Tab 1

📄 **Minor Project Report: STUDENT LABFIX**

TITLE OF THE PROJECT

STUDENT LABFIX: AN IOT COMPONENT LISTING AND ELECTRONIC DEVICE REPAIR SUPPORT SYSTEM

A MINOR PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DIPLOMA IN

COMPUTER SCIENCE & ENGINEERING

SUBMITTED BY

Raj Prakash Kumar

Roll Number: **2023-CSE-25**

UNDER THE GUIDANCE OF **Mr. NIKESH Pandit**, Lecturer, CSE Department
Mr. KAMLESH KUMAR, HOD & Mentor, CSE Department SUBMITTED TO Department of Computer Science & Engineering.

Government Polytechnic Raghopur, Supaul

Year: 2023- 2026

CANDIDATE'S DECLARATION

I, **Raj Prakash Kumar**, Roll Number **2023-CSE-25**, hereby declare that the work which is being presented in this minor project report entitled, **"STUDENT LABFIX: AN IOT COMPONENT LISTING AND ELECTRONIC DEVICE REPAIR SUPPORT SYSTEM"** in partial fulfillment of the requirements for the award of the Diploma in Computer Science & Engineering and submitted in the Department of Computer Science & Engineering, **Government Polytechnic Raghopur Supaul**, is an authentic record of my own work carried out by me under the supervision of **Mr. NIKESH Pandit** (Lecturer) and **Mr. KAMLESH KUMAR** (HOD, Mentor).

The matter presented in this Project Report has not been submitted in this or any other University/Institute for the award of any Diploma/Degree.

Signature of the Student

(.....))

Roll Number:

Dated: (.....)

CERTIFICATE

Certified that this minor project report **"STUDENT LABFIX: AN IOT COMPONENT LISTING AND ELECTRONIC DEVICE REPAIR SUPPORT SYSTEM"** is the bonafide work of **Raj Prakash Kumar (Roll No: 2023-CSE-25)**, who carried out the minor project work under my/our supervision.

Mr. NIKESH Pandit
Lecturer & Mentor
Department of CSE, GPR Supaul.

Mr. KAMLESH KUMAR
HOD & Guide
Department of CSE, GPR Supaul

ABSTRACT

The Minor Project Report presents the development of a web-based solution titled **"Student LabFix"**. The primary objective of this project is to streamline the management of electronics and Internet of Things (IoT) components and to establish an efficient system for reporting and tracking the repair status of various electronic devices within the college. The website provides a central database for listing all available IoT components in college labs, enabling better inventory management. Furthermore, it incorporates a repair support module where students and faculty can log issues related to faulty electronic devices, and track the progress of the repair process. This system aims to minimize equipment downtime and improve resource utilization in the college laboratories, providing a centralized and transparent solution.

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CHAPTER 1: INTRODUCTION

1.1 Project Overview

Educational institutions rely heavily on specialized equipment, including IoT devices and various electronic components, for practical learning. Managing the inventory of these components and ensuring the timely repair of faulty electronic devices is a significant administrative challenge. This minor project addresses these challenges by developing a web-based system named "**Student LabFix".** The website is designed to be a centralized platform for Listing and Managing IoT Components and providing Electronic Device Repair Support.

1.2 Problem Formulation

Currently, the process of checking component availability and reporting faulty equipment is manual and decentralized, leading to inaccurate component counts and a lack of transparency in the repair workflow. The **Student LabFix system** seeks to transform this process by introducing a digital, transparent, and efficient system

for resource management and repair reporting at **Government Polytechnic Raghopur Supaul.**

1.3 Objectives of the Project

- To design and develop a user-friendly website (**Student LabFix**).
- To create a comprehensive, searchable database for listing all IoT and electronic components.
- To implement a robust repair tracking module that allows users to submit and track repair requests.
- To enable system administrators **(Admin/HOD)** to efficiently manage and update the status of repair reports.
- To improve resource utilization and minimize the downtime of essential lab equipment.

1.4 Organisation of the Report

This report details the project, beginning with a Literature Survey (Chapter 2), followed by the System Design (Chapter 3), Implementation and Results (Chapter 4), and concluding with the Conclusion and Future Scope (Chapter 5).

CHAPTER 2: LITERATURE SURVEY

2.1 Introduction to Literature Survey

This chapter reviews relevant works concerning inventory management, asset tracking, and web-based repair support mechanisms to establish the technical foundation for the "**Student LabFix**" system.

