

# MarkSense - Intelligently Evaluating System

**Ms. Ridhisha D. Awale<sup>1</sup>, Mr. Ayush P. Khandekar<sup>2</sup>,  
Ms. Prachi D. Munjewar<sup>3</sup>, Ms. Shrawani V. Sapkal<sup>4</sup>, Mr. Arman J.  
Bharti<sup>5</sup>, Prof. Irfan Javed<sup>6</sup>**

<sup>1,2,3,4,5,6</sup>Department of Electronics and Telecommunication Engineering  
S. B. Jain Institute of Technology, Management and Research, Nagpur  
(Autonomous, Affiliated to R.T.M. Nagpur University)

## Abstract

MarkSense is an automated student evaluation system designed to eliminate the limitations associated with traditional manual assessment processes. Manual checking of answer sheets is time-consuming, labor-intensive, and prone to human error, particularly when handling large student volumes across multiple subjects. MarkSense integrates Optical Character Recognition (OCR) to extract text from scanned or handwritten answer sheets and evaluate responses by comparing them with predefined model answers. The system automates grading, generates result reports in PDF format, and provides instant feedback to students. Separate dashboards allow administrators to upload subjects, model answers, and manage submissions, while students can view results, track their progress, and download reports. Additional features such as automated email notifications and an AI-based chatbot enhance communication and user experience. By automating evaluation, reducing manual workload, and centralizing academic data, MarkSense improves accuracy, efficiency, and transparency in educational assessment. This project demonstrates the potential of integrating AI and OCR technologies to transform conventional evaluation techniques into a smart, scalable, and efficient digital assessment solution.

**Keywords:** Automated Evaluation, Optical Character Recognition (OCR), Artificial Intelligence (AI), Student Assessment System, PDF Report Generation, Web-Based Dashboard, AI Chatbot, Performance Tracking.

## 1. Introduction

In today's digital learning environment, educational institutions are generating a high volume of academic data, making manual evaluation of student answer sheets increasingly challenging. Traditional assessment methods require teachers to check submissions individually, verify answers, assign marks, and record results. This process consumes significant time and effort, especially when handling large batches of students or multiple subjects simultaneously. Delays in evaluation lead to delayed feedback, which affects students' ability to analyze their performance and identify areas for improvement.

To address these limitations, MarkSense introduces automation into the evaluation process by integrating modern technologies such as Optical Character Recognition (OCR), Artificial Intelligence (AI), and web-based data management. The system allows administrators to upload model answers, evaluate student

submissions automatically, and generate result reports without manual interference. OCR technology reads text from handwritten or scanned answer sheets, while intelligently compares the extracted content with model answers to determine scoring accuracy.

MarkSense provides separate dashboards for administrators and students, offering convenient and centralized access to academic records. Administrators can manage subjects, monitor submissions, generate reports, and send notifications, whereas students can view their results instantly, track performance, and download reports in PDF format. Additionally, the system incorporates an AI-based chatbot to assist users with queries and provide real-time guidance.

By reducing manual workload, improving accuracy, and enabling immediate feedback, MarkSense transforms traditional assessment into a fast, reliable, and scalable digital evaluation method. The project demonstrates how automation and AI can enhance academic efficiency, transparency, and accessibility while supporting the evolving demands of modern education systems.

## 2. EXISTING SYSTEM

In most educational institutions, student assessments are still evaluated manually. Teachers review answer sheets individually, assign marks, and record results manually using spreadsheets or registers. This traditional evaluation process is time-consuming, especially when dealing with large student groups or multiple subjects..

Existing digital evaluation tools, if available, are generally limited to basic online quizzes or objective-type assessments and cannot evaluate descriptive answers or handwritten submissions. These systems lack integration with OCR or AI-based evaluation, making it difficult to automate the checking of handwritten scripts. Additionally, most existing platforms do not provide features such as auto-generated reports, student performance tracking, or centralized dashboards for administrators and students.

Students also lack real-time access to results and often rely on delayed manual announcements or printed mark sheets. There is no unified system where students can instantly view their performance, download reports, or track improvements over time. Similarly, administrators face difficulties managing academic data across different tools.

These limitations highlight the need for an automated, efficient, and intelligent evaluation system that can process handwritten or scanned answer sheets, reduce manual workload, and provide quick feedback to students.

