

Implementation of AI-Driven Academic Achievement Tracker

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Abstract

Managing certificates and academic records manually is inefficient and time-consuming, leading to administrative overhead, errors, and delays in report generation. Physical storage of certificates for academic, extracurricular, and faculty development activities makes it difficult to maintain accurate records and provide personalized academic guidance. To address this, an AI-driven system has been developed to automate certificate digitization, skill extraction, and academic record management. The system integrates OCR to extract text from certificates, NLP to identify event names, and an ontology-based model to map relevant skills. Extracted skills are stored and analyzed to generate real-time reports and personalized recommendations for students and faculty. Additionally, an AI-powered recommendation engine suggests projects and courses based on skill gaps, improving academic and career growth. This solution enhances efficiency, accuracy, and accessibility in record management, reducing administrative workload while enabling data-driven academic support for institutions and students.

Keywords: Academic Report Generator, Course & Project Recommendation, Certificate Collection, Hybrid Filtering.

1. Introduction

In most institutions, academic records, certificates, and faculty achievements are still managed manually and with a lot of effort. Academic, extracurricular, and faculty development activity certificates are kept physically and need a lot of effort for collection, validation, and collation. Administrators and faculty members manually prepare data on student accomplishments, workshops, and certifications, resulting in delays, discrepancies, and administrative burden. This conventional method decreases efficiency, raises the risk of human mistakes, and discourages the capability to offer individualized academic support based on a student's performance.

To solve these issues, this project presents an AI-Driven Academic Achievement Tracker, an automated system that uses Optical Character Recognition (OCR), Natural Language Processing (NLP), and Ontology-based learning to scan, classify, and analyze academic certificates. The system

identifies the most important skills from uploaded certificates, aligns them with an ontology-based model, and provides personalized recommendations for students, such as recommended projects and courses to improve their learning paths. One of the defining characteristics of this system is academic reporting, eliminating the need to manually collect data and create reports. The system offers automated, AI-driven student and faculty accomplishment reports, lessening administrative effort and ensuring precision. Users are able to create custom reports based on a certain date range, monitor historical academic performance, and export reports in various formats, including ZIP files of certificates. This functionality supports institutional decision-making with real-time feedback on skill acquisition and professional development. By automating certificate gathering, skill harvesting, academic reporting, and individualized learning suggestions, the AI-Driven

Academic Achievement Tracker greatly improves efficiency, accuracy, and accessibility at academic institutions. This project illustrates how AI-enabled automation can simplify academic record management while facilitating data-driven insights to inform students and faculty in professional development. [1]

2. Existing System

At most educational institutions, certificate tracking and academic record management are very manual and ineffective. Administrators and instructors use conventional techniques to gather and update student and faculty achievement records, which results in slowness, inaccuracies, and more administrative burdens. [2]

2.1. Manual and Complex Data Collection

The present mechanism for capturing student and staff achievements involves weekly data collection in which a single staff member extracts information from different sources from several classes and departments. Students need to submit their technical, non-technical, and extracurricular certificates manually, and faculty members offer updates on activities, workshops, and Faculty Development Program (FDP) certification. The procedure is time-consuming and inefficient, involving continuous communication and follow-ups.

2.2. Certificate and Academic Record Management Challenges

2.2.1. Time-Consuming & Labor-Intensive

- Collecting, validating, and classifying certificates manually is tedious.
- Hours of faculty and administrative personnel time is consumed in collecting data, impacting productivity.

2.2.2. Prone to Human Errors

- Discrepancies in data input, lost certificates, and records duplication result in incorrect academic profiles. [3]
- Reports tend to be incorrect due to manual processing and lack of updates.

2.2.3. Delays in Report Generation

- Because records are dispersed in various departments, preparing consolidated reports is done in weeks or months.
- Data analysis is done manually by faculty and

administrative personnel, which results in further delays.

2.3. Inconsistent Record-Keeping

- Achievements of students are usually kept in various forms (paper records, Excel spreadsheets, or casual records), and it becomes challenging to maintain a centralized profile.
- When students move from semesters or years, monitoring their academic and co-curricular progress becomes increasingly challenging.

2.3.1. Lack of an Efficient Student Profile Management System

Lack of a systematic, AI-based tracking system leads to:

- No immediate insight into student progress.
- Limited customized academic counseling, as organizations are unable to effectively assess student skills.
- Inability to retrieve previous records, resulting in uneven reporting and lost opportunities for students and teachers.