2.2 Inventory Management Systems (IMS)

Reviewing existing Inventory Management Software and methods highlights the need for digitization. Traditional, manual methods result in data inaccuracy. The adoption of QR code/Barcode based inventory systems (as justified by [1]) and web-based solutions ([2]) proves crucial for improving component tracking in technical education environments.

2.3 Web-Based Repair and Ticketing Systems

The Repair Support feature is based on standard ticketing systems. Research into Help Desk/Ticketing Systems (like those discussed in [3]) provided insights into essential

features such as ticket generation, status tracking, and technician assignment. This section justifies the choice of a centralized maintenance management system ([4]) to ensure transparency and oversight.

2.4 Technology and Architecture Review

A study of modern web development frameworks and database management systems ([5]) helped in selecting a suitable technology stack (e.g., **Python/Django** with **MySQL**) that ensures the system is scalable, secure, and ***cost-effective for a college setting.***

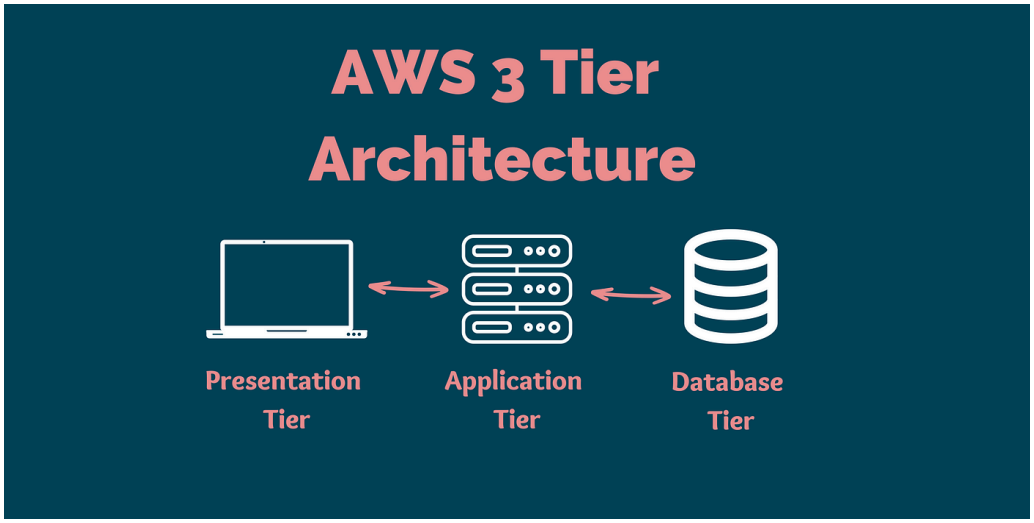
2.5 Identification of Research Gaps

Existing commercial solutions are often too complex or expensive. **Student LabFix** fills the gap by providing a customized, low-cost solution that specifically integrates IoT component inventory and general electronic device repair tracking onto a single, simplified platform tailored for polytechnic college use.

CHAPTER 3: SYSTEM DESIGN

3.1 System Architecture

The Student LabFix system utilizes the 3-Tier Architecture for robust functionality:
Presentation Tier: User interface (*HTML, CSS, JS*) visible to all users (*Students, Faculty, Admin*).
Application Tier: System logic and processing (*Backend Framework*). It validates requests and interacts with the database.
Data Tier: Stores all persistent data *(MySQL/PostgreSQL)* including component details and repair tickets.



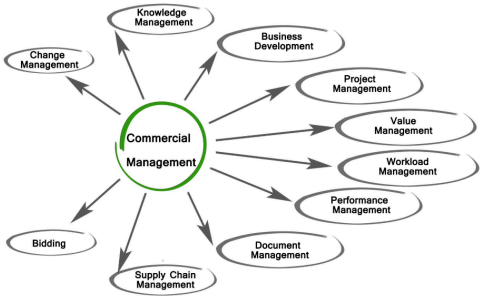
(FIGURE 3.1:)

3.2 Module Decomposition

The system is divided into three core modules:
User Management Module: Handles registration, login, and Role-Based Access Control (RBAC) for Students, Faculty, and Administrators.
Component Inventory Module: Manages the database of IoT components, allowing Admin to add/update stock and Users to search/view availability and location.
Repair Support and Tracking Module (The Ticketing System): Allows students to submit repair requests. Features include Ticket Assignment and Status Tracking (Pending, In Progress, Resolved) by the Admin/Technician.