## 3. PROPOSED SYSTEM

The proposed system, MarkSense, introduces automation into the student evaluation process by integrating Optical Character Recognition (OCR), Artificial Intelligence (AI), and centralized data management. Unlike traditional methods where teachers manually check answer sheets and record marks, MarkSense enables the administrator to upload a model answer, after which the system automatically evaluates student submissions—whether handwritten, scanned.

The system extracts text from uploaded answer sheets using OCR technology and interprets the extracted content. AI-based evaluation algorithms then compare the student's answer with the model answer to

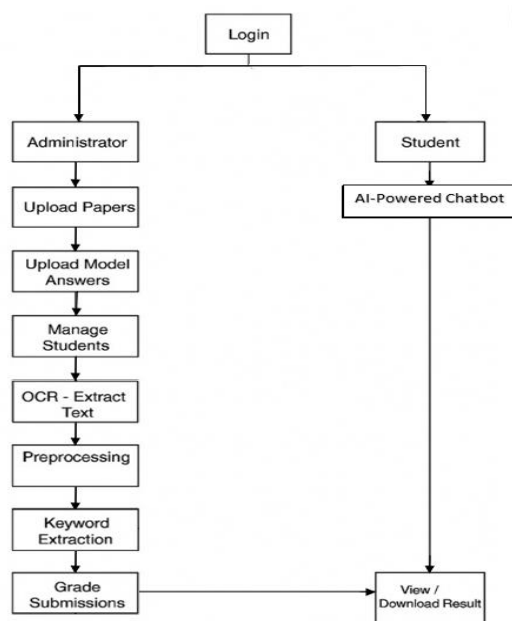
determine similarity, relevance, and correctness. Marks are assigned automatically, and reducing evaluation time significantly.

MarkSense features separate dashboards for administrators and students. Administrators can manage subjects, upload model answers, track submissions, and download reports. Students receive real-time access to their results, view their performance history, and download report cards in PDF format. An AI-powered chatbot is integrated to assist users by answering queries, guiding navigation, and improving user interaction.

The system also supports automated email notifications to inform users about submissions, result updates, and important alerts. All academic data—including results, submissions, and performance reports—is stored securely in the database, ensuring reliability and centralized record management.

By combining OCR-based script evaluation, AI-powered grading algorithms, downloadable reports, and multi-user dashboards, MarkSense offers a scalable, efficient, and intelligent solution that transforms the manual assessment process into a fast, accurate, and automated digital workflow.

## 4. DESIGN AND IMPLEMENTATION OF PROPOSED METHODOLOGY



### 1. Start

This procedure begins when the admin opens the MarkSense web application.

During startup, the system initializes essential backend services:

- Database connection
- OCR service (for text extraction from scanned answer sheets)
- NLP modules (Sentence-BERT, grammar correction, keyword extraction)
- Session handler (for authentication)

Before loading the login page, the system checks:

- User session status (already authenticated or not)

- System resource availability (OCR engine, NLP libraries)

The system ensures all required components are ready before giving access to the dashboard.

## 2. Sign-in / Login

When the application opens, the user is directed to the login page.

Users have two roles:

- **Admin** (teacher/evaluator)
- **Student**

Actions performed:

- Admin logs in using username & password.
- Students log in using their own credentials to check results.

After successful login, the system loads:

For **Admin**

- Subjects created
- Uploaded model answers
- Recent evaluated submissions

For **Student**

- Evaluation history
- Marksheets and feedback summaries

## 3. Admin Dashboard (Home Page)

After login, the admin reaches the dashboard, which acts as the control panel.

From here, the admin can:

- Upload model answer (PDF or text format)
- Upload student answer sheet (scanned PDF or image)
- View evaluated results
- Download marksheets
- Manage subjects and student records

The dashboard provides **one-click access** to the entire paper-checking workflow.

## 4. Actions Section

The Actions section of MarkSense provides the necessary management tools for administrators to operate the system efficiently. From this section, the admin can create and manage subjects and upload the model answer for each subject, ensuring evaluation criteria are properly defined. Additionally, the system allows the admin to upload scanned handwritten answer scripts of students for evaluation. All previously evaluated scripts and their corresponding scores can be viewed through the Evaluation History feature, making it easy to review past assessments. The admin can also download detailed PDF marksheets and reports whenever needed. These actions enable smooth operation without requiring repeated configuration.

