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Mobile Application for Computer Engineering Department to Improve Students' Skillsets

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Abstract: The objective of this project is to design and implement a mobile application for the Computer Engineering Department that helps students improve their academic skillsets. Developed using Flutter and Dart, the application provides year-wise access to academic resources such as notes, assignments, timetables, faculty details, events, quizzes, and CGPA calculators. Additionally, it offers a profile management system and an in/out notification feature. The proposed system provides a centralized, user-friendly platform for students and faculty, encouraging interactive learning and timely communication.

Keywords: Flutter, Dart, Academic Mobile App, Quiz Module, Notification System, CGPA Calculator, Notes Management.

I. INTRODUCTION

In today's educational environment, students often face challenges in organizing their academic materials and staying updated with departmental activities. Traditional systems of resource sharing are fragmented and inefficient. With the increasing penetration of mobile devices, there is a demand for smart applications that can support students academically while providing faculty with easy-to-manage communication tools. This paper presents a mobile application that bridges the communication and resource-sharing gap in the Computer Engineering Department.

The growth of mobile technology has revolutionized communication and learning approaches, particularly in the academic sector. With students becoming more reliant on mobile devices for everyday learning and interaction, there is an urgent need for department-specific applications that cater to the unique curriculum and academic structure of individual departments. The Computer Engineering Department, being highly dynamic and technology-oriented, stands to benefit immensely from such a system. Our proposed solution is a year-wise modular mobile application that centralizes educational content, departmental updates, and academic utilities. By integrating essential features like a CGPA calculator, assignment uploads, event updates, and personalized profiles, the application encourages self-paced learning, consistent communication, and timely information access. This initiative not only supports academic performance but also enhances the overall student experience and departmental functioning.

II. LITERATURE REVIEW

Several mobile applications had been evolved inside the schooling region that specialize in gaining knowledge of control, student development, and collaboration. applications like Google lecture room, Moodle, and Vedic App provide features like assignments, quizzes, and notifications. but, those systems are not tailored mainly to the needs of a computer Engineering branch. Our application pursuits to offer a branch-specific enjoy combining a couple of educational utilities in a single platform.

Google study room streamlines the technique of challenge distribution, grading, and communication. however, it's far closely reliant on net connectivity and lacks personalization for branch-based totally facts organization. further, Moodle, although open-source and customizable, demands sizable setup and renovation, which may not be feasible for smaller establishments or departments with restrained technical assets.

The Vedic App, developed for college control, consists of modules which includes attendance tracking, pupil overall performance assessment, and rate control. while it is comprehensive, its complexity might also restrict ease of use, particularly when catering to a particular branch like laptop Engineering.

Studies including "cell mastering in higher education: A assessment of Case research" (Alrasheedi & Capretz, 2015) spotlight the significance of tailoring academic mobile apps to unique instructional settings to improve relevance and engagement. custom-constructed programs, as discussed inside the paintings by A. Saxena (2018) on "function of mobile programs inside the training quarter," emphasize the advantages of person-centric,path-specificfunctionalities.

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Despite the life of preferred-purpose instructional platforms, there may be a clear gap in solutions that address department-stage instructional workflows — along with 12 months-wise difficulty categorization, quiz-based skill assessment, and tailored notification structures. Our proposed cellular application particularly addresses those gaps through integrating middle educational needs of the computer Engineering department into a single, clean-to-use gadget. unlike the aforementioned answers, our app makes a speciality of simplified deployment, minimum college schooling, and most pupil application through smooth UI and modular design powered with the aid of Flutter and Supabase.

III. METHODOLOGY

The proposed cellular software is designed using a modular method to make certain scalability, maintainability, and an intuitive person interface. The whole application is established in a yr-clever manner to cater to students from all 4 years of the computer Engineering branch.

A. System architecture

The structure follows a client-server model in which the cell software acts as the purchaser advanced the usage of Flutter and Dart. Supabase serves as the backend for statistics control, garage, and consumer authentication. All key interactions—which includes fetching notes, uploading assignments, and dealing with quizzes—are accomplished through API calls.

