SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID –** 25028
- **Problem Statement Title-** Smart Classroom & Timetable Scheduler
- **Theme-** Smart Education
- **PS Category-** Software
- **Team ID-** N/a
- **Team Name (Registered on portal):** The AMAZERS

The AMAZERS

IDEA TITLE

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❖ Proposed Solution (Describe your Idea/Solution/Prototype)

- Our solution is a digital system that allows the college to input key details such as the **number of blocks, rooms, subjects offered, room capacities, student batches, maximum number of classes per day or week, faculty assignments, and shift timings**. Based on this information, the system automatically allocates appropriate rooms to each class and reschedules any classes that cannot be accommodated to the next available shift. **It also keeps track of vacant rooms for quick updates during timetable changes and provides timetable management for teachers as well**.

- Our solution automatically organizes and updates class and faculty schedules, preventing clashes and double bookings while greatly reducing the manual time and effort required to prepare and adjust timetables, resulting in smoother planning for both teachers and students.

- Our system takes real-time information into account, including faculty availability, room capacity, teaching load requirements, subject combinations, and student preferences, ensuring that schedules are practical, balanced, and tailored to actual needs.

- Our solution stands out because it uses real-time data to automatically manage all aspects of class scheduling, including faculty availability, room capacity, teaching loads, subject combinations, and student preferences. Unlike traditional methods, it offers a fully integrated system that ensures practical, conflict-free, and balanced timetables, while saving significant time and effort for both staff and students. This unique approach combines automation with live updates, providing a smart, user-friendly platform that addresses every scheduling need in one place.

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TECHNICAL APPROACH

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- **Frontend:** HTML, CSS, JavaScript, React for building a responsive and interactive web interface.
- **Backend:** Python for AI-powered features and handling logic, with JSON used for smooth data exchange.
- **Automation:** n8n for workflow automation to manage processes and integrations seamlessly.

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WORKFLOW

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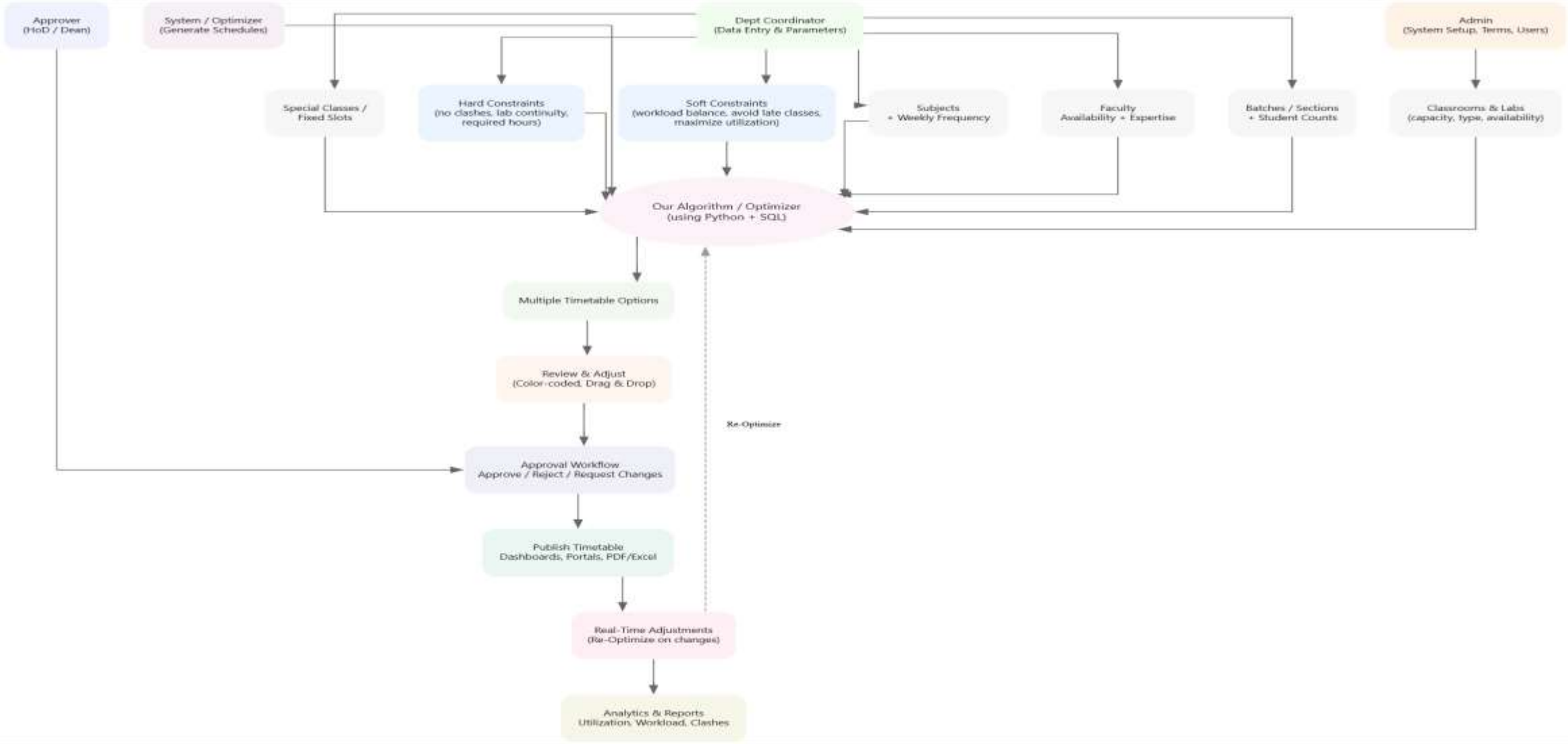