2.3.2. Requirement of an AI-Based Solution

Automating certificate collection, skill extraction, and academic reporting is the need of the hour to overcome these issues. An AI-based system can:

- Use OCR to digitize certificate collection.
- Extract skills using NLP and ontology-based learning.
- Have structured academic profiles spanning across several years.
- Create automated reports for students and faculty.
- Make project and course recommendations to individual students and faculty based on extracted skills.

By adopting AI, institutions can remove inefficiencies, save administrative burden, and enhance data-driven academic decision-making, making tracking of student and faculty progress more accurate, scalable, and accessible. [4]

3. Proposed System

To overcome the inefficiencies associated with manual academic record keeping, the current project proposes a web-based academic report generator

based on Artificial Intelligence (AI) for automatic skill extraction and recommendation. The system dispenses with the tedious task of collecting certificates manually by offering one-stop-shop centralization where students, faculty members, and administrators can easily handle academic accomplishments.

3.1. Automated Certificate Collection and Academic Record Management

The system to be implemented allows for automatic collection and maintenance of certificates associated with technical, non-technical, and extracurricular activities. Students upload their certificate of attendance for events, whereas staff members upload their Faculty Development Program (FDP) certificates, YouTube lecture videos, and event information. Class advisors also update student placement information so that academic profiles are correct and updated. The admin dashboard gives an exhaustive view, and institutions can operate students, instructors, classes, and departments smoothly. [5]

3.2. AI-Based Skill Extraction and Profile Management

The software utilizes Optical Character Recognition (OCR) and Natural Language Processing (NLP) to pull out the prominent skills from certificates uploaded. Once pulled out, these skills get automatically added in the student's profile, creating a formatted document of his academic and extracurricular activity. In order to complement skill organization even more, Fuzzy C-Means (FCM) clustering is utilized, which organizes similar skills dynamically. It provides adaptive categorization of skills with the help of overlapping skill sets and cumulative progress of a student over time. Through regular refinement of groupings of skills, the academic profiles are made well-structured and representative of a student's growing expertise.

3.3. AI-Based Personalized Recommendations

The system employs a hybrid recommendation strategy that integrates Collaborative Filtering and Content-Based Filtering to recommend appropriate projects, courses, and academic opportunities based on skills extracted.

- **Collaborative Filtering:** Finds students with comparable skill sets and recommends learning paths from collective wisdom.
- **Content-Based Filtering:** Maps individual student profiles to appropriate projects, internships, and courses by examining skills extracted from certificates.

These integrated filtering methods improve the accuracy of recommendations, providing students with customized academic advice that caters to their career aspirations.

3.4. Reinforcement Learning for Continuous Improvement

In order to enhance recommendation quality, the system uses Reinforcement Learning (RL), which learns to adjust future recommendations from student feedback. If a student accepts or rejects a recommendation, the system learns from the feedback and improves future project and course suggestions. As time passes, this feedback model maximizes recommendations, making them more relevant and personalized.

3.5. Academic Report Generation and Institutional Analytics

One of the main features of the system proposed is automated generation of academic reports, which saves time from manual compilation of data. The system generates monthly reports on student and faculty accomplishments automatically. Institutions can also create customized reports for particular date ranges, monitor historical academic performance, and export reports in various formats, such as ZIP downloads of certificates. These reports offer real-time information on skill acquisition, student achievement, and institutional performance, allowing data-informed decision-making by faculty and administrators. [6]

3.6. Academic Report Generation and Institutional Analytics

Through the incorporation of AI-based automation, the system eliminates a large proportion of administrative burden, enhances the accuracy of data, and maximizes academic decision-making. The main benefits are:

- Smooth collection and management of certificates in one web platform.

- Accurate skill extraction and clustering for formalized academic profiles.
- Individualized student recommendations through hybrid filtering. [7]
- AI-based reinforcement learning to improve subsequent recommendations.
- Automatic report generation for enabling academic analytics and monitoring.

By using this AI-based solution, institutions are able to automate academic record management, increase student engagement, and offer data-informed advice for better learning outcomes. [8]

4. Implementation

The AI-Driven Academic Achievement Tracker is a web-based implementation that automates certificate gathering, skill extraction, and individualized academic recommendations. The system aims to offer secure user management, AI-driven skill extraction, recommendation generation, and academic reporting. The implementation comprises a number of major modules, each playing its part in an intelligent and seamless academic tracking solution.

