International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 10 | Oct - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

PLANORA - Master Your Time, Maximize Your Learning

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Abstract - Effective study planning is a crucial skill for students to manage their academic workload, yet conventional approaches often rely on static task lists and fixed timers that do not adapt to individual learning styles. As a result, students face challenges in prioritizing tasks, sustaining focus during study sessions, and evaluating their productivity, which may lead to poor time management, irregular study habits, and increased academic stress. To address these issues, this work proposes *Planora*, an intelligent, web-based study planner that integrates adaptive learning techniques with algorithm-driven task management. The system is developed using the Flask framework and MongoDB database, providing students with a personalized dashboard to manage study routines more effectively. A greedy priority-based scheduling algorithm is employed to organize tasks according to deadlines, importance, and estimated duration, ensuring that critical activities are completed on time. A key innovation of Planora is its adaptive Pomodoro timer, which adjusts focus intervals based on a student's recent performance—reducing session length to avoid fatigue or extending it to enhance productivity. The system further computes a weekly focus score using weighted averages derived from session completion and distraction patterns. Additional features include a Generative AI-powered study assistant for academic support and visual analytics to track subject-wise efforts and productivity trends. By combining intelligent algorithms with behavioral insights, Planora offers a dynamic, data-driven study planning experience tailored to each student's learning needs.

1.INTRODUCTION

The need for effective study planning is increasing as academic institutions raise their standards. Students must balance multiple subjects, assignments, projects, and exams while maintaining a healthy study-life balance. Many still rely on traditional methods such as paper planners or simple to-do lists, which lack adaptability and intelligence. These approaches often fail to prioritize tasks, track productivity, or provide insights into study habits, leading to missed deadlines, last-minute preparation, and higher stress levels.

Existing digital tools have addressed some of these challenges by offering task management or focus timer features [1][2]. Applications like *Forest* encourage focus through gamification, while platforms like *Notion* provide flexible note-taking and organization. However, these tools often work in isolation and do not adapt to individual learning behaviors, such as varying attention spans and productivity patterns. A fixed Pomodoro timer, for example, treats all students the same, ignoring individual differences.

Planora was developed to address these issues. It is a web-based intelligent study planner that combines task management, adaptive timers, performance tracking, and AI-powered assistance in one platform. Students access personalized dashboards to manage routines, track progress, and prioritize tasks using a scheduling algorithm. An adaptive Pomodoro timer adjusts focus intervals based on performance. A Generative AI assistant offers academic guidance, while visual analytics and motivational features help students monitor study patterns and maintain consistency.

Planora thus provides a comprehensive, intelligent, and personalized solution for effective study planning.

2. Functional And Non Functional Requirements Of Planora

2.1 Functional Features

- User Registration & Onboarding: New users can register with a unique email and secure password. A short questionnaire collects age, study subjects, sleep schedule, study preferences, motivation, and distractions.
- User Login & Session Management: Secure login with MongoDB verification and JWT tokens; automatic logout after 30 minutes of inactivity.
- Personalized Dashboard: Displays best study time, neglected subjects, burnout risk, and daily streak with recommendations.
- Task Management & Scheduling: Add tasks with deadlines, importance, and duration; greedy priority-based algorithm creates an optimized plan.
- Adaptive Pomodoro Timer & Notes: Tracks focus sessions, adjusts durations based on performance, and allows timestamped notes.
- Session History & Focus Score: Logs all sessions; calculates weekly focus scores.
- Visual Analytics & Challenges: Graphs show study trends; weekly challenges earn badges.
- AI Study Assistant & Preferences: Chatbot answers queries and users can edit profile preferences.
- Password Management: Secure reset and change options.

2.2 Non-Functional Features

- Response Time: Pages such as dashboards, tasks, and session logs should load quickly, ideally within 2–3 seconds.
- Data Security: User credentials and study session data must be stored securely, with passwords encrypted to protect privacy.
- Access Control: Each student should access only their own data and features, ensuring proper role-based control.
- Usability: The interface should be simple, intuitive, and mobile-friendly.
- Data Integrity: All study records, tasks, and notes should be saved accurately to prevent data loss.
- Maintainability: The system's code should be organized and well-documented for easy updates and bug fixes.
- Reliability: Core features, including task scheduling, the Pomodoro timer, and AI study assistant, should work correctly under normal usage.

