

HAWASSA UNIVERSITY



FACULTY OF INFORMATICS

DEPARTMENT OF COMPUTER

SCIENCE

Mobile App Development Project Proposal

**Title: Centralized Maintenance Management System for
Hawassa University-IoT (Mobile Application)**

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Abstract

The **Centralized Maintenance Management System for Hawassa University-IoT** is a mobile-based application designed to digitize and streamline the maintenance process within the university's facilities. The proposed system enables students, staff, and administrators to report, assign, and track maintenance requests related to university buildings, classrooms, dormitories, and offices. Currently, maintenance operations are often conducted through manual and paper-based procedures, causing inefficiencies and delays. By leveraging mobile technology, this system aims to improve communication, transparency, accountability, and response time, ultimately ensuring a well-maintained and conducive learning environment.

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1. Introduction

Efficient maintenance management is essential for the smooth functioning of educational institutions. Hawassa University, as one of Ethiopia's largest higher learning institutions, manages numerous buildings, dormitories, and facilities. However, the current maintenance system relies heavily on manual reporting, which often leads to inefficiencies and delays in resolving issues.

To overcome these challenges, this proposal introduces a **Centralized Maintenance Management System for Hawassa University-IoT** that simplifies the reporting, assignment, and monitoring of maintenance activities. The system fosters effective communication between students, administrators, and technicians, thereby improving operational efficiency and service quality.

2. Background of the Study

Maintenance of physical infrastructure is a critical component of university management. Institutions with outdated or paper-based systems face difficulties in tracking reported issues, managing workloads, and ensuring timely repairs.

In many cases, students and staff must report maintenance problems verbally or through handwritten notes, which can be misplaced or delayed. These inefficiencies lead to prolonged repair times, dissatisfaction among stakeholders, and resource wastage.

With the advancement of mobile technology, universities can leverage digital platforms to create an efficient maintenance reporting and tracking system. The proposed system will help Hawassa University improve accountability, streamline workflows, and promote a culture of timely facility management.

3. Problem Statement

Maintenance management in large institutions such as **Hawassa-IoT University** faces a number of operational challenges that hinder efficiency and service quality. Currently, reporting maintenance issues is often time-consuming and inefficient, as it relies heavily on verbal communication or paper-based requests. This manual process results in incomplete or misplaced information, making it difficult for administrators to track and prioritize reported problems. Furthermore, the lack of effective communication and coordination among students, administrators, and technicians leads to confusion, delayed responses, and unresolved issues. Without a proper tracking and record-keeping system, it becomes challenging to monitor maintenance progress or evaluate performance over time. These limitations contribute to poor service delivery, unnecessary resource wastage, and decreased satisfaction among the university community. Therefore, there is a critical need for a **digital, centralized maintenance reporting and management system** that enhances transparency, accountability, and responsiveness in handling maintenance operations across the university's facilities.

4. Objectives of the Study

4.1 General Objective

To design and develop a mobile-based **Centralized Maintenance Management System for Hawassa University-IoT** that streamlines the reporting and management of maintenance activities at Hawassa University-IoT

4.2 Specific Objectives

- ❖ To allow students and staff to report maintenance problems through the mobile app.
- ❖ To enable administrators to assign and monitor maintenance tasks.
- ❖ To allow technicians to update and complete assigned tasks.
- ❖ To track the progress and status of each maintenance report.
- ❖ To generate reports for decision-making and resource planning.

5. Scope of the System

5.1 Functional Scope

The system will be a **mobile application developed in Java**, supported by a **Java backend**. Its core functionality is defined by the following user roles:

Reporters (Students and Staff):

- Authenticate securely into the system.
- Submit maintenance requests, including a specific category, location (building, room), detailed description, and photo evidence.
- View the real-time status and history of their own submitted requests.
- Receive push notifications upon assignment and completion of their requests.
- Provide feedback or rate the completed service.

