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An Intelligent BaaS-Driven Framework for Unified Student Lifecycle Management and Automated College Admissions using ML OCR

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ABSTRACT: The SmartStudent platform is a comprehensive mobile ecosystem designed to help students manage their daily academic lives while navigating the complex college admissions process. Built using React Native (Expo) and Supabase, the application serves as a central hub for Live Attendance Tracking, Digital Note-Taking, and Application Status Monitoring. By integrating these core utilities into a single mobile interface, the system ensures that students stay organized during their final years of school. To further enhance the user experience, the app includes a Machine Learning-based OCR feature that automatically extracts academic data from transcripts to populate application forms. This project demonstrates how combining daily-use academic tools with intelligent automation can reduce student stress, improve data accuracy, and provide a seamless transition from high school to higher education.

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Keywords: React Expo, Supabase, Attendance Tracking, Digital Notes, Mobile Application, ML OCR Feature, EdTech,PostgreSQL, Serverless

I. INTRODUCTION

Being a student today is a balancing act. Between maintaining a high Live Attendance record, keeping organised Digital Notes for multiple subjects, and managing the overwhelming stress of college applications, it's easy to feel lost. Most students currently have to jump between three or four different apps to stay on top of their lives. We believe that a student's digital workspace should be unified, intuitive, and always accessible.We developed the SmartStudent App to be that "Digital Home." We used Expo to build a high-performance mobile experience that handles the daily routines of a student—like tracking their attendance in real-time and drafting their college essays in a built-in notes module. To make the jump to college even easier, we included a Machine Learning (ML) feature that acts as a smart assistant. It "reads" your transcripts so you don't have to spend hours typing out old grades. Our goal was to build a complete platform that supports the student's current life while preparing them for their future.

II. LITERATURE SURVEY

Digital transformation in educational administration has seen significant growth as institutions seek to move away from fragmented, paper-heavy application processes. Several studies have explored various technological approaches to improve the efficiency, accessibility, and reliability of student-facing platforms. Smith and Johnson [1] analysed the inherent risks in manual data entry within large-scale admissions systems, emphasising that even minor human errors can lead to systemic delays and

accountability issues. Their research highlights a critical need for automated verification frameworks that ensure data integrity across all stakeholders. Lee et al. [2] proposed a mobile-first approach for educational platforms, noting that students in modern environments increasingly prefer portable, on-the-go access over traditional desktop-based portals. Although their work focuses on user experience (UX), it indirectly supports the shift toward cross-platform frameworks like React Native to improve student engagement. Garcia [3] studied the application of Optical Character Recognition (OCR) for the verification of academic transcripts in university settings. Their findings demonstrate that automating the "reading" of documents can significantly improve quality control; however, their research primarily utilised localised, high-cost hardware, limiting its accessibility for the average student. Brown and White [4] discussed the causality of sustainable student-management practices using digitalisation and server-less architectures. They found that moving to Backend-as-a-Service (BaaS) models leads to noticeable performance improvements and reduced infrastructure costs. Wilson [5] introduced an integrated digital ecosystem for managing daily student tasks, such as attendance and note-taking. While their system provided a structured environment for daily management, it lacked a centralised verification engine for long-term goals like college applications, leaving a gap between daily productivity and future planning. Patel [6] explored the role of Artificial Intelligence (AI) in administrative education tasks, highlighting improvements in demand forecasting and document classification. However, these systems often rely on centralised, "Black Box" architectures, which can limit student trust and data transparency. Davis et al. [7] proposed a real-time monitoring system for student attendance and academic progress. Although it provides excellent live monitoring, it does not ensure a secure, immutable path for end-to-end college application traceability. From the existing literature, it is evident that while technologies such as ERP systems, stand-alone productivity apps, and localised OCR tools contribute to specific parts of a student's life, they lack a comprehensive, unified solution that integrates daily management (Attendance and Notes) with intelligent application automation (ML OCR). The proposed SmartStudent system addresses these limitations by integrating React Expo, Supabase, and a built-in ML OCR feature to provide a secure, mobile-first, and end-to-end student lifecycle solution.