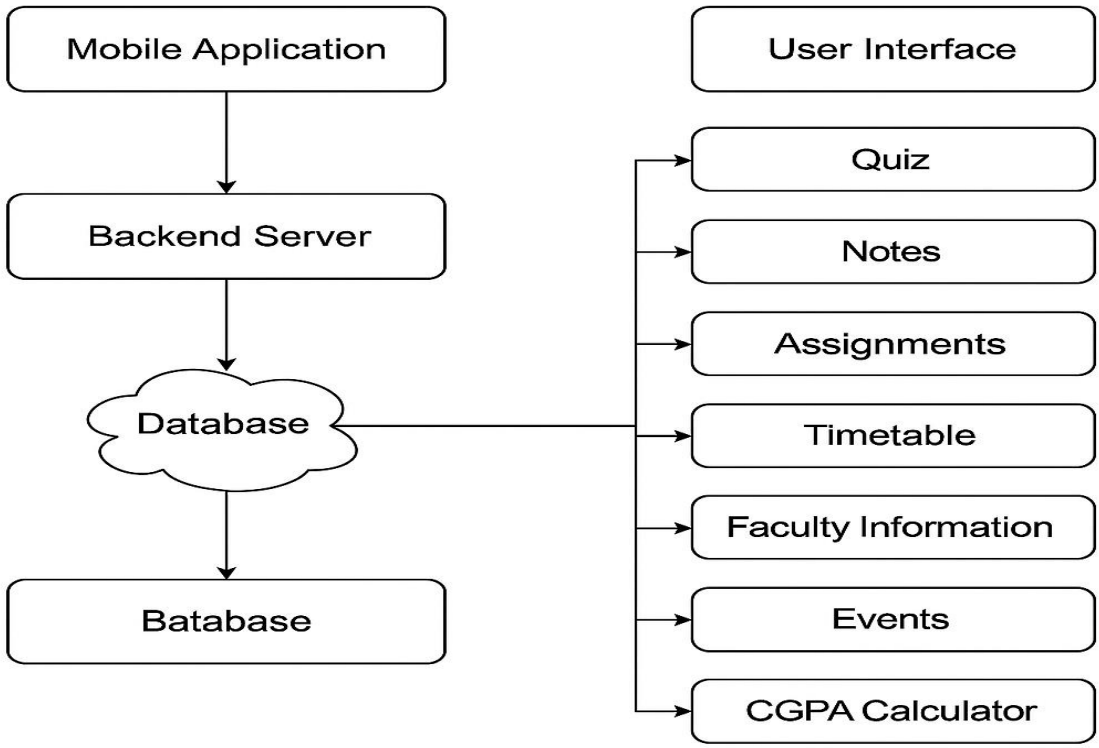

Figure 1: System Architecture and Functional Block Diagram

B. Useful Modules

• Notes: yr-sensible classified notes for each subject are uploaded by way of school and accessed by means of college students.

• Assignments: school can upload assignments; college students can publish them via the app. repute tracking is likewise to be had.

- Timetable: Dynamic and visually structured timetable handy to every year.
- Faculty records: shows distinctive college profiles along with touch facts.
- Activities: Upcoming and beyond departmental occasions with info, snap shots, and venue.

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• Quiz Module: includes subject-particular MCQs to track scholar mastering and overall performance.

• Profile: college students can view and edit their non-public instructional profiles.

• CGPA Calculator: students can calculate their CGPA by coming into semester-wise grades.

• Notification gadget: enables in/out monitoring and sends real-time notifications.