4.1. User Management

The system utilizes Role-Based Access Control (RBAC) to provide different users—students, faculty, and administrators—access permissions. Students are able to update their academic profiles, upload certificates, and view recommendations. Faculty are able to upload FDP certificates, event details, and research publications, and class advisors update student placement information. Administrators manage users, academic records, and report generation. The system offers safe authentication processes, such as password security, multi-factor authentication (MFA), and safe session management, to protect data and users' privacy. [9]

4.2. Certificate Management

To make certificate collection more efficient, students and instructors can upload technical, non-technical, and extracurricular activity certificates, such as sports and research papers. Each certificate is processed through AI-based text recognition to identify the relevant information, which is then mapped to the academic profile of the user. The certificates are stored securely in categorized repositories, enabling users to access them in an

efficient manner. Data integrity is maintained by the system through automated validation mechanisms to identify duplicate or invalid submissions. [10]

4.3. AI Skill Extraction

The system combines Optical Character Recognition (OCR) to pull textual information from certificates, which is processed through Natural Language Processing (NLP) algorithms. The text is processed to determine event names, organizations, and linked skills. By utilizing an ontology-based method, the system aligns extracted text with pre-established skill sets and assigns confidence ratings to provide precision. For higher efficiency, the system utilizes fuzzy clustering methods that dynamically cluster skills in terms of similarity so that student profiles are kept tidy and indicative of their changing proficiency. The fig 1: show case the workflow of the AI Skill Extraction process. [11]

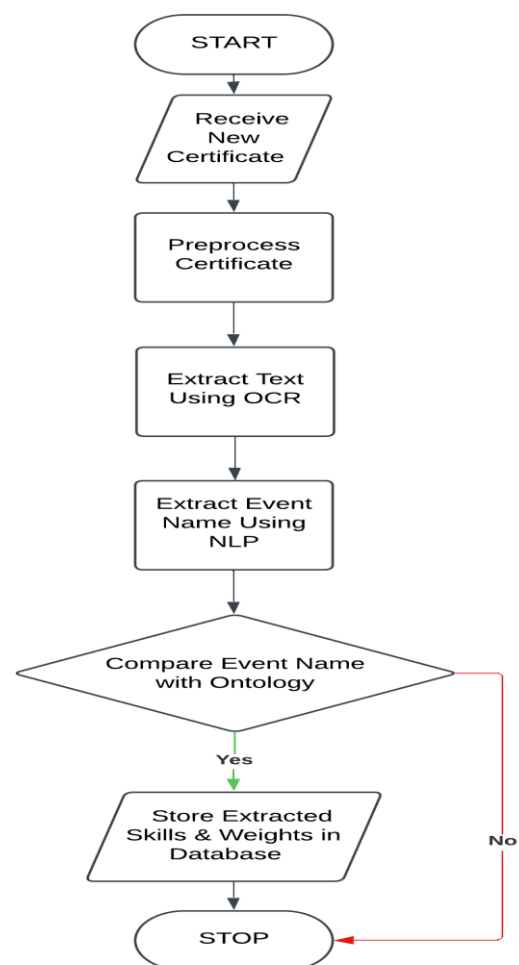


Figure 1 AI Skill Extraction

4.4. Project & Course Recommendation

The recommendation module utilizes Hybrid AI Filtering, which marries Collaborative Filtering (using students with similar skills) and Content-Based Filtering (comparing extracted skills with academic opportunities). This is done to guarantee that students get project and course recommendations tailored to their career objectives. The system also detects the missing skills necessary for suggested projects and directs students to particular courses to bridge the gaps in their knowledge. Automated scheduled tasks operate on a daily and weekly basis to refresh recommendations (Fig 2) to ensure that users have constant access to relevant learning opportunities. [12]

4.5. Feedback & Reinforcement Learning

To constantly improve the accuracy of recommendations, the system employs reinforcement learning from user feedback. Students either accept or decline project and course recommendations (Fig 2), with their feedback stored as scores in the database. The AI model learns from the interactions, and future recommendations are modified based on student interests and usage patterns. Gradually, this process makes suggestions more pertinent, so that students are exposed to opportunities specific to their developing skill sets and career aspirations. (Figure 2) [13]