3.3 Data Flow Diagram (DFD)

The DFD illustrates the movement of data: User/Student submits a Repair Request or views the Component List, whichq is processed by the System and updated in the Central Database.



(FIGURE 3.2:)

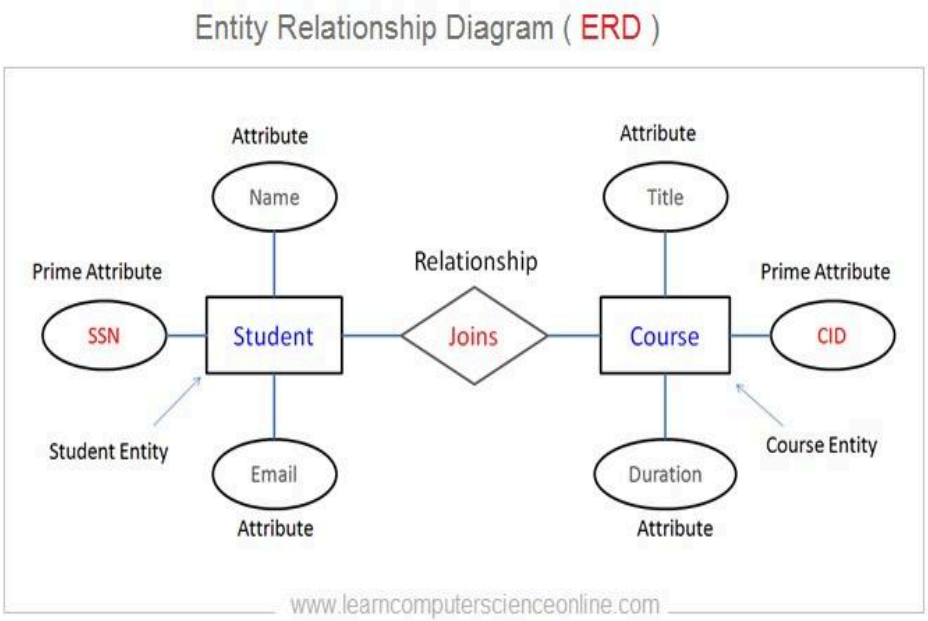
CHAPTER 4: IMPLEMENTATION AND RESULTS

4.1 Tools and Technology Stack

The project was built using the following stack:
Frontend: HTML5, CSS3, JavaScript.
Backend: Python (or chosen framework).
Database: MySQL (or chosen DBMS).

4.2 Database Design and Implementation

The database schema was designed using an Entity-Relationship (ER) Diagram to ensure efficient data integrity. Key tables implemented include Users, Components, and Repair_Tickets.



(FIGURE 4.1:)

4.3 Core Algorithms and Code Structure

4.3.1 Algorithm for Component Inventory Management

The core logic for updating available stock:

```
FUNCTION UpdateComponentStock(ComponentID,
ChangeQuantity):
    current_quantity = FETCH
Components.available_quantity WHERE ID =
ComponentID
    total_quantity = FETCH Components.total_quantity
WHERE ID = ComponentID

    new_quantity = current_quantity + ChangeQuantity
```

```
    IF new_quantity >= 0 AND new_quantity <=
total_quantity:
        UPDATE Components SET available_quantity =
new_quantity WHERE ID = ComponentID
        RETURN SUCCESS
    ELSE IF new_quantity < 0:
        RETURN ERROR "Stock cannot go below zero."
    ELSE:
        RETURN ERROR "Stock exceeds total inventory
capacity."
END FUNCTION
```

4.3.2 Algorithm for Repair Ticket Submission

The logic for creating a new repair request:

```
FUNCTION SubmitRepairTicket(Device, Location, Issue,
ReporterID):
    IF Device AND Location AND Issue ARE NOT EMPTY:
        ticket_id = GENERATE_UNIQUE_ID()

        INSERT INTO Repair_Tickets (ticket_id,
device_name, location, issue_description, reporter_id,
status, submission_date)
        VALUES (ticket_id, Device, Location, Issue,
ReporterID, 'Pending', CURRENT_TIMESTAMP)

        RETURN SUCCESS "Ticket created: " + ticket_id
```

```
    ELSE:
        RETURN ERROR "All fields must be filled."
END FUNCTION
```

4.4 Testing and Validation

Unit Testing ensured individual functions (login, stock update) worked correctly. **User Acceptance Testing** (UAT) was performed by initial users (mentors and fellow students) to validate that the system meets the real-world operational requirements of the college lab environment.