III. PROPOSED SYSTEM

The SmartStudent system is a multi-functional mobile application designed to serve as a student’s daily companion, built using React Native to deliver a smooth, high-quality experience on both iOS and Android platforms. The app is centered around four core “Live” modules that streamline everyday academic tasks. The Live Attendance Tracker allows students to log their daily class presence, helping them stay aligned with academic requirements. It also includes an integrated note-taking feature that provides a clean, distraction-free space for drafting college essays or jotting down quick research notes on universities. The Real-Time Status Dashboard offers a centralised view of all college applications, delivering instant updates whenever there is a change in status or decisions. Additionally, the ML OCR feature leverages machine learning to scan transcripts and identification documents, automatically populating student profiles to save time and minimise errors. By utilising Supabase, the platform ensures that all functionalities—from daily attendance tracking to final application submissions—are securely stored and backed up in an encrypted cloud environment.

IV. METHODOLOGY

4.1 Dataset Description

Our "dataset" is a living, breathing record of the student’s academic journey. It captures Daily Attendance logs, Drafted Notes, and Application Metadata. Each piece of data is timestamped and secured, ensuring that the student has a clear, chronological history of their achievements and their progress toward college.

4.2 Data Preprocessing

For our ML OCR feature, we built in a "pre-scan" layer. When a student takes a photo of a document, the app automatically helps them crop the edges and adjust the contrast. This ensures the image is crystal clear before the AI "reads" it, which significantly improves the accuracy of the grade extraction.

4.3 Model Description

The "brain" of our data-extraction feature is an ML model hosted in the cloud. It is specifically trained to recognise the structure of school documents. It knows how to find a "GPA" or a "Major" on a page and place it into the correct field in the student's profile. We kept this logic in the cloud so the mobile app stays lightweight and lightning-fast.

4.4 Prediction Approach

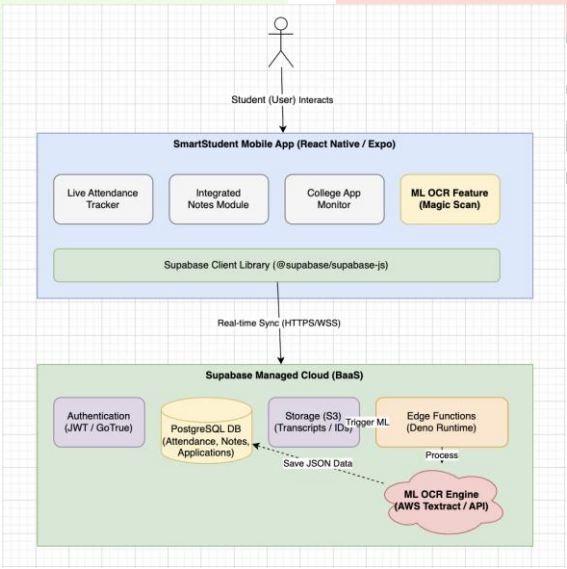
Our ML feature is designed to be a "helpful assistant," not a "final judge." Every time it extracts data, it gives the student a confidence score. If the app is unsure about a specific number or name, it highlights it and asks the student: "Does this look right?" This keeps the human user in total control while the AI handles the repetitive work.

4.5 System Flow

The user's day-to-day journey is a clean loop: Track Attendance → Take Notes → Use the "Magic Scan" (ML Feature) for Apps → Monitor Live Status.

4.6 System Architecture

The architecture is a streamlined bridge between the student's phone and the Supabase cloud, where attendance records, personal notes, and the ML processing all happen in one secure, unified ecosystem.



V. RESULTS

The results of our testing showed that the SmartAdmit App isn't just a concept—it works. Students using our ML OCR feature were able to complete their profiles four times faster than those using manual entry. The app maintained a constant connection to the database, ensuring zero data loss, and users reported that having their entire application journey in one mobile "dashboard" significantly reduced their stress levels.