## 5. Model Answer Upload

Admin uploads the model answer (reference answer key).

- Accepted formats: **PDF or text**
- The model answer is stored in the database
- NLP modules extract **keywords, important concepts, and context**

This acts as the baseline for evaluating student answers.

## 6. Answer Sheet Upload (Student Paper)

The admin uploads the **scanned handwritten answer sheet**.

- Allowed formats: PDF / Image (JPG, PNG)
- Stored temporarily for evaluation
- Once uploaded, the system triggers the evaluation pipeline

## 7. Evaluation Pipeline (Core Component)

This is the core automation process of MarkSense.

It consists of:

### a) OCR Module

Converts handwritten text into digital text

Removes noise, formatting errors, and lines

### b) Preprocessing

Removes stopwords, punctuation

Lemmatization & tokenization

### c) Grammar & Spell Correction

Uses LanguageTool/Ginger to correct OCR-based mistakes

### d) Semantic Similarity (Sentence-BERT)

Compares student answer with model answer **based on meaning**, not just keywords

Generates similarity percentage (e.g., 78%)

### e) Keyword Extraction (spaCy)

Identifies important words or terms from model answer

Checks whether student answer contains required concepts

All extracted values are passed to the **grading module**.

## 8. Score Generation & Feedback

The grading logic combines:

Semantic similarity score

Keyword matching score

Grammar correctness

The final marks are calculated.

The system automatically generates:

Total score

Question-wise marks

Feedback (strengths + areas to improve)

## 9. Result & Marksheet Generation (End Process)

After evaluation:

The marksheet (PDF) is generated

Detailed feedback is stored in database

Admin can download marksheet or view in dashboard

For students:

They see the evaluated results in their dashboard

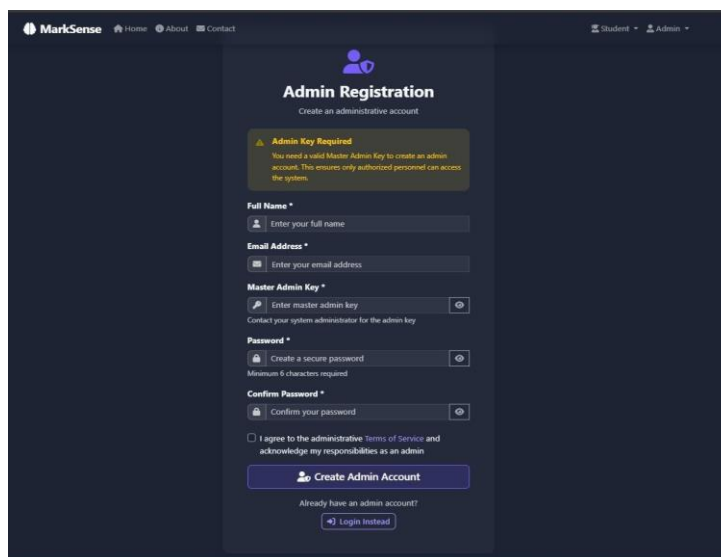
Can download the PDF marksheet

## 5. RESULT ANALYSIS

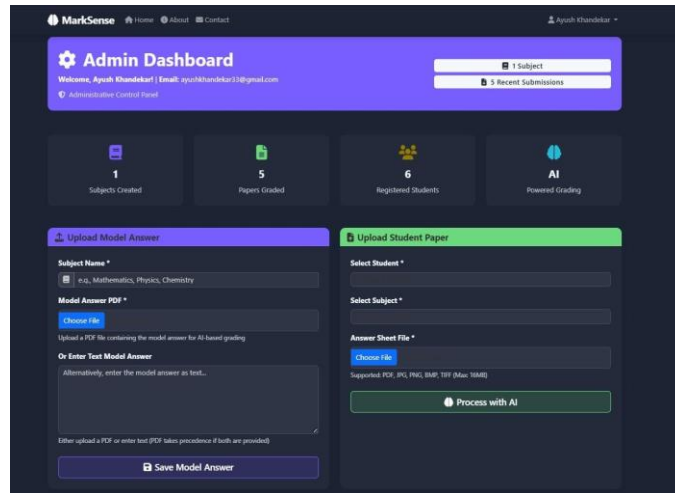
After integrating all modules, MarkSense was tested with real handwritten answer sheets to evaluate its accuracy and performance. The testing process involved uploading scanned answer scripts, allowing the system to extract text using OCR, and then automatically comparing the extracted text with the prepared model answer. The system generated marks instantly and stored them in the database for future reference.