CHAPTER 5: CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

The Minor Project "**Student LabFix**" successfully delivered a centralized, digital platform that effectively manages IoT component inventory and provides a transparent repair tracking system. This system enhances lab efficiency and resource utilization at Government

Polytechnic Raghopur Supaul. The project met all set objectives, proving the viability of a customized web solution for institutional asset management.

5.2 Future Scope

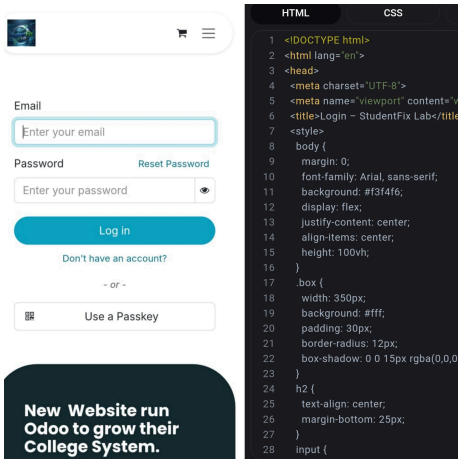
Future enhancements for the system include:
QR Code Integration: Implementing QR code generation for quick inventory auditing and fault reporting via mobile devices.
Automated Notifications: Integrating email/SMS alerts for status changes.
Analytics Dashboard: Developing advanced reporting features to analyze repair history and component failure trends.

5.3 Learning Outcome

Working on Student LabFix provided hands-on experience in full-stack web development, database design, and implementing complex business logic like the multi-stage ticketing system, applying theoretical knowledge to solve a real-world institutional problem.

CHAPTER 6: Login and Signup

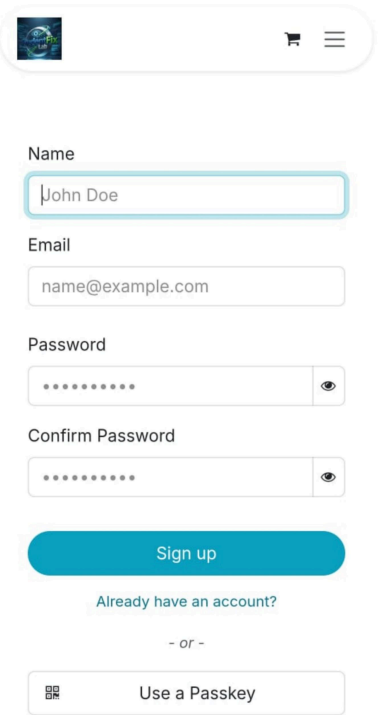
•*Login page*

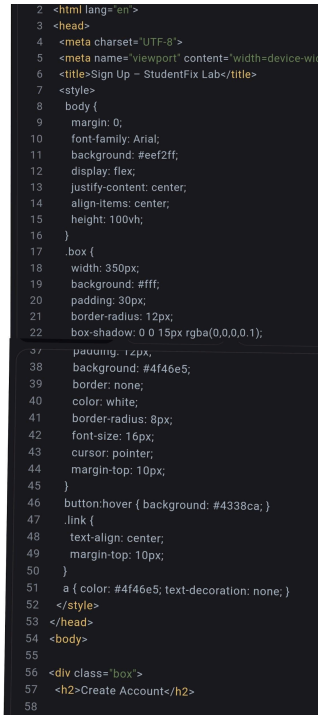


Key highlights of the login page include:

- Simple and clean user interface with clearly visible input fields.
- Email-based authentication for secure access.
- Password visibility toggle for user convenience.
- Reset Password option allowing users to quickly recover forgotten passwords.
- Account registration link (“Don’t have an account?”) for new users.
- Passkey login support, enabling faster and more secure logins.
- Fully mobile responsive design, optimized for smartphones and tablets.

