

AutoSechula

(Project Proposal)

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1. Abstract

The challenge of manually creating timetables for educational institutions, including schools, colleges, and universities, has long been a cumbersome and error-prone process. This arduous task not only consumes valuable time but also often leads to scheduling conflicts, resource wastage, and reduced overall productivity. To address these pressing issues, we propose the development of an AutoSechula. This comprehensive solution combines user-friendly front-end development with robust back-end architecture, utilizing technologies such as HTML, CSS, JavaScript, jQuery, Bootstrap, PHP and Python, while securely storing data in a SQL server database. The system caters to the diverse needs of professors and students, offering an intuitive user interface and an admin dashboard for data input and editing. Moreover, it employs a

genetic algorithm to optimize timetable generation, considering custom constraints and ensuring adaptability to evolving requirements. With a focus on scalability, security, and ongoing maintenance, this AutoSechula aims to revolutionize scheduling processes, enhance efficiency, and contribute to the seamless management of time-dependent activities in educational institutions.

2. Background and Justification

The development of an AutoSechula arises from the pressing need to address the inherent challenges and inefficiencies associated with manual timetable creation. Educational institutions, businesses, and organizations frequently grapple with complex scheduling tasks, including instructor allocation, room assignment, and resource optimization, which are time-consuming and error-prone when done manually. These manual processes often result in scheduling conflicts, resource wastage, and reduced overall productivity. An automated solution is justified by its potential to streamline and optimize scheduling procedures, significantly reduce human effort and errors, improve resource utilization, and ultimately enhance the effective allocation of time-dependent activities, contributing to improved operational efficiency and satisfaction among stakeholders.

Furthermore, as educational institutions and organizations continue to evolve, there is a growing need for greater flexibility and adaptability in scheduling to accommodate various curricular or operational changes. An AutoSechula offers the ability to quickly adjust schedules in response to unforeseen events, staff availability changes, or shifting student preferences, ensuring that resources are allocated efficiently and effectively. This not only minimizes disruptions but also enhances the overall learning or operational experience. Additionally, the data analytics capabilities of such systems can provide valuable insights into scheduling trends, enabling institutions to make data-driven decisions for continuous improvement. In essence, an Automated Timetable Generator not only addresses existing scheduling challenges but also positions institutions and organizations to better navigate the dynamic demands of the modern educational and business landscape, ultimately benefiting all stakeholders involved.

3. Project Methodology

In our proposed system, we embark on the development of an AutoSechula, which is structured into four essential modules.

To commence, **the front end module** entails crafting an intuitive and user-friendly front-end, ensuring an aesthetically pleasing and efficient website layout that facilitates seamless human-computer interaction.

Subsequently, **in the data manipulation module**, we embark on data collection, storing this valuable information in a secure database, and employing genetic algorithms to train on this dataset. We go a step further by applying custom constraints to ensure that the generated timetable aligns precisely with the specific requirements.

Finally, in the **integration module**, we orchestrate the seamless integration of the website's front-end with its back-end. This integration is pivotal in ensuring the optimal functionality of the system, fostering the best possible human-computer interaction.

experience. Through these meticulously designed modules, our Automated Timetable Generator not only addresses scheduling challenges but also provides a comprehensive and user-centric solution for educational institutions and organizations, elevating efficiency and satisfaction across the board.

4. Project Scope

The scope of the AutoSechula project, with a focus on educational institutions like schools, colleges, and universities, is well-defined and comprehensive:

Front-End Development: The project encompasses the development of a user-friendly front-end for the website using HTML, CSS, JavaScript, jQuery, and Bootstrap. This front-end will provide an intuitive and visually appealing interface for both professors and students.

Back-End Development: Python will be used to build the back-end of the website, ensuring robust functionality and efficient data processing for timetable generation.

Database Management: Data will be securely stored in a SQL server database, guaranteeing the safety and integrity of all scheduling information. Database management will be a crucial component of the project.

Target Audience: The primary target audience for this automated timetable generator includes professors and students within educational institutions. The system will cater to the specific needs and preferences of these users.

Automated Timetable Generation: The core functionality of the project is the implementation of a genetic algorithm for automated timetable generation. It will consider various factors such as instructor availability, room allocation, and department-specific constraints to create optimized timetables.

Adaptability: The system will be designed to accommodate changes in scheduling requirements, making it suitable for a dynamic educational environment.

Security and Data Privacy: Ensuring the security and privacy of stored data is of paramount importance. The use of a SQL server database will provide robust data security measures.

Scalability: The system may be designed to scale with the growing needs of educational institutions, accommodating a larger number of departments, professors, and students as necessary.

User Support and Training: The project scope may include provisions for user support and training to ensure that professors and students can effectively use the automated timetable generator.

Data Insights and Reporting: Optional features for generating data insights and reports based on scheduling trends may be considered, offering valuable information for decision-making and optimization.

5. High-Level Project Plan:

1. Project Initiation Phase

- Identify key stakeholders, including educational institutions, professors, and students.
- Formulate a project team with roles and responsibilities.
- Develop a project charter outlining the project's purpose, goals, and key milestones.

2. Requirements Gathering and Analysis Phase

- Analyze existing systems and processes to identify gaps and areas for improvement.
- Document custom requirements of teaching staff and their constraints.
- Document functional and non-functional requirements for the automated timetable generator.
- Create use cases, user stories, and system flow diagrams to visualize the system's functionality.

3. Design and Development Phase

- Design the user interface prototype, focusing on user-friendliness and ease of navigation
- Develop the website using HTML, CSS, JavaScript, jQuery, and Bootstrap to create a responsive and visually appealing front-end.
- Formulate the gathered data for training the genetic algorithm.
- Develop and fine-tune the genetic algorithm to optimize timetable generation.

4. Deployment and Roll-out Phase

- Set up the web application on a production server, ensuring compatibility with various web browsers.
- Configure and deploy the admin dashboard on a secure server with proper access controls for authorized administrators.

- Enable admin login with credentials and provide the functionality to edit timetables if necessary, ensuring user access control and data security.

5. Maintenance and Support Phase

- Establish a maintenance plan to address future enhancements, bug fixes, or updates based on user feedback and changing requirements.
- Provide ongoing technical support to users, addressing their queries and issues promptly through a designated support system.
- Monitor the system's performance, security, and scalability, making necessary improvements as required to ensure a seamless user experience and system reliability.

6. References

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