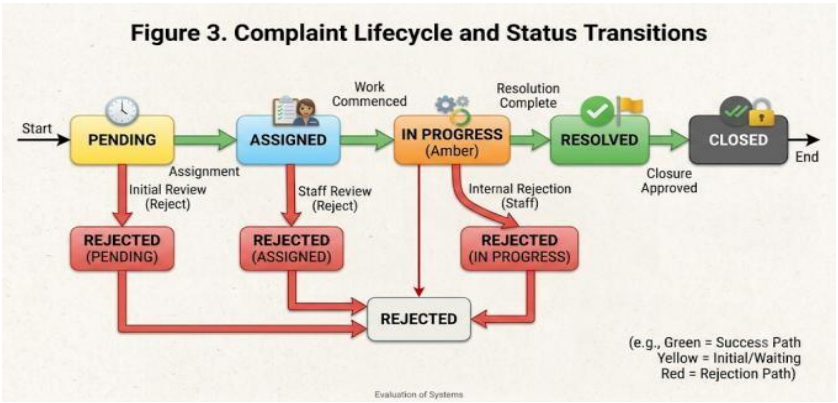


Figure3: Complaint Lifecycle and Status Transitions

SYSTEM IMPLEMENTATION

CampusFix was implemented as a web-based application using a frontend, backend API layer, authentication mechanism, and relational database. The implementation is divided into functional modules corresponding to the different user roles and system operations.

L. Authentication Module

The authentication module manages user registration, OTP verification, login, password recovery, and session-related operations. During registration, the user's information is validated and an OTP is used for email verification. Passwords are stored using secure hashing rather than plain-text storage. Authentication endpoints are protected against repeated unauthorized requests through rate-limiting mechanisms.

M. Student Complaint Module

The student module provides the primary interface for complaint submission and tracking. A student can provide a complaint title, description, location, and supporting attachment when required. After successful submission, the system generates a complaint reference identifier and stores the complaint with its initial status.

Students can access their complaints and view status changes throughout the complaint lifecycle. Once a complaint has been resolved and closed, the student can provide feedback about the resolution.

N. Administrator Module

The administrator module provides system-level management functions. Administrators can manage staff information, departments, and complaint assignments. Complaints can be reviewed and assigned to appropriate staff members according to departmental responsibilities.

The administrator can also monitor complaint status and use the maintained history to understand the progress of individual complaints.

O. Staff Module

The staff module focuses on complaint processing. Staff members can view complaints assigned to them, accept or reject assignments, update complaint progress, and provide remarks. Once the required work has been completed, the staff member can mark the complaint as resolved.

P. API and Data Management

The backend exposes APIs for authentication, complaint operations, assignment, status updates, remarks, timeline retrieval, staff management, and related operations. Input validation is applied to API requests to reduce invalid data and unauthorized operations.

The relational database maintains relationships between users, profiles, departments, complaints, assignments, notifications, feedback, and complaint history. These relationships allow the system to preserve consistency and traceability across the complaint lifecycle.

Q. Security and Access Control

Security is implemented through authentication, authorization, password hashing, input validation, OTP expiration, and rate limiting. Protected API operations verify the authenticated user's role before executing sensitive actions. This prevents students from performing administrative operations and prevents unauthorized access to staff-specific complaint functions.



(a) Student – Complaint Submission Page (b) Admin – Complaint Assignment / Dashboard (c) Staff – Complaint Management Page

Fig. 4. CampusFix User Interface

RESULTS AND DISCUSSION

The developed CampusFix system was evaluated by testing its major functional modules and the transitions within the complaint lifecycle. Testing focused on authentication, complaint submission, complaint retrieval, departmental assignment, staff operations, status management, complaint history, feedback, and role-based access control.

The authentication module was evaluated for registration, OTP verification, login, OTP resend, password recovery, and reset operations. Complaint management was tested by creating complaints, retrieving complaint information, updating eligible complaints, cancelling eligible complaints, assigning complaints to staff, and changing complaint states according to the defined lifecycle.

The role-based authorization mechanism was also evaluated to verify that users could perform only operations permitted for their roles. Student operations were restricted to student-level functionality, staff operations were limited to assigned complaint processing, and administrator operations included management and assignment capabilities.

The results demonstrate that the implemented workflow provides a structured mechanism for managing complaints from initial registration to closure. Maintaining complaint history improves traceability, while assignment and status management provide visibility into the current responsibility and progress of each complaint.

R. Functional Testing

The major functional test categories are summarized in Table II. The final values should be based on the actual test execution performed on the deployed or development version of CampusFix.

S. Discussion

Compared with traditional complaint-handling approaches, CampusFix provides a centralized mechanism for registering and tracking complaints. Department-based assignment reduces ambiguity regarding responsibility, while the structured lifecycle makes the current state of a complaint visible to relevant users.

The system also establishes a foundation for future intelligent features. Historical complaint information can potentially be used to identify frequently occurring issues, determine departments with high complaint volumes, and support automated prioritization or categorization.

However, the current implementation primarily focuses on structured digital complaint management. Intelligent classification, automatic priority prediction, large-scale performance evaluation, and real-world deployment across multiple institutions remain potential areas for future development.

REFERENCES

[1] S. S. R. K. et al., "Smart Student Grievance Redressal System with Foul Language Detection," in *Proc. 8th Int. Conf. Advanced Computing and Communication Systems (ICACCS)*, Coimbatore, India, 2022, pp. 1–6, doi: 10.1109/ICACCS54159.2022.9785119.

[2] Y. Venkata Ramesh, B. Yasaswini Sai Akhila, K. Sushma, G. Sai Kumari, and S. K. Chandini, "College Campus Grievance Management System," in *Proc. National Conference on Advanced Trends in Computer Science and Information Technology*, 2021.

[3] "Automating Customer Complaint Classification in Telecom using Pretrained Natural Language Processing Models," in *Proc. 3rd Int. Conf. Sustainable Computing and Data Communication Systems (ICSCDS)*, Erode, India, 2025, doi: 10.1109/ICSCDS65426.2025.11167043.

[4] "Streamlining Hostel Administration Through Real-Time Event Triggers and Priority Based Complaint Sorting Algorithm with React Native and AWS Integration," in *Proc. 3rd Int. Conf. Artificial Intelligence and Machine Learning Applications (AIMLA)*, Namakkal, India, 2025, doi: 10.1109/AIMLA63829.2025.11040367.

[5] "Design and Implementation of College Dormitory Management System," in *Proc. 4th Int. Conf. Emerging Research in Electronics, Computer Science and Technology (ICERECT)*, 2022, doi: 10.1109/ICERECT56837.2022.10059902.

[6] "On Grievance Protocols for Conflict Resolution in Open Multi-Agent Systems," in *Proc. 44th Hawaii Int. Conf. System Sciences (HICSS)*, 2011, doi: 10.1109/HICSS.2011.322.