- ***Signup Page***





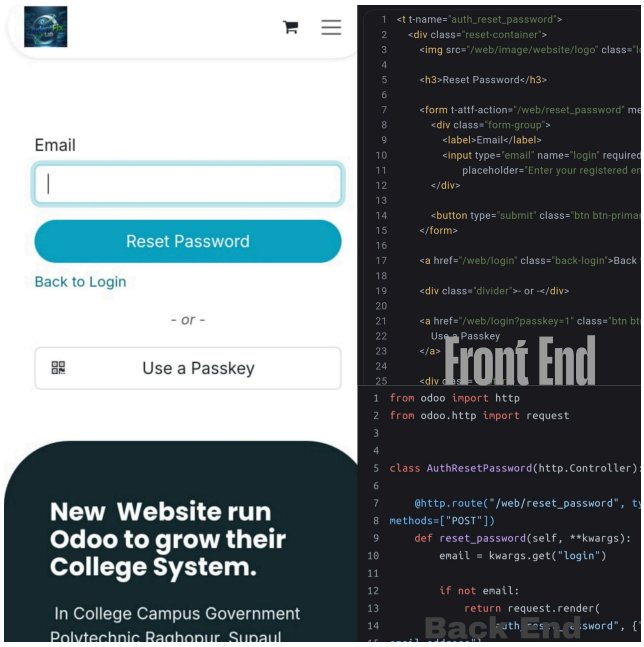
```
<html lang="en">
<head>
 <meta charset="UTF-8">
 <meta name="viewport" content="width=device-wi
 <title>Sign Up – StudentFix Lab</title>
 <style>
  body {
   margin: 0;
   font-family: Arial;
   background: #eef2ff;
   display: flex;
   justify-content: center;
   align-items: center;
   height: 100vh;
  }
  .box {
   width: 350px;
   background: #fff;
   padding: 30px;
   border-radius: 12px;
   box-shadow: 0 0 15px rgba(0,0,0,0.1);
   padding: 12px;
   background: #4f46e5;
   border: none;
   color: white;
   border-radius: 8px;
   font-size: 16px;
   cursor: pointer;
   margin-top: 10px;
  }
  button:hover { background: #4338ca; }
  .link {
   text-align: center;
   margin-top: 10px;
  }
  a { color: #4f46e5; text-decoration: none; }
 </style>
</head>
<body>

<div class="box">
 <h2>Create Account</h2>
```

Key features of the signup page include:

- Simple and intuitive registration form with fields for Name, Email, Password, and Confirm Password.
- Password visibility option to reduce typing errors during registration.
- Secure account creation using Odoo’s backend authentication and encryption.
- Validation system that prevents incorrect or incomplete user details.
- Link to Login Page for users who already have an account.

- Passkey registration support, allowing faster and more secure account creation.
- Fully responsive layout, optimized for both mobile and desktop devices.