The results showed that MarkSense could successfully read handwritten content with a precision, even when handwriting styles varied slightly between students. The semantic analysis model efficiently matched student responses with the expected answer based on meaning rather than only exact word matching. This made the evaluation process more flexible and closer to human judgment.

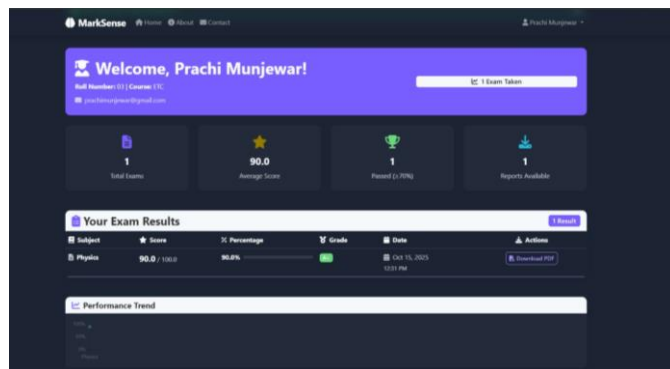
In terms of performance, the automated evaluation process significantly reduced the manual workload for teachers. Tasks that normally take several minutes per paper were completed within a few seconds. Users found the platform easy to use, especially with features like viewing evaluation history and downloading PDF reports directly from the system. The testing confirmed that MarkSense is reliable, time-efficient, and scalable for real academic environments.



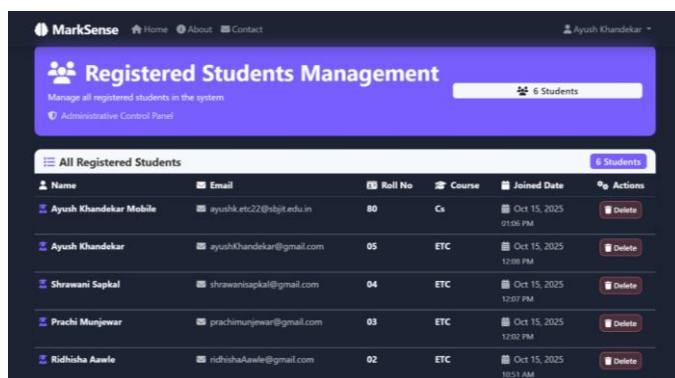
**Fig 1: Admin Registration Page**



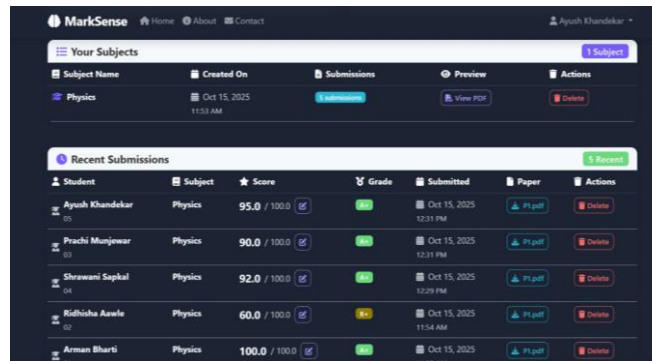
**Fig 2: Admin Dashboard**



**Fig 3: Student Dashboard**



**Fig 4: Student Management**

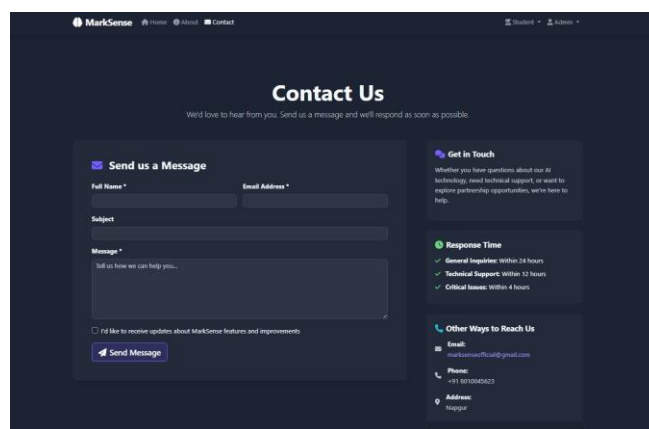


Subject Name	Created On	Submissions	Preview	Actions
Physics	Oct 15, 2025 11:53 AM	3 Submissions	View PDF	Delete

