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Development of a Web-Based Student Management and College CRM System

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Abstract: ***Managing student information efficiently is a critical requirement for modern educational institutions. Manual record keeping and spreadsheet-based systems often result in data redundancy, inaccuracy, and administrative delays. This paper presents the design and implementation of a web-based College Customer Relationship Management (CRM) system developed using React.js. The proposed system provides a centralized dashboard to manage student records, monitor fee payment status, and display real-time statistics. The system adopts a modular component-based architecture to ensure scalability and maintainability. Experimental evaluation demonstrates improved data organization, reduced manual workload, and enhanced user experience. The developed solution provides a foundation for future integration with backend services and cloud-based deployment.***

Keywords: College CRM, Student Management System, React Application, Dashboard System, Fee Monitoring, Web Development.

I. INTRODUCTION

Digital transformation in educational institutions has become essential for efficient academic administration. Colleges handle large volumes of student data including admissions, course enrollment, academic year information, and financial records. Traditional manual systems or basic spreadsheet tools are inefficient for managing such data at scale.

A College Customer Relationship Management (CRM) system is designed to centralize student-related operations into a unified digital platform. The main objective of this project is to develop a responsive and user-friendly College CRM dashboard that simplifies student data management and fee tracking using modern web technologies.

The proposed system focuses on:

1) Centralized student record management
2) Real-time dashboard statistics
3) Fee payment tracking
4) Improved administrative productivity
5) Scalable system design

II. PROBLEM STATEMENT

Many small and medium-sized institutions still rely on manual or semi-digital systems for student record management. These systems suffer from:

1) Data duplication
2) High probability of human error
3) Time-consuming updates
4) Lack of real-time reporting
5) Limited accessibility

There is a need for a lightweight, modern, and scalable web-based solution that can address these issues effectively.

III.OBJECTIVES

The primary objectives of the proposed College CRM system are:

1) To develop a web-based platform for managing student records.
2) To provide real-time dashboard analytics.
3) To track student fee payment status.
4) To design a responsive and user-friendly interface.
5) To ensure modular and scalable architecture.

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IV. SYSTEM ARCHITECTURE

A. Overall Architecture

The system follows a frontend-based architecture using React.js. The architecture consists of:

- User Interface Layer
- Component Logic Layer
- State Management Layer

The application uses React Hooks (useState) for managing student data dynamically. The system operates as a single-page application (SPA) ensuring fast rendering and improved user experience.

B. Functional Modules

1) Dashboard Module

The dashboard provides key statistical indicators:

- Total number of students
- Number of students with pending fees
- Institutional capacity overview

These values are calculated dynamically from the student data array.

2) Student Registration Module

This module allows administrators to:

- Add student name
- Add course details
- Add academic year
- Automatically assign fee status

Each new student is assigned a unique ID, and the fee status is initialized as "Pending".

3) Student List Module

The student list displays structured tabular data including:

- Student ID
- Name
- Course
- Academic Year
- Fee Status

The table updates automatically whenever new data is added.

V. TECHNOLOGY STACK

Layer	Technology Used
Frontend	React.js
Styling	Tailwind CSS
UI Components	ShadCN UI
State Management	React Hooks

Table I
SYSTEM COMPARISON

The selection of React.js ensures component reusability, fast rendering using Virtual DOM, and improved maintainability.

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VI. IMPLEMENTATION DETAILS

The student records are stored as an array of objects. Each object contains:

1) id
2) name
3) course
4) year
5) fees

The system calculates dashboard metrics using JavaScript functions:

Total Students:

Total = students.length

Pending Fees:

Pending = students.filter(student => student.fees === "Pending").length

The system ensures real-time updates without page refresh.

VII. RESULTS AND PERFORMANCE ANALYSIS

The developed College CRM system was tested with multiple student entries. The system demonstrated:

1) Accurate real-time data updates
2) Responsive layout across devices
3) Smooth UI interaction
4) Reduced manual calculation errors

Comparison with manual systems shows:

Parameter	Manual System	Proposed CRM
Data Accuracy	Medium	High
Speed	Low	High
Data Retrieval	Slow	Instant
Maintenance	Difficult	Easy

The system improves administrative efficiency and reduces processing time.