Administrators:

- Access an administrative dashboard to view, filter, and triage all incoming maintenance requests.
- Assign and dispatch requests to specific technicians or teams.
- Monitor the progress of all active tasks in real-time.
- Generate and export analytical reports on key performance indicators (e.g., average resolution time, most frequent issues, technician workload).

Technicians:

- View a personalized task queue of assigned maintenance requests.
- Update the status of tasks (e.g., *Acknowledged*, *In Progress*, *On Hold*, and *Completed*).
- Add completion notes and details upon resolving an issue.

6. Significance of the Study

This system will:

- Improve communication between the university community and maintenance teams.
- Enhance accountability and transparency in maintenance operations.
- Reduce delays in issue reporting and task completion.
- Facilitate efficient record-keeping and data-driven decision-making.
- Create a cleaner, safer, and better-managed campus environment.

7. Methodology

7.1 System Analysis

A needs assessment will be conducted through interviews and surveys with students, staff, and maintenance personnel to identify pain points in the current process.

7.2 System Design

The system will be designed using the **Model-View-Controller (MVC)** architecture. The user interface (UI) will focus on simplicity and accessibility, ensuring that users can report and track issues with minimal effort.

7.3 System Development Tools and Technologies

- **Frontend (Mobile App):** Flutter
- **Backend:** Java
- **Database:** PostgreSQL
- **Authentication:** Firebase Auth or JWT-based authentication
- **Version Control:** GitHub

8. System Features and Functionalities

1. User Authentication and Role Management
2. Report Submission with Text and Image Uploads
3. Administrator Dashboard – task assignment and monitoring
4. Technician Panel – view and update assigned tasks
5. Notification System – task status updates and alerts
6. Analytics and Reporting – maintenance trends and performance summaries
7. Search and Filter Tools – find reports by category, date, or building
8. Feedback System – users can rate maintenance services

System Workflow

The **Centralized Maintenance Management System for Hawassa University-IoT** follows a structured workflow that ensures efficient reporting, task management, and feedback collection throughout the maintenance process. The workflow consists of five main phases, as described below:

1. **Reporting Phase:**

In this phase, a student or staff member (reporter) uses the mobile application to submit a maintenance issue. The user selects the relevant location (such as a building and room number), provides a brief description of the problem, specifies the issue category (e.g., electrical, plumbing, furniture), and attaches a photo as evidence. Once submitted, the report is automatically logged into the system for administrative review.

2. **Task Assignment:**

The maintenance administrator reviews all submitted reports through the administrative dashboard. Based on the issue type and location, the administrator assigns the task to a specific technician or maintenance team responsible for that area. The assigned technician receives an automatic notification detailing the task and its priority level.

3. **Maintenance Action:**

Upon receiving the task, the technician acknowledges it within the system and proceeds to inspect and resolve the issue. The technician can update the task status to stages such as *In Progress*, *On Hold*, or *Completed*, depending on the repair progress. This ensures transparency and real-time tracking of ongoing maintenance activities.

4. Verification and Feedback:

After the technician marks the task as completed, the reporter or administrator verifies whether the issue has been properly resolved. The reporter can then provide feedback or rate the service quality based on timeliness and effectiveness. This phase helps maintain accountability and service quality across the maintenance workflow.

5. Reporting and Analytics:

The system includes an analytics dashboard that allows administrators to generate performance and operational reports. These reports display key metrics such as:

- o Total number of issues reported and resolved.
- o Most common maintenance categories or recurring problems.
- o Technician performance and task completion rates.
- o Average resolution and response times.
- o Monthly or yearly maintenance statistics for planning and budgeting.

This systematic workflow ensures a transparent, efficient, and data-driven maintenance process that enhances the overall facility management operations of Hawassa University.

9. Expected Outcomes

- A fully functional mobile app that digitizes maintenance operations.
- Improved workflow efficiency and faster response times.
- Centralized data for long-term analysis and budgeting.
- Increased satisfaction among students, staff, and administrators

10. Limitations of the Study

- The system depends on stable internet connectivity.
- Limited technical resources during development and deployment phases.
- User training may be required for smooth adoption.

References

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