Student	Subject	Score	Grade	Submitted	Paper	Actions
Ayushi Khandekar	Physics	95.0 / 100.0	A	Oct 15, 2025 12:31 PM	P1.pdf	Delete
Prachi Munjwar	Physics	90.0 / 100.0	B	Oct 15, 2025 12:31 PM	P1.pdf	Delete
Shreewati Sephal	Physics	92.0 / 100.0	B	Oct 15, 2025 12:29 PM	P1.pdf	Delete
Ridhisha Awale	Physics	60.0 / 100.0	C	Oct 15, 2025 11:54 AM	P1.pdf	Delete
Armaan Bharti	Physics	100.0 / 100.0	A+	Oct 15, 2025	P1.pdf	Delete

**Fig 5: Student Grade**



**Contact Us**  
We'd love to hear from you. Send us a message and we'll respond as soon as possible.

**Send us a Message**

Full Name \*      Email Address \*

Subject

Message \*

I'd like to receive updates about MarkSense features and improvements.

**Send Message**

**Get In Touch**  
Whether you have questions about our AI technology, need technical support, or want to explore partnership opportunities, we're here to help.

**Response Time**

- General Inquiries: Within 24 hours
- Technical Support: Within 12 hours
- Critical Issues: Within 4 hours

**Other Ways to Reach Us**

Email: [marksense70ai@gmail.com](mailto:marksense70ai@gmail.com)

Phone: +91 9010049523

Address: Nagpur

**Fig 6: Contact Page**

## 5. Conclusion

The proposed MarkSense system successfully demonstrates an intelligent, automated approach to evaluating handwritten or scanned answer sheets using techniques such as OCR, NLP, and semantic similarity analysis. By integrating Optical Character Recognition for text extraction and Natural Language Processing models for grammar correction, keyword matching, and semantic understanding, the system eliminates the need for manual evaluation and drastically reduces human effort. Sentence-BERT and supporting NLP modules ensure that each answer is evaluated not only based on keywords but also on meaning and contextual relevance, making the evaluation process more accurate and unbiased.

The architecture of MarkSense follows a modular and structured workflow, ensuring smooth execution from answer sheet upload to result generation. The Admin Panel simplifies management tasks such as uploading model answers, uploading answer sheets, tracking evaluation history, and downloading marksheets. On the other hand, the Student Dashboard provides students with instant access to their scored evaluations and downloadable feedback reports. This separation of roles improves system security and eliminates unauthorized access to sensitive academic data.

The system's evaluation pipeline demonstrates reliability and scalability. OCR extracts text even from imperfect or low-quality handwritten scripts, NLP preprocessing improves clarity, and semantic similarity models generate marks based on content correctness. The process ensures fairness by

minimizing subjective biases that commonly occur in manual checking. Each evaluated response generates a PDF marksheet with detailed feedback, helping students understand their mistakes and learn from them.

MarkSense also focuses on performance tracking and automated logging, ensuring transparency in evaluation. The storage of past evaluation records enables admins to analyze patterns, student performance, and overall grading activity in real time. The system's design supports modular updates—new NLP models or new evaluation criteria can be integrated without restructuring the entire system.

Overall, MarkSense serves as a robust, reliable, and scalable solution for automating descriptive answer evaluation in educational institutions. It improves the speed of assessment, enhances accuracy, and ensures consistent evaluation standards across students. Future enhancements may include integrating handwriting recognition for direct text extraction, adding AI-based answer summarization, supporting multiple regional languages, and enabling a full-fledged analytics dashboard for deeper insights into performance trends. With continuous improvements, MarkSense has the potential to transform traditional exam evaluation into a more automated, transparent, and efficient process.

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