

Electrician Work Management Platform

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ABSTRACT: The electrical service industry often faces challenges in managing electricians, assigning jobs, tracking task progress, maintaining inventory, and handling payments. Traditional manual methods lead to delays, communication gaps, and inefficient resource utilization. This research presents the development of an Electrician Work Management Platform, a web-based application designed to streamline workforce management and improve operational efficiency. The platform provides role-based access control, job assignment, task tracking, material inventory management, payment processing, notification services, and performance reporting. The system was developed using Python, Flask, SQLite, HTML, CSS, JavaScript, and Bootstrap. By digitizing daily operations, the proposed platform improves communication between administrators and electricians, reduces paperwork, enhances transparency, and enables real-time monitoring of project activities.

Keywords: Workforce Management, Electrician Management, Task Tracking, Flask Framework, Web Application, Project Monitoring.

1. INTRODUCTION

The rapid growth of digital technologies has transformed the management of industrial and service-based operations. Electrical contractors and service providers frequently encounter difficulties in coordinating field workers, monitoring project progress, maintaining inventory records, and ensuring timely payment processing. Manual management approaches often result in inefficient communication, delayed task completion, and inaccurate record keeping.

To address these challenges, the Electrician Work Management Platform was developed as a centralized

web-based system. The platform allows administrators to manage electricians, assign jobs, monitor task completion, maintain material inventories, and generate reports. Electricians can view assigned work, update task statuses, and receive notifications regarding project activities.

The system aims to improve operational efficiency while ensuring transparency and accountability throughout the project lifecycle.

2. PROJECT OVERVIEW

The Electrician Work Management Platform is a web-based management system designed to automate and simplify the daily activities of electrical service organizations.

The platform provides:

- User registration and authentication
- Electrician management
- Job assignment and tracking
- Task management
- Material inventory management
- Payment processing
- Reporting and analytics

3. PROBLEM STATEMENT

Electrical service providers often rely on manual processes for managing jobs and workers. These traditional methods create several problems:

- Difficulty in tracking job progress
- Lack of centralized record management
- Errors in inventory tracking
- Delayed payment processing

4. OBJECTIVE

The primary objectives of the proposed system are:

1. To automate electrician workforce management.
2. To simplify job and task assignment processes.
3. To maintain accurate inventory records.

5. LITERATURE SURVEY

A literature survey was conducted to understand existing workforce management systems, contractor management applications, and task scheduling platforms.

Study 1: Workforce Management Systems

Research on workforce management systems indicates that digital platforms help organizations optimize employee scheduling, task allocation, and performance monitoring.

Findings:

- Improved employee productivity.
- Better task scheduling.

Limitation:

Most systems are designed for general workforce management and do not address the specific requirements of electrical service operations.

Study 2: Contractor Management Systems

Contractor management systems are widely used in construction and maintenance industries to manage workers, projects, and resources.

Findings:

- Improved project tracking.
- Better resource management.

Limitation:

Limited support for real-time electrician task tracking and inventory management.

Study 3: Task Management Applications

Task management applications provide features such as task assignment, status tracking, notifications, and reporting.

Findings:

- Faster task completion.
- Improved team collaboration.

Limitation:

Most applications are generic and lack industry-specific customization.

Study 4: Inventory Management Systems

Inventory management systems help organizations maintain accurate stock records and monitor material usage.

Findings:

- Reduced material wastage.
- Better stock control.

Limitation:

Inventory systems often operate independently and are not integrated with workforce management.

6. SYSTEM ARCHITECTURE

The platform follows a three-tier architecture:

Presentation Layer

- It includes a HTML, CSS Bootstrap , JavaScript.

Application Layer

- Application layer including a Flask Framework, Job Management Module, Task Management Module, Inventory Module, payment module

Data Layer

- SQLite Database

7. METHODOLOGY

The development of the platform followed an Agile-based software development methodology.

Phase 1: Requirement Analysis

Requirements were gathered by studying the workflow of electrical service providers and identifying operational challenges.

Phase 2: System Design

System architecture, database schema, user roles, and module interactions were designed.