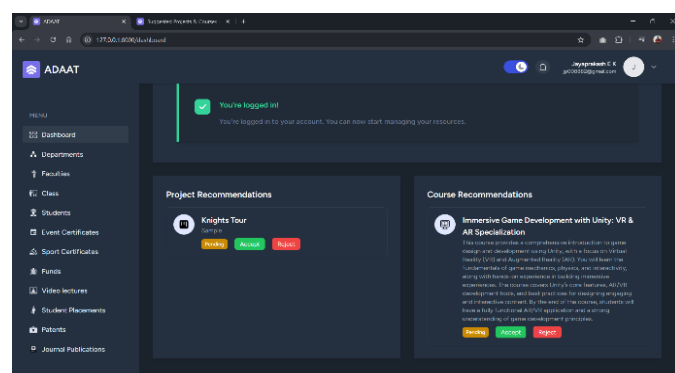


Figure 2 Recommendations and Feedback

4.6. Reporting & Analytics

One of the major parts of the system is automated report generation of academic performance, which does away with the need for manual data gathering. The system provides monthly reports of student and

faculty accomplishments, allowing institutions to monitor academic performance in real time. Administrators and coordinators can also produce customized reports by date range, facilitating in-depth analysis of academic records (Fig 3). The system maintains a historical archive of generated reports, enabling comparisons and long-term performance tracking. Additionally, users can export reports in multiple formats, including ZIP downloads of certificates, providing a structured and efficient way to retrieve academic records. (Figure 5) [14]

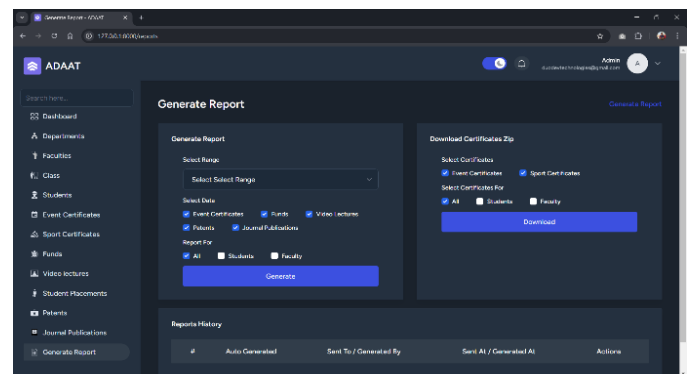


Figure 5 Report Generation Page

5. Discussion

The use of AI-Driven Academic Achievement Tracker is a major improvement in how educational institutions handle student and faculty records. Manual, error-ridden, and time-consuming traditional processes of certificate acquisition, skill tracking, and academic reporting are used. The system proposed herein eliminates these inefficiencies because it automates digitization of certificates, extracts applicable skills, and produces AI-driven recommendations. By adopting OCR, NLP, and ontology-based learning together, the system provides correct skill mapping with structured academic profiles in the long term. Among the most effective components of this system is its hybrid AI recommendation system, which brings together collaborative filtering and content-based filtering to propose appropriate projects and courses according to derived skills. The integration of reinforcement learning takes the system to a further level of intelligence through the process of improving subsequent recommendations based on user ratings. While students interact with project and course

recommendations, the system continuously adjusts to keep the recommendations personalized and in sync with changing learning needs. Besides, the automatic academic reporting functionality solves one of the largest challenges facing higher education institutions—the manual assembly of student and faculty performance. The system produces monthly reports, offers date-based customized reporting, and has historical records for long-term tracking of academicians. Institutions can export reports and certificates in ZIP format to save administrative time and enhance data availability. These features not only increase institutional productivity but also offer data-based information for making informed academic decisions. Security is also a primary concern in the design of the system. The Role-Based Access Control (RBAC) model provides access permissions to students, faculty, class advisors, and administrators such that they are able to control data securely. The authentication process, such as multi-factor authentication and encrypted storage, protects sensitive academic information such that user details are kept safe. Though the system proposed here overcomes several hindrances in academic record-keeping, scope for improvement exists. Adding the system to provide AI-based career guidance, predictive analytics of academic performance, and real-time industry skill trends will further make it useful. Integrating the system with external websites like LinkedIn, MOOCs, and job portals can make transitions from academic success to professional pursuits smooth. [15]

Conclusion

The AI-Powered Academic Achievement Tracker efficiently automates certificate harvesting, skill extraction, academic reporting, and learning recommendations. Using machine learning, reinforcement learning, and NLP, the system makes academic administration an effective, AI-enabled process. The presence of OCR and ontology-based learning validates accurate skill extraction, while the hybrid AI recommendation model offers students learning opportunities. By virtue of its organized academic reporting capabilities, the system greatly minimizes manual labor, eradicates data inconsistencies, and offers real-time academic

progress insights. Secure authentication processes and role-based access control further enhance data security, making the solution safe and scalable for institutions. This project illustrates the promise of AI-based automation in education, presenting a solid platform that can be developed further to support better academic decision-making, increase student interest, and correlate education with the changing needs of industries. Successful deployment of this system provides a foundation for AI-based academic management to evolve in the future, making education more efficient, data-driven, and accessible.

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