IV. TECHNOLOGY USED

The cellular software program is advanced using a modern generation stack designed for scalability speedy improvement and pass-platform compatibility the selected era are selected based totally on regular ordinary overall performance ease of integration and sturdy community assist

1 Flutter
Purpose frontend ui improvement language dart why flutter flutter is an open-supply ui framework advanced thru google it permits builders to create natively compiled packages for each android and ios from a single codebase appreciably reducing improvement time and effort its skills encompass expressive ui layout warm reload for actual-time updates at some stage in improvement and a sizeable library of customizable widgets making it fine for constructing responsive and visually appealing individual interfaces

2 Dart
Purpose programming language for flutter dart is a client-optimized programming language stated for its strong typing earlier-of-time aot compilation for immoderate average overall performance and superb useful resource for asynchronous programming the ones competencies are specially useful for handling actual-time functionalities collectively with notifications file uploads and facts fetching in the app

3 Supabase
Cause backend-as-a-service baas modules carried out authentication lets in comfortable login and registration for college kids and college the use of otp realtime database manages established academic facts like notes assignments activities and quiz records in actual-time storage buckets used for storing pdfs photographs challenge submissions and profile images apis car-generated restful apis offer clean and secure data get right of entry to minimizing the need for custom backend coding supabase is an open-deliver opportunity to firebase with nearby postgresql resource allowing efficient querying and control of based information

4 Firebase
Optionally to be had use motive push notifications firebase cloud messaging fcm is optionally covered to deliver actual-time indicators and updates to users those encompass notifications approximately upcoming timetable modifications and departmental announcements

5 Rest apis
Rest apis are performed to facilitate secure and green verbal exchange most of the frontend and backend middle functionalities like fetching notes filing quizzes and updating character profiles depend upon authenticated api calls ruled through supabases characteristic-based totally get admission to manipulate

6 Git github
Version control is controlled using git with github serving because of the truth the collaboration platform this setup permits for seamless organization collaboration hassle tracking and prepared manipulate of the improvement lifecycle

7 Design
Gadget figma and canva are used for ui wireframing and developing in-app photographs which consist of banners icons and illustrations these system help make sure a smooth intuitive and consumer-quality layout

V. IMPLEMENTATION

The mobile application was developed using **Flutter** for the front-end and **Supabase** for backend services, enabling seamless cross-platform functionality and real-time data management. The system was modularly designed, with each core feature—such as assignments, quizzes, and user profiles—developed and tested in isolation to guarantee optimal individual performance. Subsequent **integration testing** ensured cohesive interaction between all modules.

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Authentication and Access Control

Secure user authentication and role-specific permissions were managed through **Supabase Auth**. This allowed differentiated access, where students could interact with year-wise academic content, while faculty members retained control over uploading educational resources and managing student submissions.

UI and Backend Integration

The user interface was crafted using a thoughtful blend of **stateful and stateless widgets**, resulting in a responsive and efficient layout across various screen sizes. Real-time data—such as class schedules and upcoming events—was retrieved from Supabase through **API calls**, then elegantly rendered using **grid** and **card-based layouts** for better visual engagement and clarity.

VI. RESULT

The application was tested among 30 students across all four years. The feedback showed improved engagement with departmental activities and easier access to academic materials. Below are some screenshots representing core functionalities of the application:

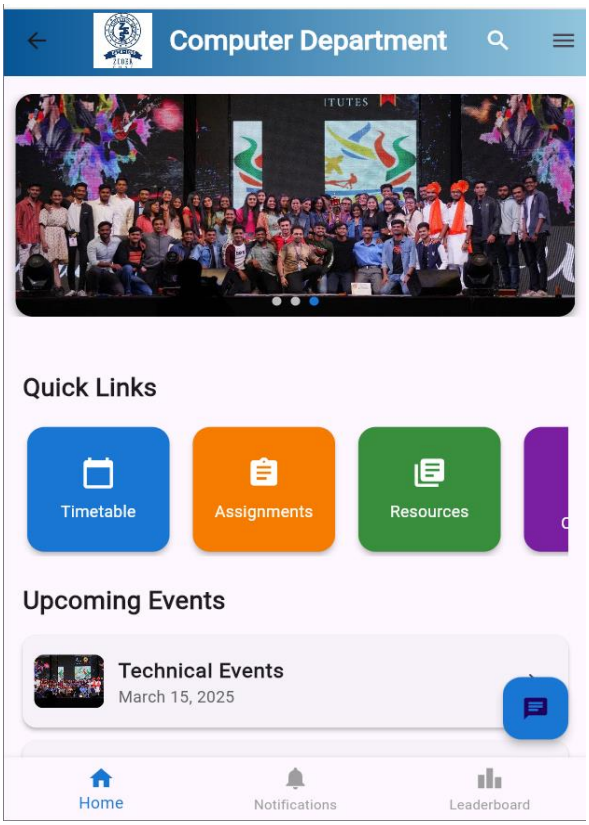
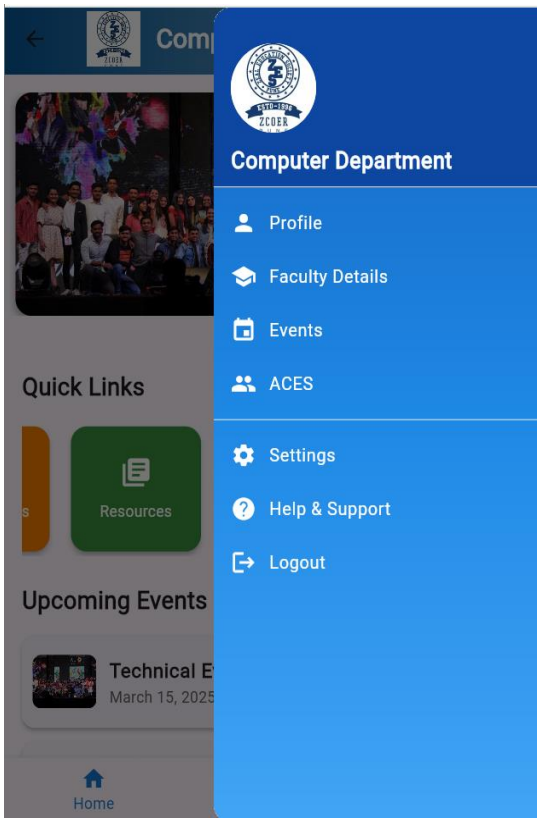


Figure 2: Homepage Figure



3: Profile Page

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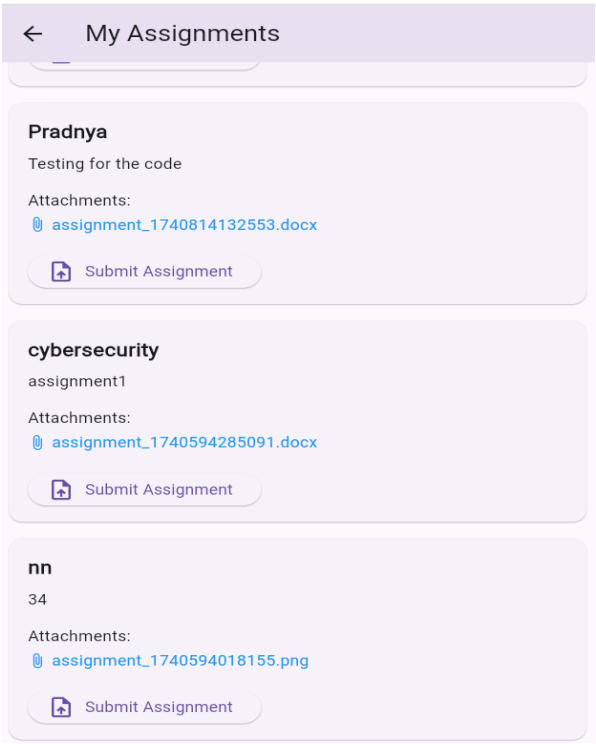

