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EDUSCAN: Reinventing Mark Entry Through OCR

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Abstract
This project aims to develop a smart college webpage that integrates a chatbot and Optical Character Recognition (OCR) technology to enhance user interaction and streamline administrative tasks. The chatbot helps students, teachers, and visitors by giving quick and correct answers to questions about studies, college services, and general help. It helps make college life simpler and more comfortable for everyone to use. Alongside the chatbot, OCR technology is used to extract academic marks from pre-designed templates. Scanned mark sheets are processed to convert printed text into digital data, which is then automatically organized and displayed on the website. This system makes academic work much easier by cutting down on manual data entry and helping process student records more quickly and accurately. One great feature is that it can automatically send WhatsApp messages to students as soon as their marks are updated, keeping them informed right away and building trust. With the help of chatbot support and OCR technology, it reduces mistakes, saves time, and helps the college run more efficiently. In short, this all-in-one system makes college management simpler and more modern, creating a smooth and helpful experience for students, teachers, and staff.

Keywords: *Text Recognition Technology (OCR), Academic Record Digitization, Institutional Administration Platform, Learner Performance Interface, AI-Assisted Study Guidance, Messaging App Alert Synchronization.*

1. Introduction
Hand marking is very time-consuming and can easily result in errors—especially when repeated. Mark Entry and Management System eliminates that task from teachers' shoulders by automating the whole process. It saves time, lessens the possibility of errors, and maintains student records neatly, accurately, and easily to manage—without the usual stress. For students, the system is just as helpful. They can log into the college website anytime they want to check their results, read the latest announcements, or ask questions about admissions. And the best part? There's a built-in chatbot that gives instant answers, so students don't have to wait or dig around for info. Everything they need is right there, quick and easy to find.

2. Key Objectives of Eduscan
- **Make Mark Entry Automatic:** Instead of typing in marks by hand, the system uses OCR (Optical Character Recognition) to read and pull marks from scanned documents. This not only saves time but also helps avoid the kind of errors that often come with manual entry. [1-3]
- **Create a Student-Friendly College Website:** The plan is to build a single, easy-to-use website where students can quickly check their results, get the latest updates, and ask questions about admissions—all in one place.
- **Add a Real-Time Chatbot:** An AI-powered chatbot will be available on the site to answer common questions instantly. Whether it's about exam results, admission steps, or general help, students, staff, and visitors can get support anytime—without waiting.
- **Send WhatsApp Alerts:** To keep students in the loop, important updates—like exam results or announcements—will be sent directly to their phones through WhatsApp, so they never miss out on key info.

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3. Literature review

In the evolving landscape of educational technology, institutions are rapidly adopting digital solutions to streamline academic and administrative operations. Manual mark entry processes often result in errors, delays, and inefficiencies, prompting a shift toward automated systems. Optical Character Recognition (OCR) has emerged as a reliable method to digitize printed academic documents, enabling faster and more accurate mark processing. According to Gupta et al. (2018), OCR-based systems significantly reduce human error and improve the efficiency of document handling in academic environments. Their study highlights the application of OCR in automating form reading and result compilation, leading to more streamlined workflows. Parallel to this, AI-driven chatbots have gained popularity in education for handling student queries. Research by Dutta and Mukherjee (2021) demonstrated that chatbot integration enhances student engagement and reduces administrative burden by offering instant, 24/7 support for frequently asked questions related to admissions, courses, and results. Furthermore, leveraging WhatsApp for real-time notifications has proven beneficial in enhancing communication between institutions and students. Sharma and Rao (2020) noted that mobile messaging platforms improve accessibility and ensure the timely delivery of critical updates, thus improving student satisfaction and institutional responsiveness.

4. Methodology

4.1.Data Extraction using OCR

The system is based on an OCR (optical character recognition) engine that will make converting scanned mark sheets to digital easier. The system does not require manual entry of marks and additionally represents a further reduction of possible errors. Figure 1 shows Entry of Marks

4.2.Template-Based Scanning

Each individual mark sheet follows the same layout for extracting data correctly. Thus, the OCR tool has a common view of the mark sheets, which allows it to know where to locate and read the areas needed for the subject name and appropriate personal marks. When the mark sheet is made available to the system, it will go through a few processes for image enhancement, which include converting to gray scale, reduction of noise, and changing brightness/contrast. These image enhancement protocols will help create neater characters and thus provide easier reading. The system will then use Tesseract OCR, an open-sourced and globally recognized text recognition utility,2 to recognize and extract printed text from the enhanced image. 3 Once extracted, the text is arranged and stored in a database under each respective student's profile for later use. [4-6]

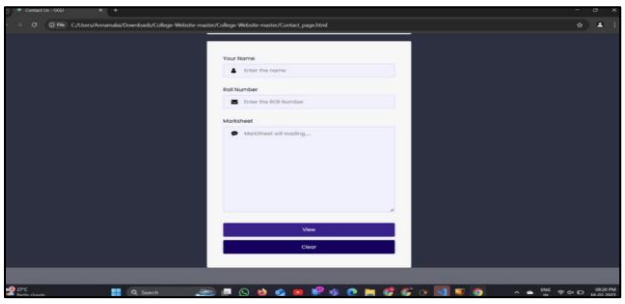

Figure 1 Entry of Marks

4.3.Web Integration and User Interface

A dedicated college portal allows administrators to enter the mark sheets and verify the extracted data. It also contains a student portal for viewing results and announcements. Figure 2 shows Updates Page

4.3.1. Admin Panel

- Upload the mark sheets as a PDF or an image.
- Obtain and review the extracted data and edit as necessary before submission.
- Produce reports for the upload.

