



Intelligent Project Scheduling Assistance System

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Abstract

The Intelligent Project Scheduling Assistance System is a web-based platform designed to help students effectively plan and manage academic projects. Students often face challenges in selecting suitable topics, identifying required skills, and completing projects on time. This system provides a structured approach to overcome these difficulties through intelligent support. It allows students to perform skill assessments to evaluate their current competencies. The system compares student skills with project requirements to identify gaps. Based on this, it performs skill gap analysis and highlights areas for improvement. Personalized learning recommendations are provided to help students enhance their skills.

The platform also generates project schedules with defined milestones for better planning. Students can track their progress and complete tasks systematically. Faculty members can monitor progress, provide feedback, and guide students effectively. The system is developed using Python (Flask), MongoDB, and web technologies like HTML, CSS, and JavaScript. Overall, it improves project management efficiency and enhances student learning outcomes through data-driven insights.

Introduction

The Intelligent Project Scheduling Assistance System is a web-based application designed to assist students in planning, organizing, and managing their academic projects effectively. In many academic institutions, students often face difficulties in selecting suitable projects, identifying the necessary skills, and completing tasks within the specified time frame. This system provides a structured platform that helps students analyze their current skill levels and plan their project activities efficiently. The system enables students to perform skill assessments, identify skill gaps, and receive learning recommendations to improve their abilities. It also generates an intelligent project schedule that includes milestones and deadlines, allowing students to track their progress throughout the project lifecycle. Faculty members can monitor student activities, provide mentoring support, and give feedback through the system. By integrating skill analysis, scheduling, and progress tracking, the system improves the efficiency of academic project management.

Project planning and scheduling are essential components of successful academic and professional work. Traditionally, students manage their projects manually without a proper structure or guidance, which often leads to poor time management, incomplete

tasks, and lack of skill development.

With the advancement of web technologies and intelligent systems, it has become possible to design platforms that assist students in managing their academic work more efficiently. The concept of skill assessment and gap analysis helps identify the difference between the skills required for a project and the skills possessed by a student. By analyzing this gap, the system can suggest suitable learning resources and help students develop the required competencies.

The main objectives of the Intelligent Project Scheduling Assistance System are: To provide a platform for students to plan and manage their academic projects. To perform skill assessment for evaluating student capabilities. To identify skill gaps between required project skills and student skills. To generate an optimized project schedule with milestones. To provide learning recommendations and resources for improving skills. To enable faculty mentoring and feedback for student projects. To help students align their projects with industry skill requirements and career goals.

The scope of this project focuses on improving project planning and management for students through an intelligent web-based system. The system allows students to evaluate their skills, identify missing competencies, and receive suggestions for improving their abilities before starting or during the project development

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process. The application supports project scheduling, milestone tracking, and progress monitoring, which helps students complete their projects within deadlines. Faculty members can also use the system to monitor student performance and provide guidance when necessary. Although the system is mainly designed for academic projects, the concept can be extended to professional project management, skill development platforms, and career planning systems in the future.

This report is organized into several chapters to provide a clear understanding of the project development process.

Related Work

A review of existing systems indicates that traditional project management tools primarily focus on task scheduling, resource allocation, and deadline management, helping users organize activities but failing to consider individual student skill levels. As a result, students often select projects that do not align with their competencies, leading to difficulties during execution. Several studies highlight the importance of skill assessment in evaluating user capabilities, while skill gap analysis techniques are used to identify the difference between required and existing skills, enabling better understanding of missing competencies. Recent advancements emphasize the adoption of web-based platforms for academic project management, which provide centralized access for students and faculty and support features such as progress tracking and report generation. However, most existing systems lack intelligent decision-making capabilities, automated scheduling, and personalized learning recommendations. Furthermore, limited integration of mentoring and feedback mechanisms reduces their overall effectiveness. Some systems partially address scheduling but ignore skill-based project alignment. Therefore, the proposed system overcomes these limitations by integrating skill assessment, skill gap analysis, intelligent scheduling, and mentoring support into a unified and efficient platform.

Existing System Approach

In many educational institutions, project planning and management are primarily carried out manually by students and faculty members without the support of a structured system. Students usually select project topics based on their own understanding and organize their work using basic tools such as notebooks, spreadsheets, or simple task management applications. Existing systems mainly focus on general project management, where tasks and deadlines are assigned manually, but they do not consider individual student skill levels or compare them with the requirements of a project. This often leads to inappropriate project selection and difficulties in execution due to a lack of necessary knowledge and skills. Furthermore, most current approaches lack advanced functionalities such as skill gap analysis, intelligent scheduling, progress tracking, and mentoring support, resulting in inefficient project management and limited skill development.