Figure 4: Assignments Management

Figure 5: CGPA Calculator

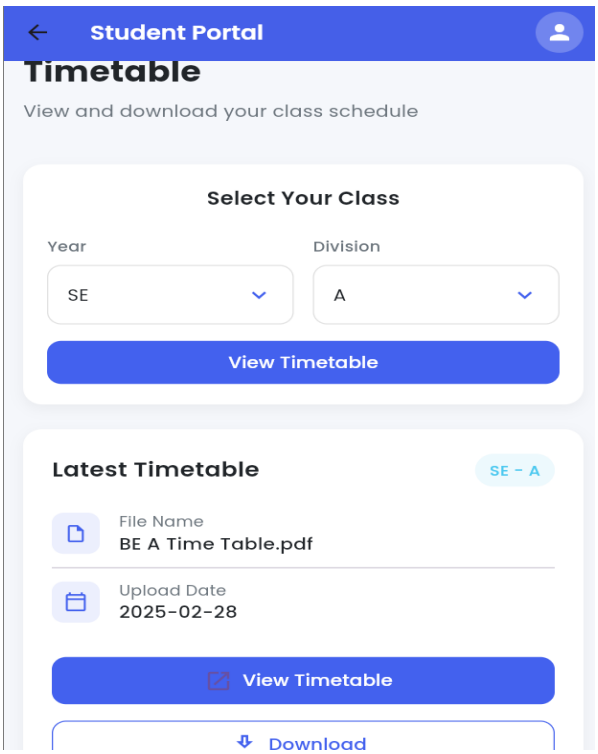

Figure 6: Timetable Management

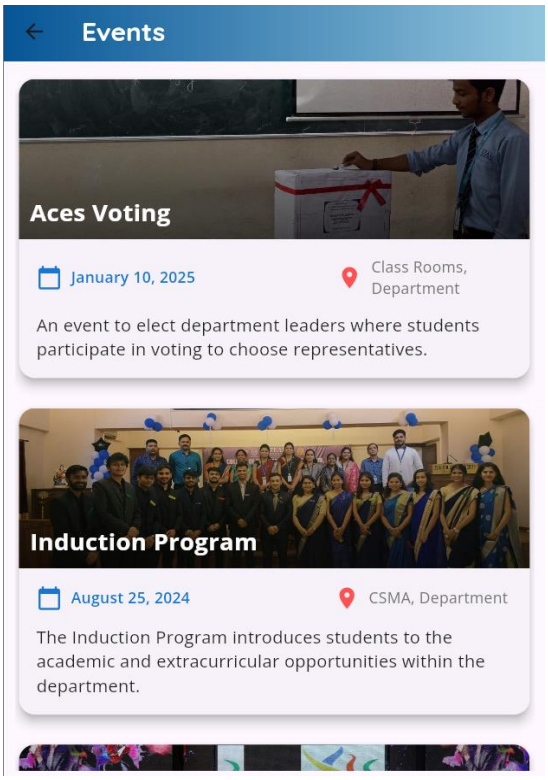

Figure 7: Events Details

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Feature

FEATURE	BEFORE IMPLEMENTATION	AFTER IMPLEMENTATION
Notes Access	Manual sharing via WhatsApp	In-app organized access
Assignment Handling	Paper submissions / Emails	Direct upload and submission via app
Event Awareness	Poster-based / Word-of-mouth	App notifications and details
Timetable Access	Printed or PDF format	Dynamic in-app view

Survey Result

A post-deployment survey was conducted involving 50 students to evaluate the impact of the academic mobile application. The responses revealed the following key insights:

- **92%** of participants experienced enhanced accessibility to study materials and lecture notes.
- **87%** reported a more streamlined and efficient assignment submission process.
- **81%** found the event notification feature helpful for staying informed about departmental updates.
- **78%** noted that the integrated timetable feature improved their ability to manage academic schedules effectively.

These findings reflect a substantial positive shift in both academic engagement and ease of access to essential resources after the app's implementation.

V. CONCLUSION

Feedback from students confirms the application's success in delivering a user-friendly and impactful solution for academic needs. High satisfaction scores underscore the app's role in simplifying processes and improving overall student involvement in departmental activities. The intuitive design and seamless navigation have fostered regular usage, reinforcing the app's practicality. By bridging conventional academic systems with modern digital solutions, the application not only supports flexible learning but also ensures uninterrupted access to key educational services. This framework presents a robust and adaptable model that holds the potential for replication across various departments and institutions aiming to modernize their academic management systems and support student growth effectively.

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