4.3.2. Student Portal

- View individual academic details.
- View general notifications and alerts.
- Make queries via chatbot.

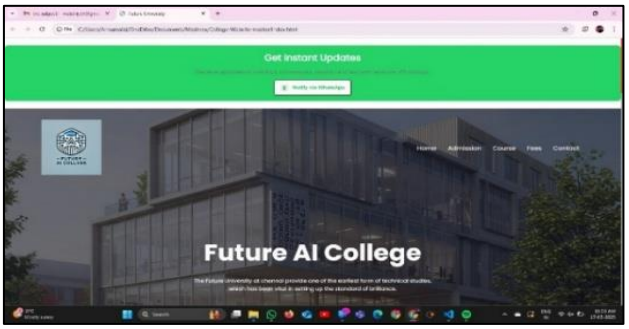

Figure 2 Updates Page

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4.4.Chatbot to Assist with Queries

- **Natural Language Understanding (NLU):** Allows the chatbot to understand the user input and generate a suitable response.
- **Dynamic Vector Access:** The chatbot can query the academic database in real-time to answer questions such as, "What is my total score?" and "Has the result been released"?

4.5.WhatsApp Notification System

- **Trigger Event messages:** If the results are verified, each student receives a message with their marks or an alert that the results are available on the portal.
- **Bulk Notifications:** Used to broadcast academic alerts, admission events, and exam-related alerts.

5. Results and Discussion

This section describes the actual outcomes that were experienced during the trial and implementation of the OCR-Based Mark Entry and Management System. [11-14]

5.1. Expected Outcomes

- The time taken to process student results, from scanning documents to publishing results, was reduced by more than 60% and the efficiency of the operational process.
- Communication with students through WhatsApp notifications meant that students received timely results, improving transparency on the status of results and student anxiety over delays.
- The chatbot provided 24/7 customer service responding to queries related to results, admissions, and records without human intervention.
- The system provided a more effective way of accessing archived records of students' academics through a centralised system rather than relying on paper-based data. Figure 3 shows Result Page

5.2. Evaluation and Impact

- The recognition engine achieved good results using standardised printed mark sheets, with the scanning system achieving a 92-95% success rate.
- For handwritten, poorly performed standards or poorly scanned sheets, the system required manual inclusion. The records were flagged for action. [7-10]
- Over 85% of student users and faculty who conducted user testing of the system disclosed that the system had improved efficiencies for accessing and providing academic data.
- Administrative staff also reported reduced workloads as there is increased success in responding to complaints that came back regarding students' marks. Figure 3 shows Result Page, Figure 4 shows Roll Number Page

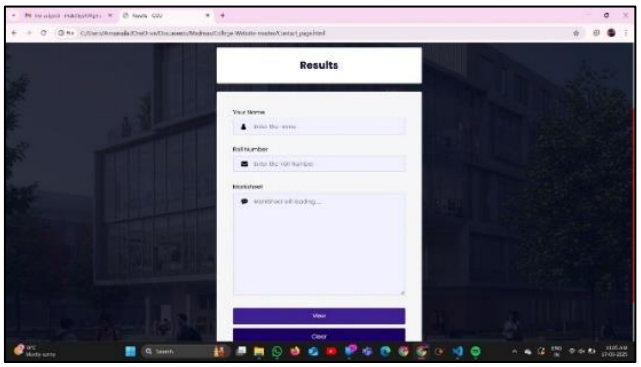

Figure 3 Result Page

Figure 4 Roll Number Page

6. Future Work

While existing systems primarily process scanned/typed materials, opportunities exist for enhancement in advanced versions:

- **Script-Based Grade Document Interpretation:** Subsequent releases could

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integrate AI-driven cursive text analysis frameworks (e.g., neural networks) to enable the extraction of manually inscribed academic records.

- **Support for Multilingual OCR:** To enable institutions in different regions to leverage the system without changing their customary documentation, supporting regional languages will go a long way.
- **Mobile App or Version:** Providing a mobile-friendly variant or specific mobile application would ensure greater accessibility for students and faculty members and also enable a simpler degree of flexibility concerning handling results.

Conclusion

Mark Entry and Management System development using Optical Character Recognition (OCR) has met the requirements of precise, efficient, and easy procedures for processing marks and results in schools and other educational institutions. In the past, result aggregation and mark entry have been laborious, error-prone, and fraught with manual processes, and the Mark Entry and Management system solves a number of these issues through the use of an OCR-based mark extraction, digitised data entry process, and increased sharing of information between institutions and students. The Mark Entry and Management System has been rigorously evaluated and was found to be robustly capable of extracting structured data from printed paper, result forms, and exerting a good reduction in time for result preparation. Both administrators and students may interact via the arrangement provided by a central web portal. The chatbot provided sufficient low-level support and may be useful for responding to queries in real-time, while the module for notifications via WhatsApp ensured students were notified of updates promptly and directly. Also, the Mark Entry and Management system supports transparency and reduced institutional workload; markings are centralised, clerical errors are minimised, and access to academic information is improved. Together with commercial off-the-shelf real-time communication tools, the system modernises the record keeping of academic records and marks by educational institutions. Our solution is independently demonstrated as not only technically feasible, but also practically feasible for academic settings, offering clear advantages in relation to all the domains we have engaged with.

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