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FEASIBILITY AND VIABILITY

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- This project is highly feasible and practical, using proven web technologies (HTML, CSS, JavaScript, React) and Python for AI-driven scheduling, with n8n for workflow automation and Assistant support. These tools are widely supported, cost-effective, and easy to maintain, making development, deployment, and future upgrades simple. The approach is adaptable to different college environments, reduces errors, and saves time. Similar solutions are already being used globally, proving its real-world value. This system will make complex scheduling smooth, quick, and flexible, benefiting students, teachers, and administrators.

- Potential challenges of this project include staff and students not getting enough training to use the new tools well, and transferring all old data safely without mistakes. There could also be difficulties in making sure the new system works well with existing software and in keeping sensitive information secure.

- To overcome these challenges, the project should offer clear training for everyone via video and text, plan careful steps for bringing old data onto the new system, and choose user-friendly, flexible technology. It’s helpful to keep lines of communication open for feedback, make security a top priority, and move forward with step-by-step testing before a full launch. These strategies will make the transition much smoother and safer for the whole college community

IMPACT AND BENEFITS

- **Students:** Get clear, clash-free timetables, reducing stress and confusion. Easy online access to updated schedules anytime.
- **Faculty:** Fair distribution of workload and better class planning. Automatic updates save time and reduce manual effort.
- **Administrators/Management:** Saves time in preparing and adjusting timetables. Optimized use of classrooms and resources lowers costs. Enables data-driven decisions for resource allocation.

- Automates scheduling to **save time and reduce errors**. Ensures fair **workload distribution** and efficient resource use. Provides easy access to updated timetables anytime. Scales easily for **larger institutions and future growth**.

RESEARCH AND REFERENCES

N8N Workflows:

1. (https://github.com/Zie619/n8n-workflows)
2. (https://github.com/enescingoz/awesome-n8n-templates)
3. (https://github.com/orgs/n8n-io/repositories)

Google research for avoiding mistakes:

1. (https://www.fieldproxy.com/blog/disadvantages-of-manual-job-scheduling)
2. (https://www.grtech.com/blog/7-mistakes-to-avoid-when-creating-a-school-timetable)

Some Libraries and Queries:

1. (https://research.aimultiple.com/python-job-scheduling/)
2. (https://web.mit.edu/decima/content/sigcomm-2019.pdf)
3. (https://stackoverflow.com/questions/12089431/database-table-design-for-scheduling-tasks)