Disadvantages of the Existing System:

- Lack of automatic skill assessment for students
- Absence of skill gap analysis to identify missing or weak skills
- Manual project scheduling leading to poor planning
- No personalized learning recommendations for skill improvement
- Limited progress monitoring and milestone tracking

- Difficulty for faculty in monitoring student progress and providing structured mentoring

Proposed System

To overcome the limitations of the existing system, the Intelligent Project Scheduling Assistance System is proposed. This system provides a web-based platform that helps students plan and manage their projects efficiently by using intelligent analysis and structured scheduling methods.

The proposed system allows students to perform skill assessments to evaluate their abilities. The system compares these skills with the skills required for a specific project and performs skill gap analysis to identify missing competencies. Based on this analysis, the system provides learning recommendations and resources to help students improve their skills. The system also generates an intelligent project schedule with defined milestones and deadlines. Students can track their progress and update completed tasks, while faculty members can monitor student performance and provide feedback or mentoring support.

Methodology

The methodology of the Intelligent Project Scheduling Assistance System follows a structured and modular approach to support efficient academic project management. Initially, users register and log in securely through the authentication module. After logging in, students perform a skill assessment by rating their current competencies, and the system stores this data for further processing. The system then retrieves the required skills for selected projects and performs a skill gap analysis by comparing them with the student's existing skills.

Based on this analysis, the system identifies missing or weak skills, prioritizes them, and generates personalized learning recommendations along with relevant resources. Subsequently, an optimized project schedule with tasks and milestones is automatically generated to guide students in completing their work systematically. Students can manage tasks and update their progress through the tracking module, while faculty members monitor progress and provide feedback and mentoring support. The entire system operates on a three-tier architecture comprising frontend, backend, and database layers, ensuring efficient data processing and communication.

Overall, the integration of skill assessment, gap analysis, recommendation generation, scheduling, and monitoring modules enables effective project planning and successful completion.

System Architecture

System architecture represents the overall structure of the application and how different components interact with each other. In this project, a three-tier architecture is used consisting of the user interface, backend server, and database. The frontend is developed using HTML, CSS, and JavaScript to interact with users. The backend is implemented using Python with the Flask framework to handle logic and requests. MongoDB is used as the database to store user data, project information, and progress details. System design describes the overall structure and working of the proposed system. It explains how different components of the system interact with each other to perform specific tasks. This phase converts the requirements gathered during analysis into a structured design. It includes architecture, diagrams, database structure, and system workflows. Proper system design ensures efficient performance, scalability, and maintainability of the application.

