



AI-BASED AUTOMATED PROJECT ALLOTMENT SYSTEM FOR COLLEGE FACULTIES

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Abstract: In academic institutions, assigning projects manually is frequently ineffective, biased, and challenging to scale as the number of students increases. The Automatic Project Allotment System presented in this paper intelligently assigns projects to students according to their academic performance, preferred technology, and skill sets. The system analyzes student profiles and faculty-defined project requirements by combining rule-based matching with Natural Language Processing (NLP) techniques. To aid in faculty evaluation, the platform also integrates automated project report analysis, which includes plagiarism detection, text summarization, and keyword extraction. Streamlit and Python are used to implement the entire system, which offers role-based dashboards for administrators, instructors, and students. When compared to manual allocation methods, experimental results show increased efficiency, fairness, and transparency.

Keywords - Academic automation, NLP, skill matching, Streamlit, automatic project allocation, and plagiarism detection

I. INTRODUCTION

1.1 Motivation and background

One essential element of contemporary technical education is project-based learning. Assigning suitable projects that complement students' abilities and interests is crucial to the success of this type of learning. Project allocation is done by hand in many institutions, though, which results in delays, human bias, and less-than-ideal student-project matching.

Automation provides a scalable and objective solution as data-driven academic systems expand. Intelligent systems can assign projects more efficiently by utilizing structured student data and NLP-based analysis of project requirements. In order to ensure equitable and skill-relevant project distribution, this study suggests an Automatic Project Allotment System that reduces manual intervention.

1.2 The paper's contributions

The following are the main contributions of this study:

Project Allocation System with Automation:

In order to minimize manual labor and allocation bias, the paper proposes an end-to-end automated project allocation framework that assigns projects to students according to their technological preferences, academic performance, and skill sets.

Mechanism of Skill-Based Matching:

By examining how student abilities and faculty-defined project requirements overlap, a clear rule-based matching algorithm is created to guarantee pertinent project assignments.

Evaluation of Project Reports Assisted by NLP:

The system supports effective and reliable academic evaluation by integrating Natural Language Processing techniques for plagiarism detection, text summarization, and keyword extraction.

Realistic Web-Based Application:

Using Streamlit, the entire solution is implemented as a role-based web application, showcasing its scalability and real-world relevance for educational institutions.

II. REVIEW OF LITERATURE

2.1 Allocation and Recommendation Methods Based on Skills

Academic platforms and employment portals frequently use skill-based recommendation systems to match user profiles with requirements. To guarantee relevant allocation, these systems typically rely on rule-based scoring and keyword similarity. These methods enhance student engagement and learning outcomes in academic settings by assisting students in matching their skills to project requirements. Nevertheless, the allocation logic of many current systems is opaque and unadaptable.

2.2 Academic Evaluation Systems Using Natural Language Processing

Techniques from Natural Language Processing (NLP) are widely used in academic assessment tasks that involve unstructured textual data. Automated assessment and plagiarism detection are supported by techniques like document similarity analysis, text summarization, and keyword extraction. NLP-based systems speed up evaluations and increase grading consistency. These methods are frequently used without regard to project allocation systems, despite their efficacy.

2.3 Research Deficit

When used independently, the existing literature demonstrates notable improvements in NLP-driven academic evaluation and skill-based allocation. The integration of both strategies into a single automated academic platform, however, has received little attention. Administrative overhead and manual labor are increased when there are no unified systems. By suggesting an integrated automatic project allocation system with NLP-enabled report analysis, this study fills the gap.

III. CONCEPTS FOR SYSTEM METHODOLOGY

3.1 Information Gathering and Sources

- Gathers information about students, including their CGPA, abilities, and preferred technology.
- Keeps track of faculty-defined project information, such as the domain and necessary skills.
- Project reports in TXT, DOCX, and PDF formats are accepted.
- Makes use of a secure relational database.

