

Smart Electrician Service Management System

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Abstract

The electrical service industry continues to rely heavily on manual processes for assigning jobs, monitoring work progress, managing resources, and maintaining communication between contractors and electricians. These traditional approaches often result in delays, inefficient resource utilization, and difficulties in tracking project status. This paper presents a Smart Electrician Service Management System, a web-based platform designed to automate and streamline electrician service operations. The system provides role-based access for administrators and electricians, enabling efficient job assignment, task monitoring, inventory management, payment processing, and performance reporting. Developed using Python Flask and SQLite, the platform improves operational efficiency, enhances communication, and ensures real-time tracking of service activities. Experimental implementation demonstrates that the proposed system significantly reduces administrative workload and improves service coordination compared to conventional methods.

Keywords: Electrician Management, Service Automation, Flask Framework, Inventory Management, Task Tracking, Web Application.

1. Introduction

With the rapid growth of residential, commercial, and industrial infrastructure, the demand for reliable electrical maintenance and installation services has increased significantly. Many contractor organizations still manage electrician assignments and service requests manually through spreadsheets, paperwork, or phone communication. These methods often lead to scheduling conflicts, delayed responses, poor record management, and limited visibility of ongoing tasks.

To address these challenges, a Smart Electrician Service Management System has been developed. The proposed system automates the complete workflow of electrician service operations, including electrician registration, job allocation, task management, inventory monitoring, notifications, payment handling, and performance analysis. The system aims to improve service efficiency, reduce human errors, and provide a centralized platform for managing electrical service operations.

2. Project Overview

The Smart Electrician Service Management System is a web-based application designed for contractor companies and electrical service providers.

The system supports two primary user roles:

Administrator: -

Administrator is manage the electricians, create and assign jobs, monitor task progress, manage inventory materials, generate reports, and process the payments.

Electrician: -

Electrician is view assigned jobs, update task status, upload reports, receive notifications, and track the completed work.

The system provides a centralized database for storing all operational information, ensuring better coordination between management and field technicians

3. Objectives

The major objectives of the project are:

1. To automate electrician service management.
2. To improve job assignment efficiency.
3. To monitor task completion in real time.
4. To manage electrical inventory effectively.
5. To provide secure user authentication.
6. To generate analytical reports for decision-making.
7. To reduce paperwork and administrative efforts.
8. To improve communication between contractors and electricians.

4. Literature Survey

In recent years, many organizations have started using software systems to manage their daily operations more effectively. Several studies have shown that digital management systems help reduce manual work, improve communication, and increase productivity.

Service management applications are commonly used to assign tasks, monitor employee performance, and maintain work records. Some systems also provide inventory management and reporting features to help organizations track resources and make better decisions.

In many electrical service companies, job assignments, work updates, and material records are still managed manually, which can lead to delays, errors, and poor coordination.

There is also a lack of a single platform that combines job management, task tracking, inventory control, payment management, and reporting.

To overcome these challenges, the Smart Electrician Service Management System has been developed. This system provides an easy and efficient way to manage electrician-related activities through a web-based platform.

It helps administrators assign jobs, monitor work progress, manage materials, and generate reports, while electricians can view their assigned tasks and update their work status.

5. Methodology

The development process follows the Software Development Life Cycle (SDLC).

Phase 1: Requirement Analysis

User requirements were collected to identify essential functionalities like job assignment, task tracking, material management, reporting, and payment processing.

Phase 2: System Design

Database schemas and user interfaces were designed to support operational workflows.

Phase 3: Development

- The system was implemented using Python Flask and SQLite.
- Modules developed include the authentication module, electrician management module, job management module, task management module, material management module notification module, payment module, and reporting module.

Phase 4: Testing

- Functional testing was conducted to verify the user authentications, job assignment, task updates, inventory calculations, and payment transactions.
- *Testing phases mainly used for check the complete work it is working correctly or not*

Phase 5: Deployment

The application was deployed in a web environment for practical usage and evaluation.

6. Database Design

Users Table:-

Users table mainly used for stores the login credentials like username, email, password, and role information.

Electricians Table: - Stores electrician details like electricians_id, name, email, phone, status.

Jobs Table: -

Jobs table used for stores job assignments, job_id pk, title, location, deadline, price, electrician and deadlines.

Tasks Table: -

Tasks table mainly used for stores the task descriptions and completion status like task_id pk, job_id pk, description, status.

Materials Table: -

Materials table used for tracks inventory usage, material_id, name, quantity, unit.

Notifications Table: -

Notification table stores user notification and also stores note_id pk, user_id fk, message, is_read.

Payments Table: -

Payments table stores transaction records and also stores payment_id, job_id fk, amount, status, transactions.