VIII. ADVANTAGES

1) Simple and intuitive dashboard
2) Real-time statistics
3) Modular architecture
4) Easy to expand with backend integration
5) Cost-effective solution

IX.. LIMITATIONS

1) No database integration (currently in-memory)
2) No authentication system
3) No role-based access control
4) No report export functionality

X. FUTURE SCOPE

The system can be enhanced by integrating:

1) Backend using Node.js or Django
2) Database such as MongoDB or MySQL
3) Authentication and authorization system
4) Payment gateway integration
5) Excel/PDF report generation
6) Cloud deployment

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XI. CONCLUSION

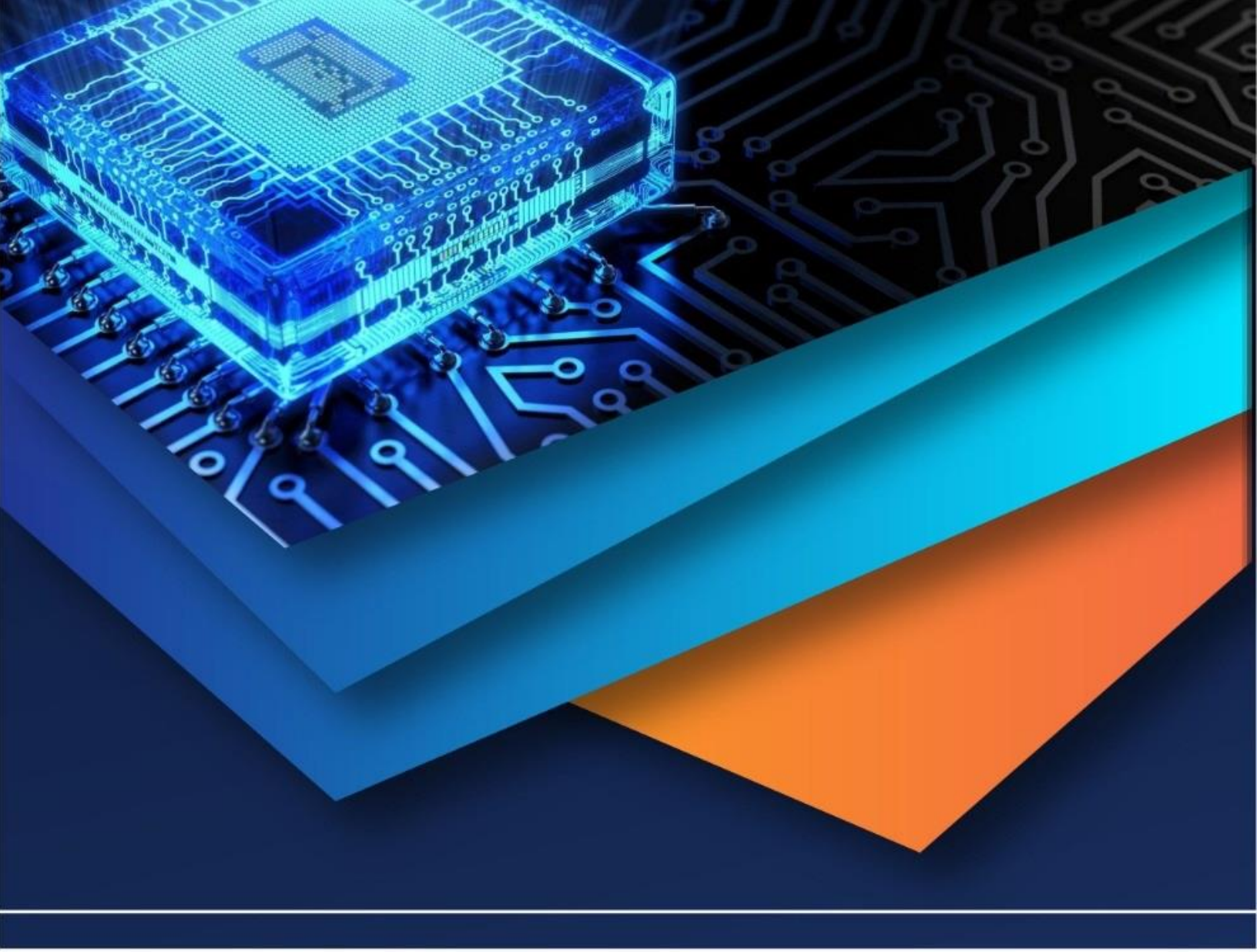
This paper presented the design and development of a web-based College CRM system using React.js. The system provides an efficient platform for managing student data and tracking fee status through a centralized dashboard.

The modular and scalable architecture allows future expansion and integration with advanced technologies. The proposed solution demonstrates how modern web development frameworks can enhance institutional administrative efficiency.

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