3.2 Algorithm for Automated Project Matching

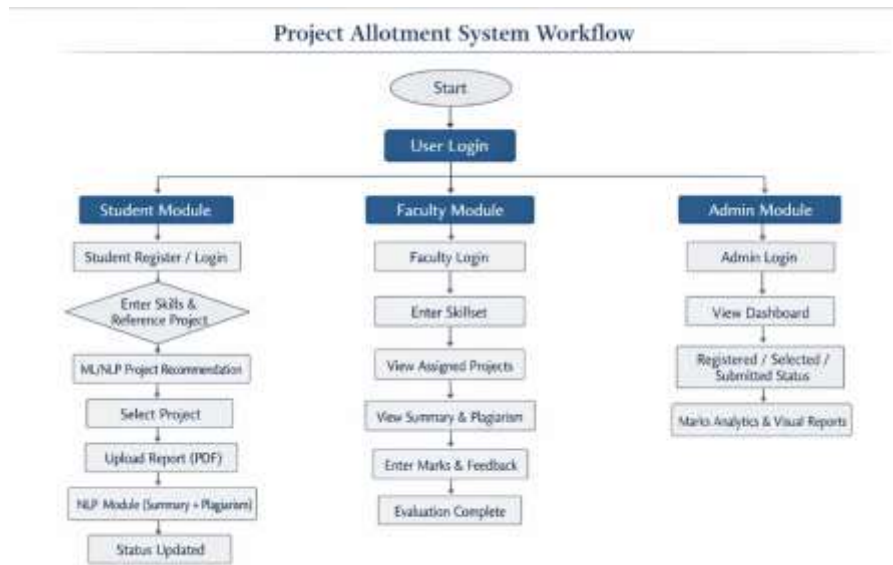
- Uses a scoring system based on rules.
- Aligns student abilities with project specifications.
- Takes CGPA and preferred technology into account.
- Automatically assigns the project with the highest score.

3.3 Report Analysis Based on NLP

- Extracts text from reports that have been uploaded.
- carries out summarization and keyword extraction.
- compares previous submissions to identify instances of plagiarism.
- helps faculty with rapid evaluation

IV. IMPLEMENTATION OF THE SYSTEM

Python is used to implement the suggested system, and Streamlit offers an interactive web-based user interface. Student, faculty, project, and report data are securely stored and retrieved using a relational database. Role-based access control and real-time communication between system components are guaranteed by the implementation.



4.1 The Technology Stack

- Frontend: Streamlit
- Backend: Python
- Database: Relational SQL database
- Authentication & Session Management: Custom Python authentication modules.
- NLP & Document Processing Libraries:
 PyPDF2 – for extracting text from PDF files
 python-docx – for reading DOCX documents
 Custom NLP utilities – for keyword extraction, text summarization, and plagiarism detection

4.2 NLP-Based Plagiarism Detection Model

TF-IDF Representation

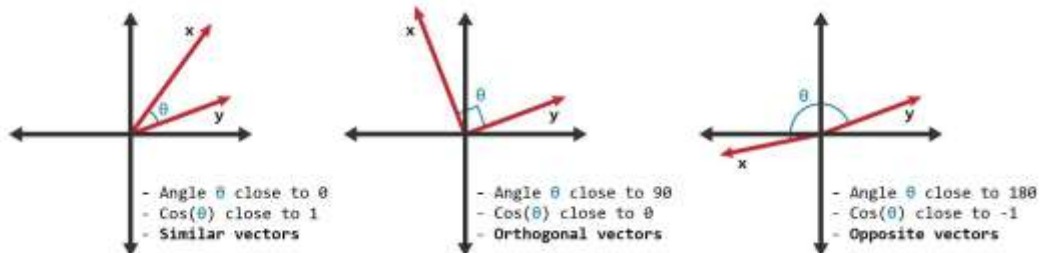
$$TF(t, d) = \frac{f_{t,d}}{\sum_k f_{k,d}}$$

$$IDF(t) = \log\left(\frac{N}{df_t}\right)$$

$$TFIDF(t, d) = TF(t, d) \times IDF(t)$$

Cosine Similarity for Plagiarism

$$Similarity(D_1, D_2) = \frac{D_1 \cdot D_2}{\|D_1\| \|D_2\|}$$



The system converts each submitted document into a TF-IDF weighted vector representation. Cosine similarity is then computed between document vectors to determine semantic overlap. A similarity scores greater than 0.8 is flagged as potential plagiarism. This method ensures objective and scalable plagiarism detection.

V. CONCLUSION AND FUTURE SCOPE

This research presented an Automatic Project Allotment System that integrates skill-based matching with NLP-powered academic report evaluation. The proposed system successfully automates project allocation, reduces manual effort, and enhances transparency and efficiency in academic project management. The implementation demonstrates practical usability through role-based dashboards and automated evaluation features.

Future Scope:

- Integration of machine learning-based project matching models
- Use of transformer-based semantic similarity techniques such as BERT
- Support for real-time collaboration and feedback mechanisms
- Cloud-based deployment for improved scalability and institutional adoption

VI. REFERENCES

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