7. Results and Discussion

The Results developed system was tested using multiple user scenarios involving administrators and electricians.

Observed Results

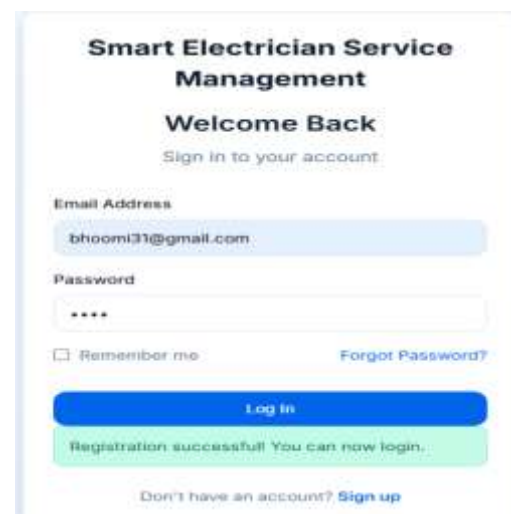
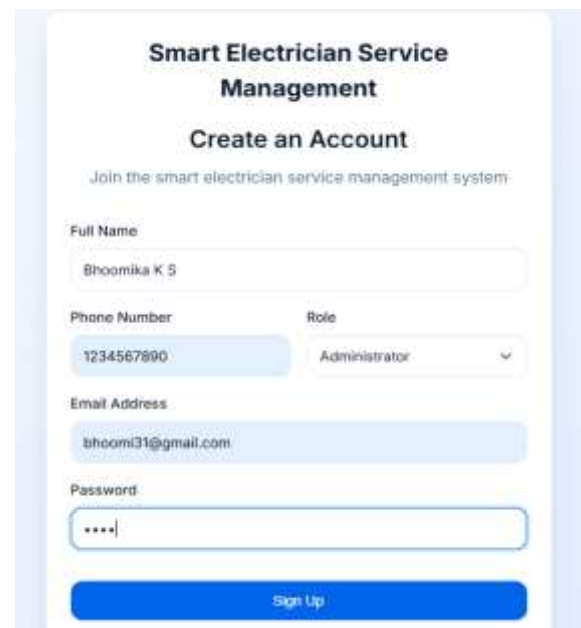
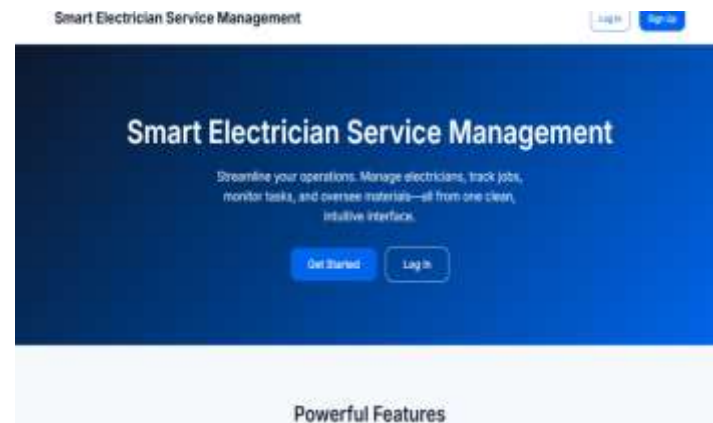
Parameter	Traditional Method	Proposed System
Job Assignment Time	High	Low
Record Maintenance	Manual	Automated
Task Tracking	Difficult	Real-Time
Inventory Monitoring	Limited	Efficient
Communication	Delayed	Instant
Reporting	Manual	Automated

The implementation demonstrated significant improvements in operational efficiency and reduced administrative workload.

Performance Outcomes

- Faster job allocation
- Improved task visibility
- Better resource utilization
- Reduced paperwork
- Enhanced communication
- Improved service delivery

8. Snapshots





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9. Conclusion

The Smart Electrician Service Management System provides a comprehensive solution for managing electrical service operations. By integrating job assignment, task tracking, inventory management, payment processing, and reporting into a single platform, the system improves efficiency and reduces manual effort. The web-based architecture enables real-time monitoring and effective communication between administrators and electricians. The implementation results demonstrate that the proposed solution successfully enhances operational productivity and service quality. Future enhancements involving artificial intelligence and mobile technologies can further increase system effectiveness and scalability.

Overall, the Smart Electrician Service Management system offers a reliable, user-friendly, and efficient solution for managing electrical service operations. The project demonstrates how modern web technologies can be used to streamline business processes, improve service quality, and enhance customer satisfaction. In the future, the system can be expanded with features such as mobile application support, GPS-based electrician tracking, online payment gateway integration, cloud storage, and AI-based job scheduling to further improve its functionality and performance.

10. References

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