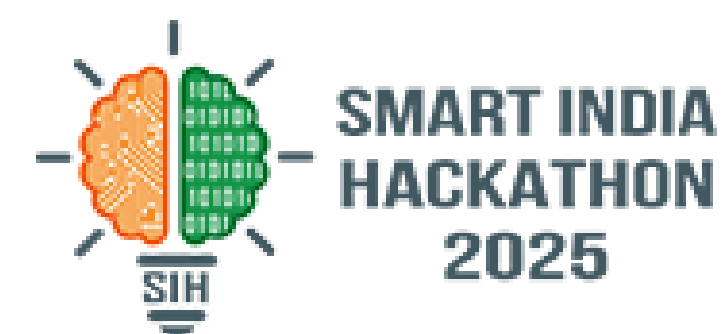


SMART INDIA HACKATHON 2025



TITLE PAGE

- **Problem Statement ID: 25028**
- **Problem Statement Title: Smart Classroom & Timetable Schedule**
- **Theme: Smart Education**
- **PS Category: Software**
- **Team ID: 25RBU040**
- **Team Name (Registered on Portal): Smartcoders**



Idea Title : Smart Classroom & Timetable Scheduler



Our Idea

- Smart Classroom + Timetable Scheduler (Web & Mobile).
- Auto clash-free timetables with real-time updates.



How It Works

- Admin enters data → AI generates timetable.
- Auto-reschedule & notify if teacher/classroom unavailable.
- Smart features → attendance, alerts, resource sharing.



Why It Solves the Problem

- Saves time, avoids errors & clashes.
- Keeps students & teachers updated.



What's Unique

- AI-based scheduling & rescheduling.
- Combines timetable + classroom management.
- Future-ready with IoT integration.

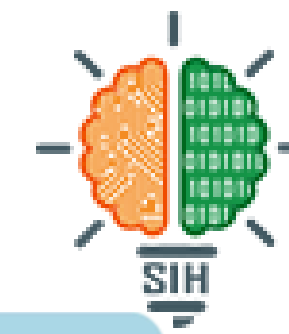
Admin Inputs Data
(Teachers, Subjects, Classrooms)

AI Generates Timetable

Clash-Free Timetable

Auto-Reschedule & Notify

Smart Features
(Attendance, Alerts, Resources)