Phase 3: Development

The application was implemented using Python Flask. Individual modules such as authentication, job management, task management, inventory control, and payment processing were developed.

Phase 4: Testing

Functional testing was conducted to verify:

- Job assignment
- Task updates
- Inventory tracking
- Payment processing

8. DATABASE DESIGN

The Electrician Work Management Platform uses a relational database implemented with SQLite to store and manage system data.

Database Overview

The database consists of the following tables:

Users Table:-

The **Users** table stores information about all registered users of the system. It is responsible for authentication and authorization.

Purpose:

- Manage user accounts.
- Store login credentials securely.

Electricians Table:-

The **Electricians** table maintains detailed information about electricians working under the organization.

Purpose:

- Store electrician details.
- Facilitate job and task assignment.

Jobs Table:-

The **Jobs** table contains information about projects or work assignments created by administrators.

Purpose:

- Manage job records.
- Assign jobs to electricians.

Tasks Table:

A single job may contain multiple tasks.

Purpose:

- Assign specific tasks to electricians.
- Track task completion status.

Materials Table:-

The **Materials** table manages inventory information related to electrical materials used during project execution.

Purpose:

- Maintain stock records.
- Monitor material usage.

Payments Table:-

The **Payments** table records all financial transactions performed within the platform.

Purpose:

- Track payments related to jobs.
- Maintain transaction history.

9. MODULES IMPLEMENTED

User Authentication Module

Provides secure registration and login functionality using password hashing.

Features

- User Registration
- User Login
- Password Encryption

Electrician Management Module

Allows administrators to manage electrician profiles.

Features

- Add Electricians
- Update Information
- Delete Records

Job Management Module

Manages job creation and assignment.

Features

- Create Jobs
- Assign Electricians
- Track Job Status

Task Management Module

Handles individual tasks associated with jobs.

Features

- Create Tasks
- Assign Tasks
- Update Progress

Material Inventory Module

Tracks materials used during project execution.

Features

- Add Materials
- Monitor Stock
- Record Usage
- Inventory Updates

Payment Management Module

Facilitates transaction recording and payment tracking.

Features

- Payment Records
- Payment Notifications
- Status Monitoring

Reporting Module

Provides performance metrics and project statistics.

Features

- Completion Rate Analysis
- Material Statistics
- Dashboard Insights

10. RESULTS AND DISCUSSION

The developed system successfully automated the management of electricians and project activities.

Observed Outcomes

Parameter	Before System	After System
Job Tracking	Manual	Automated
Task Monitoring	Difficult	Real-Time
Inventory Tracking	Paper-Based	Digital
Payment Records	Manual	Centralized
Communication	Phone Calls	Notifications
Reporting	Time Consuming	Instant

Future Enhancements

The platform can be further improved by integrating:

- GPS-based electrician tracking
- AI-powered job scheduling
- Cloud database deployment

11. SNAPSHOTS

LOGIN PAGE

Electrician Work Management Platform

Welcome Back
Sign in to your account

Email Address
bhuvi96@gmail.com

Password

☐ Remember me [Forgot Password?](#)

Log In

Registration successful! You can now login.

DASHBOARD PAGE

Dashboard

Welcome back, Bhuvana!

Need some help? [Contact Support](#)

4 All Assignments

6 In Progress

3 Completed

AXILEX

ELECTRICIAN PAGE

Electricians

Search by name, email or phone

BH Bhuvana
Electrician

BH Bhuvana
Electrician

MA Mahesh
Electrician

5 091-2023

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PROFILE PAGE

My Profile

BH Bhuvana
Electrician

Security Settings

Username

Email

Phone Number

Current Password

New Password

Confirm Password

12. CONCLUSION

The Electrician Work Management Platform provides an effective solution for managing electrical service operations. By integrating workforce management, job assignment, task tracking, inventory monitoring, payment processing, and reporting into a single platform, the system significantly improves operational efficiency and organizational productivity. The use of modern web technologies ensures accessibility, scalability, and ease of maintenance. The successful implementation demonstrates the potential of digital solutions in transforming traditional contractor management processes and supports the growing need for automation in service-oriented industries.

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