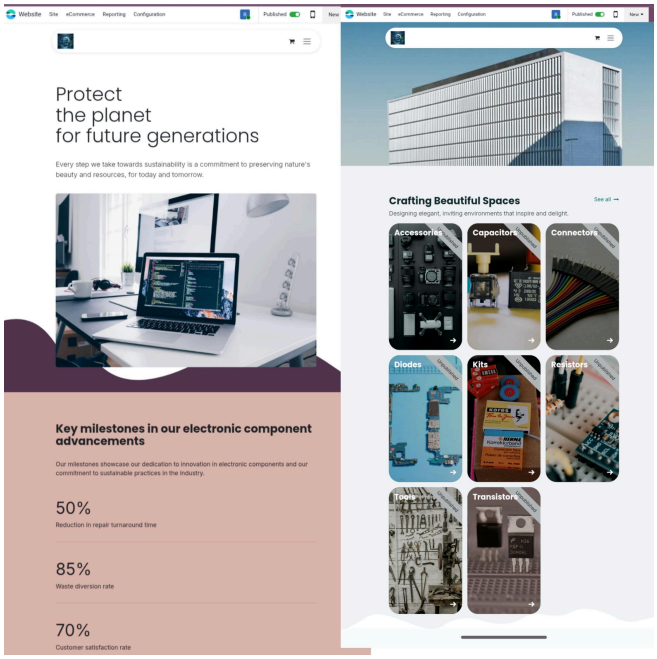
•***Reset Password***

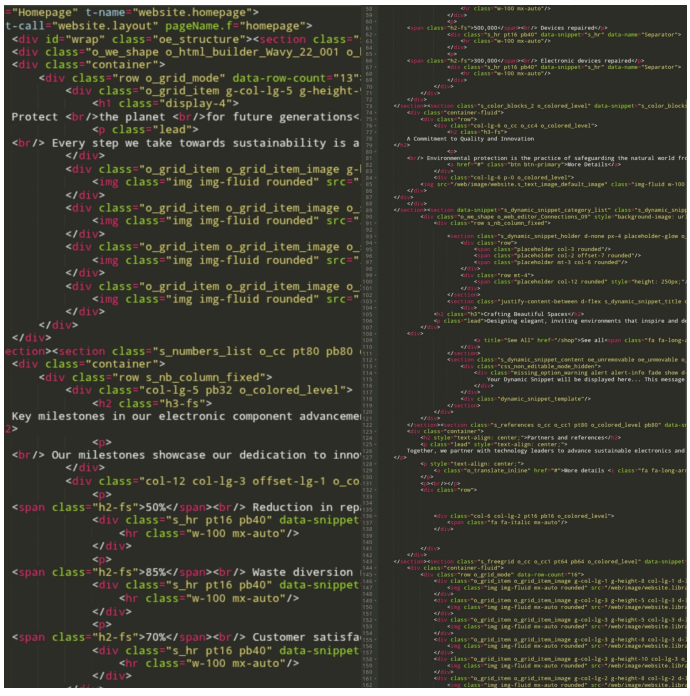


⭐ ***Key Features:***

- Email-based password recovery
- Clean and responsive design
- One-click “Reset Password” button
- Back to Login navigation
- Passkey-based login option for modern authentication
- Secure backend that sends auto-generated reset links
- College branding displayed at bottom

CHAPTER 7: Homepage





1. Modern & Clean Homepage Layout

- Website का homepage modern, responsive और visually appealing design पर आधारित है।
- Top header में navigation options (Website, eCommerce, Reporting, Configuration) और cart icon मौजूद है।

2. Category Showcase Section

Homepage पर electronics से जुड़े मुख्य categories grid layout में दिखते हैं:

- **Accessories**
- **Capacitors**
- **Connectors**
- **Diodes**
- **Kits**
- **Resistors**
- **Tools**
- **Transistors**

3. Innovation Section

- Heading: “Innovating Electronics for a Sustainable Future”
- Electronics और sustainability को जोड़ते हुए vision और mission बताया गया है।
- Button: “Join the Revolution in Electronics”

#About Us Page

1. Our Team Overview

- टीम में Diploma in Computer Science Engineering के छात्र शामिल हैं।
- सभी सदस्य IoT, Web Development, Automation और AI जैसे modern technologies पर काम करते हैं।

- टीम का उद्देश्य:

✔ Innovative projects विकसित करना
✔ Real-life problems को technology से solve करना
✔ IT field में strong career बनाना

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3. Team Members Summary

1. Mr. Raj Prakash Kumar

Qualification: Diploma in Computer Science Engineering
Technical Interests:

- IoT
- Python development
- Web applications
- AI systems

Role: टीम के lead developers में से एक, जो complex technical modules को handle करते हैं।

2. Ravi Kumar

Qualification: Diploma in Computer Science Engineering

Key Qualities:

- Discipline
- Creativity
- Quick learner

Strength: नई technologies को सीखकर implement करने में सक्षम।

3. Amit Kumar
Qualification: Diploma in Computer Science Engineering

Experience Areas:

- Web development
- IoT systems
- Biometric automation
- AI-based solutions

Role: Hardware + software integration में specialist।

4. Rajdeep Kumar
Qualification: Diploma in Computer Science Engineering
Career Goal: IT field में अपना मजबूत career बनाना
Strength: Innovative projects पर काम करके technical skills को improve करना।

5. Ankit Kumar
Qualification: Diploma in Computer Science Engineering
Key Qualities:

- Discipline
- Creativity
- Quick learner

Strength: नई technologies को सीखकर implement करने में सक्षम।

4. Purpose of About Us Page

- Visitors को project के पीछे की team से परिचित कराना।
- Team की technical capability और professionalism दिखाना।
- Website की credibility बढ़ाना।

5. Overall Highlights

- Professional team profile presentation
- Clear qualification and skills mentioned
- Students द्वारा developed एक real working website (Odoo platform)
- Teamwork, creativity और modern technologies पर फोकस

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