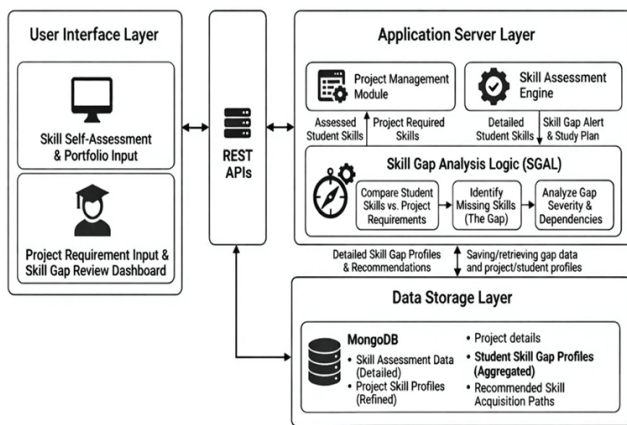


Fig-1: System architecture for Scheduling assistance system

Experimental Results

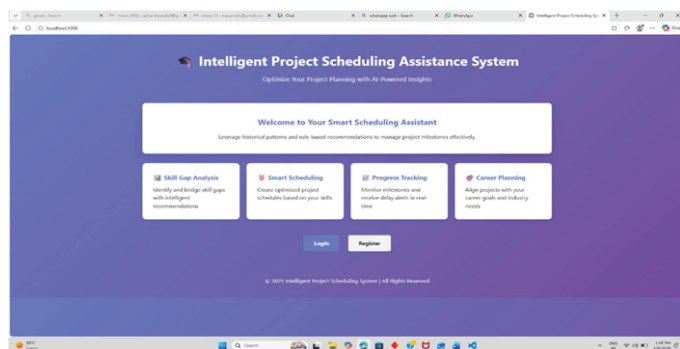


Fig-2: Home Page of the Application

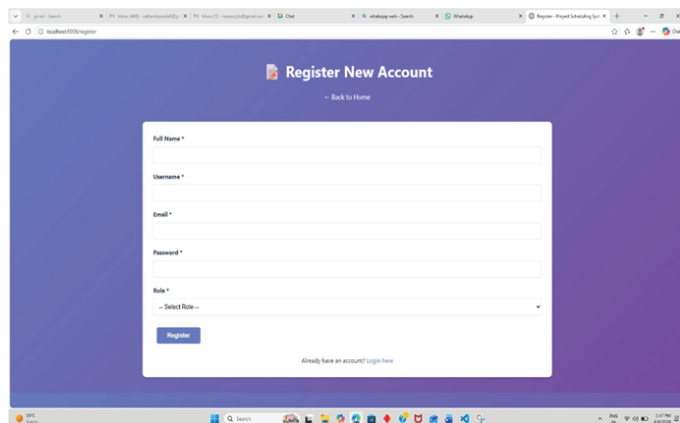


Fig-3: Register to access the Application

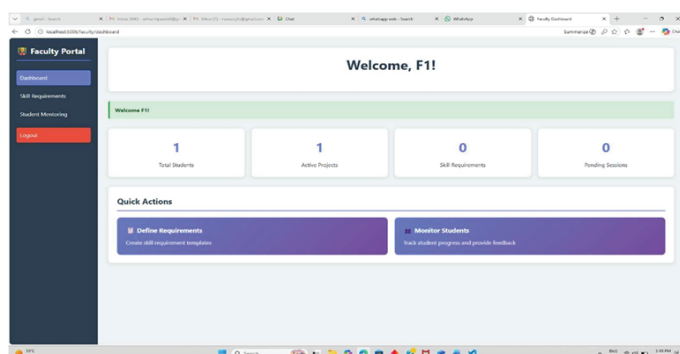


Fig-4: Faculty Dashboard

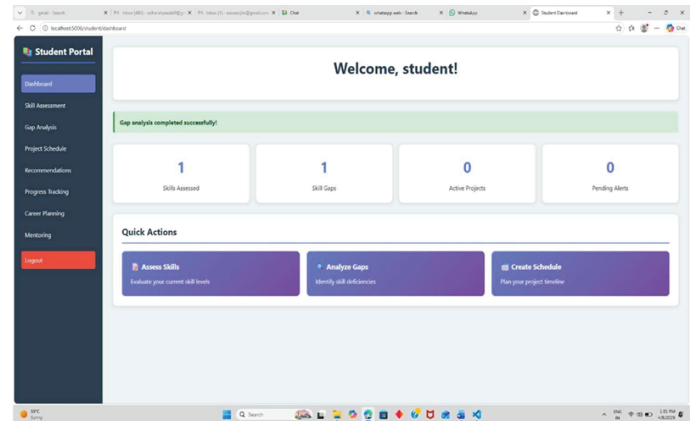


Fig-5: Student Dashboard

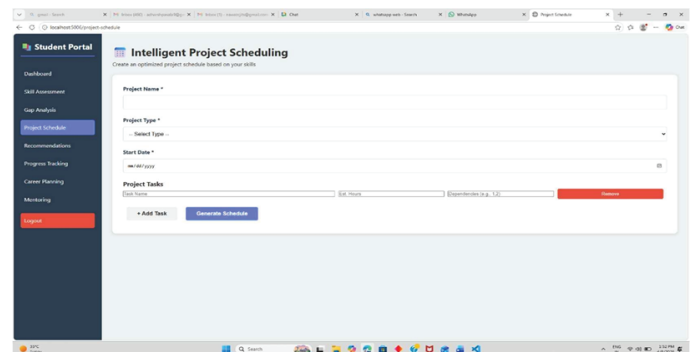


Fig-6: Scheduling the Project

Conclusion

The Intelligent Project Scheduling Assistance System was successfully developed to assist students and faculty in planning and managing project activities effectively. The system provides features such as user authentication, skill assessment, project scheduling, and progress tracking. By automating the scheduling process, the system helps users organize their project tasks and milestones in a structured manner.

The project demonstrates how modern web technologies such as Python, Flask, and MongoDB can be used to build an efficient web-based application. The system improves project planning compared to traditional manual methods by providing clear timelines and monitoring features. Overall, the developed system meets the objectives of simplifying project scheduling and improving project management efficiency.

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