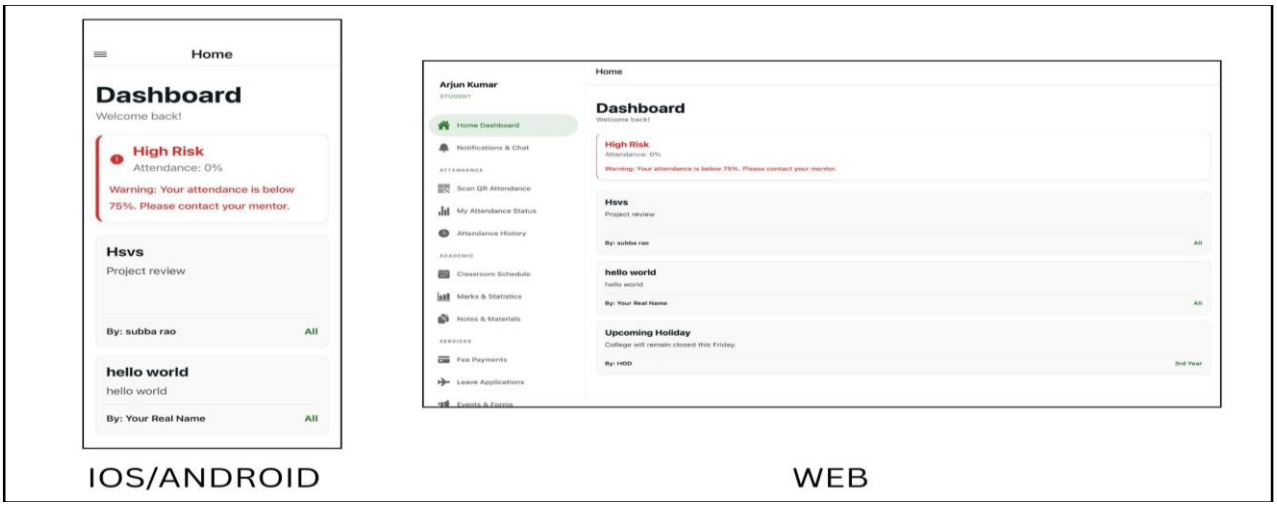


Fig. 1: User Dashboard

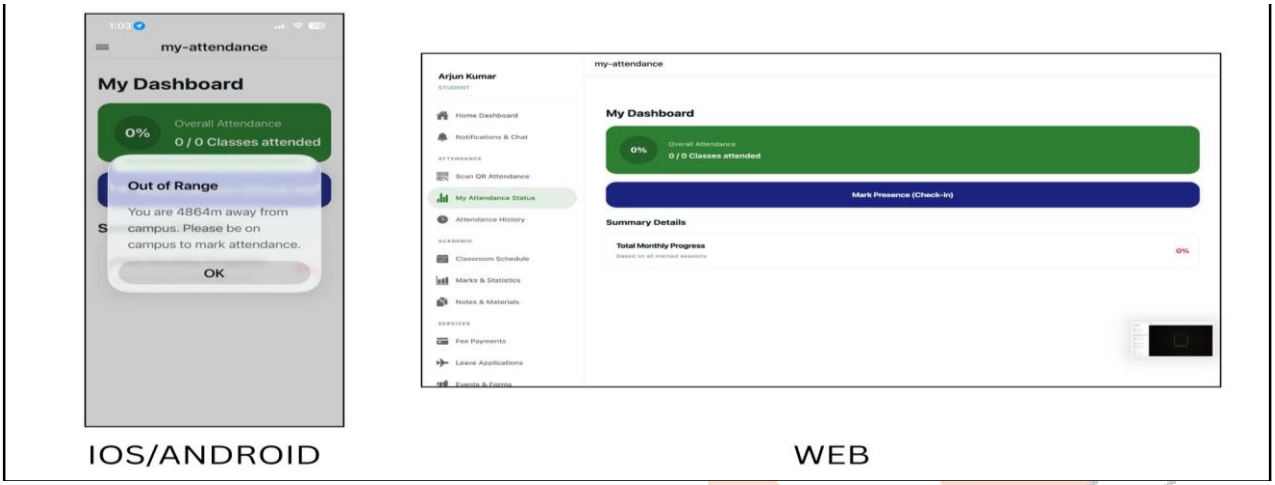


Fig. 2: Live Attendance Tracker

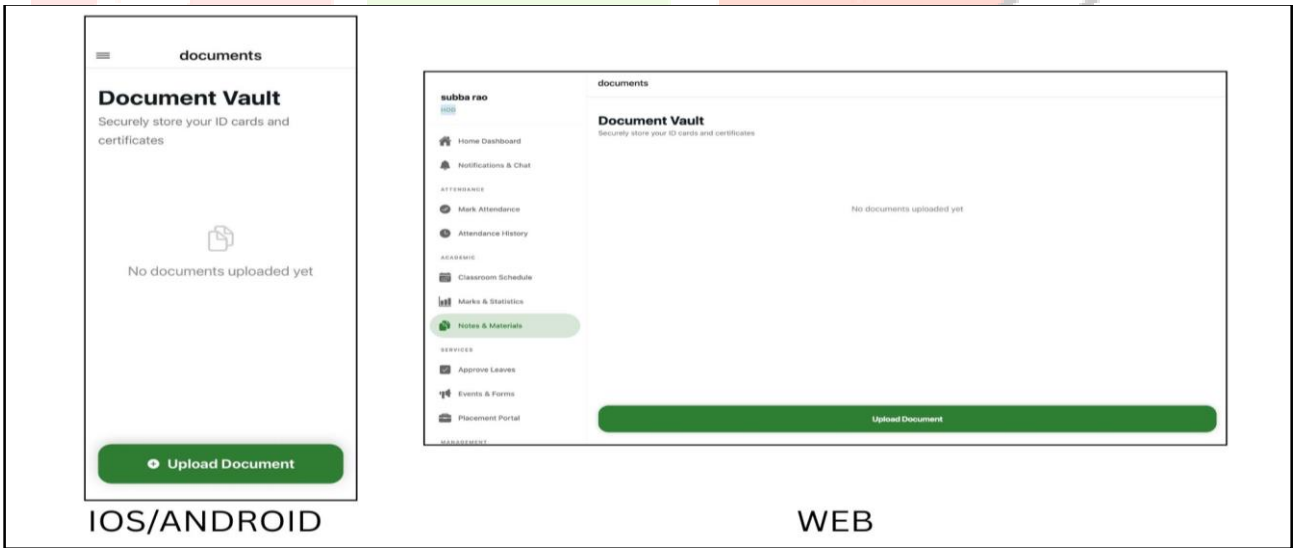


Fig. 3: Integrated Notes & Essay Drafts

Fig. 4: OCR Analysis

Fig. 5: Active Applications

VI. WEB APPLICATION

A cross-platform web and mobile-based application is developed to provide a centralized, accessible space for academic life and college admissions. It allows students to manage their daily schedules, track their applications, and automate data entry in real time using Backend-as-a-Service (BaaS) and ML technology.

Features of the Web Application:

- Dual-Interface Dashboard: Intuitive dashboards designed for both daily student management (attendance and notes) and long-term college application tracking.
- Automated Academic Profiling: Built-in ML OCR "Magic Scan" feature that extracts GPA and academic scores directly from physical transcripts, reducing manual effort and errors.
- Live Application Tracking: Real-time updates on application stages (Draft, Submitted, Under Review, Decision Ready) powered by Supabase for seamless data synchronization.
- Integrated Productivity Tools: Dedicated modules for live attendance logging and digital note-taking to support college essays and research activities.
- Secure Document Vault: Centralized and encrypted storage for managing important documents such as transcripts, certificates, and government IDs.
- Clean and Responsive UI: Modern, user-friendly interface built using React Native and Expo, ensuring smooth performance across mobile and web platforms.
- This system helps students stay organized, reduces the stress of manual form-filling through intelligent automation, and provides a transparent, real-time view of their entire academic and admission journey.

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CONCLUSION

The SmartStudent platform is an excellent example of the transformative potential of combining Backend-as-a-Service (BaaS) and Machine Learning to modernize the student experience. By integrating React Native (via Expo) with Supabase, the system delivers a high-performance solution for both academic management and college admissions. It leverages cloud infrastructure for real-time data logging and application status tracking, ensuring students always have up-to-date information. Additionally, its built-in ML OCR feature eliminates the long-standing burden of manual data entry by automatically extracting key details from transcripts. This hybrid approach enhances data integrity, security, and scalability while maintaining a smooth and user-friendly experience. Ultimately, the platform demonstrates how a unified, intelligent mobile solution can simplify the journey to higher education, making the admissions process more transparent, efficient, and accessible for students.

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