3. METHODOLOGY

The development of Planora followed the Agile Scrum methodology, an iterative and incremental approach suitable for web application development. Agile was chosen because it allows flexibility, continuous feedback, and gradual improvement, which is essential given the various features and algorithms involved. The project was divided into manageable sprints, with each sprint focusing on specific modules such as user onboarding, task management, adaptive Pomodoro timer, focus score calculation, and GenAI chatbot integration. Regular sprint reviews and retrospectives helped the team refine features based on testing and user feedback.

The requirement analysis phase was the starting point. Functional requirements were identified, including personalized user registration, JWT-based authentication, task scheduling using a priority-based algorithm, adaptive Pomodoro logic, session notes, focus score calculation, and AI-powered study assistance. Non-functional requirements, such as performance, usability, data security,

and cross-platform compatibility, were also defined to ensure smooth operation and data integrity.

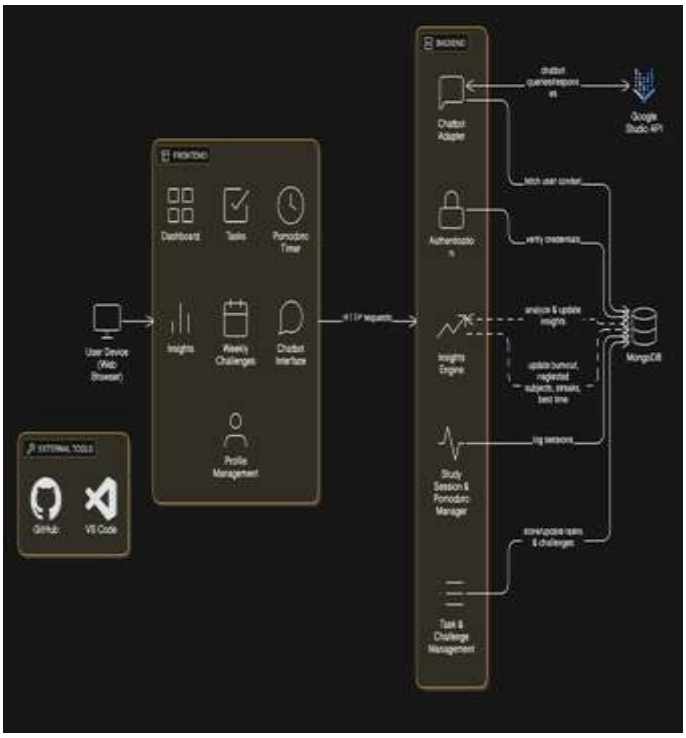
Once requirements were finalized, the system design phase used flowcharts, data flow diagrams, and database schema diagrams to visualize user workflows and data relationships. Flask was selected as the backend framework for its lightweight structure and flexibility in handling APIs and business logic, while MongoDB was used for schema-less storage of tasks, session logs, notes, and user preferences. The frontend was developed using HTML, CSS, and JavaScript to provide a responsive interface across devices.

Testing was conducted using functional and non-functional test cases. Unit testing verified individual modules such as task scheduling and the adaptive Pomodoro timer. Integration testing ensured seamless operation between modules, and the GenAI chatbot was tested with various queries to evaluate response accuracy. The system's performance and security were also tested to ensure reliable operation and safe handling of user data.

4. SYSTEM ARCHITECTURE AND DASHBOARD

The Planer is built on a three-tier architecture:

- **Frontend:** Developed using HTML, CSS, JS for interactive web.
- **Backend:** Built on Flask Python Framework for handling APIs, rule-based logic, and notifications.
- **Database:** MongoDB for storing all data in it.



5. CONCLUSION

Planora provides a major advancement in study planning by replacing traditional static methods with an intelligent, adaptive, and data-driven platform. By integrating task scheduling, adaptive Pomodoro timers, focus score tracking, and an AI-powered study assistant, the system helps students prioritize tasks, maintain focus, and monitor their productivity. Core algorithms personalize study sessions, prevent burnout, and provide quantifiable feedback on concentration. Visual analytics and motivational features encourage consistent study habits, while the secure, scalable platform ensures accessibility across devices. Overall, Planora transforms study planning into a dynamic, personalized experience that supports students in developing sustainable and effective study routines. Future enhancements could include predictive scheduling, calendar integration, collaborative study features, mobile apps, and advanced wellness analytics.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my project guide, Prof. A. S. Khapale Mam, for their valuable guidance, encouragement, and support throughout the development of Planora. I am also thankful to my college faculty and peers for their suggestions and feedback, which helped improve the project. Finally, I appreciate the resources and technologies that made this project possible, and I am grateful for the learning experience gained while completing this work.

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