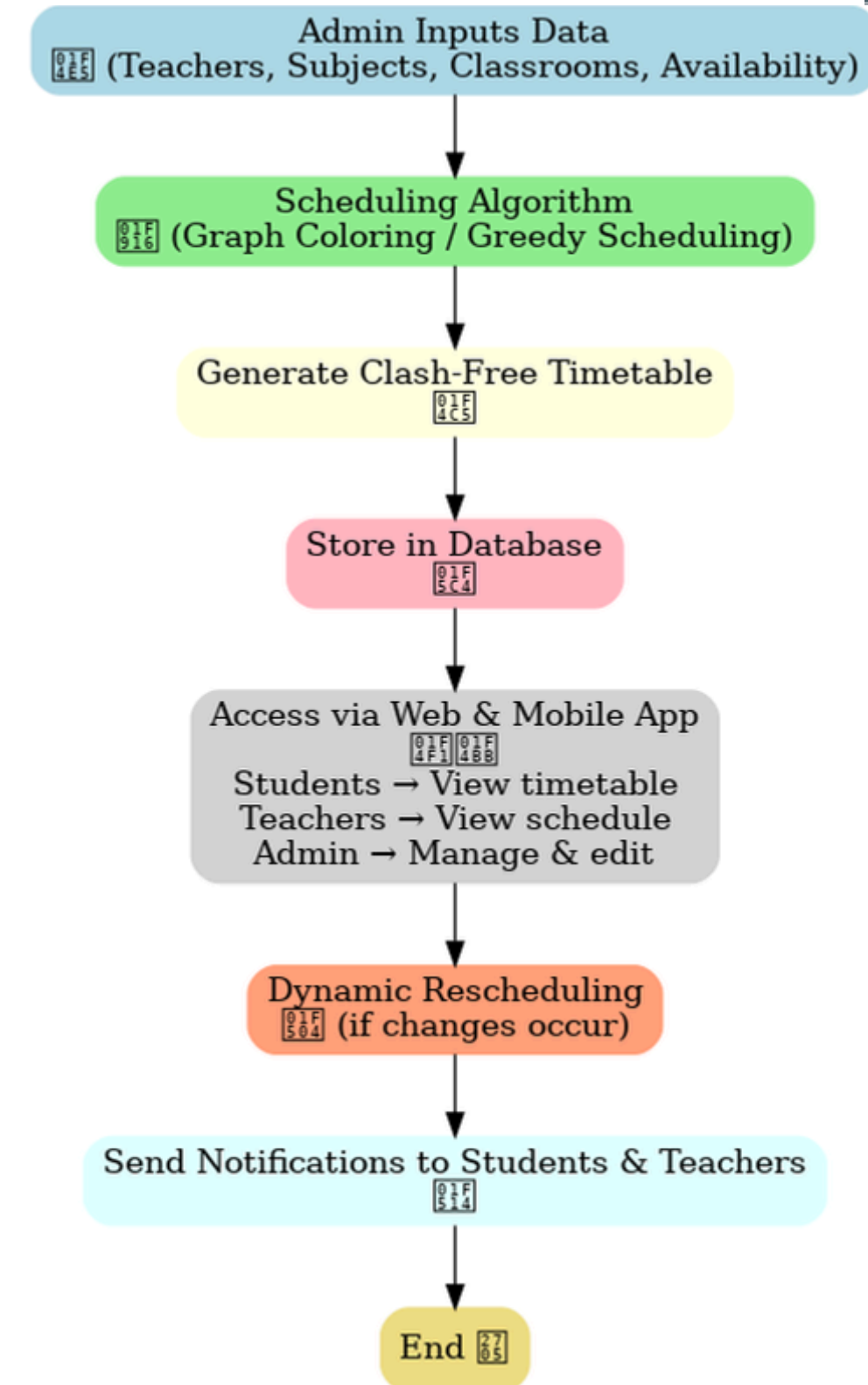


Technologies Used

- Frontend : React / Flutter
- Backend : Node.js
- Database : MySQL
- AI Algorithm : Graph Coloring / Greedy Scheduling (for clash-free timetable generation).
- (Optional) IoT → QR/Face Attendance, Smart Sensors

Methodology

- Input → Subjects, teachers, classrooms.
- AI Engine → Generates clash-free timetable.
- Output → Web & Mobile access for students/teachers.
- Dynamic Rescheduling → Auto-update & notify on changes.
- Smart Features → Attendance, alerts, resource sharing.



Feasibility Analysis

- Automates timetable creation → saves time
- Minimizes clashes & human errors
- Real-time updates via Web & Mobile

Potential Challenges & Risks:

- Conflicting teacher/classroom availability
- Performance issues with large data
- User adoption & training difficulties

Strategies to Overcome Challenges:

- Apply robust scheduling algorithms (Graph Coloring / Greedy)
- Optimize database & app performance
- Provide intuitive UI & user training

Feasibility Analysis

Feasibility Analysis

- ⌚ Automates timetable → saves time
- ⚡ Minimizes clashes & errors
- 📱 Real-time updates via Web & Mobile

Challenges & Risks

- ⚠ Conflicting teacher/classroom availability
- ⚠ Performance issues with large data
- ⚠ User adoption & training difficulties

Strategies to Overcome

- 💡 Robust scheduling algorithms
- 👤 Optimize database & app performance
- 👤 Intuitive UI & training

Potential Impact on Target Audience:

 Students → Easy access to timetable & updates, reduces confusion

 Teachers → Simplifies schedule management, reduces workload

 Admin → Efficient timetable creation & management

Benefits of the Solution:

 Social: Improves communication & organization in educational institutions

 Economic: Saves time and resources in scheduling

 Environmental: Reduces paper usage with digital timetables



Research Paper: A Classroom Scheduling Service for Smart Classes – IEEE

<https://doi.org/10.1109/TSC.2015.2444849>

Article: Designing a Smart System for Building Student's Schedule – IJAAS, 2021

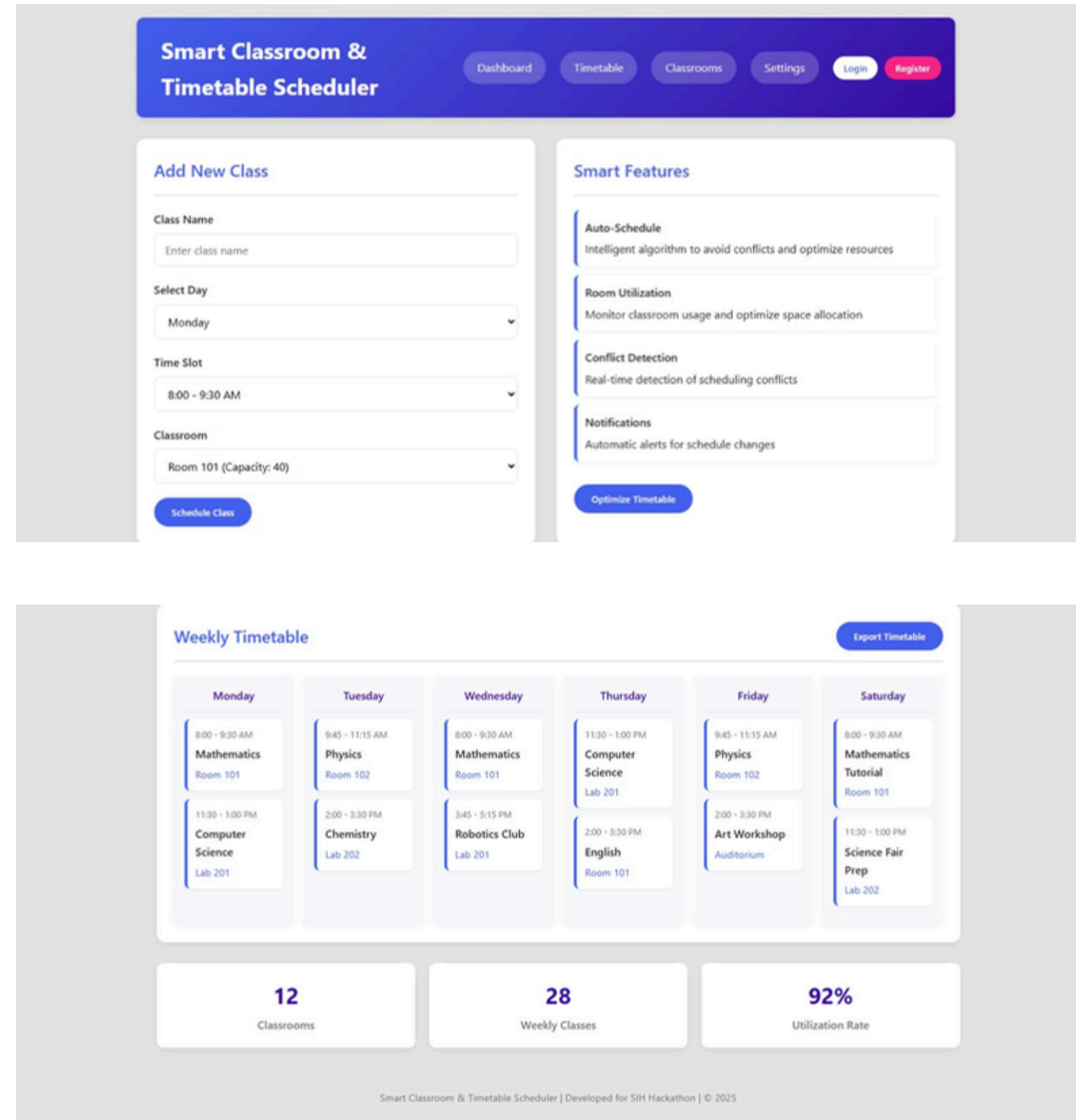
<https://doi.org/10.21833/ijaas.2021.01.011>

Research Paper: Smart Classroom Scheduling and Resource Optimization for Educational Institutions – EJRND, 2025

<https://www.journals.orclever.com/ejrnd/article/view/644>

Research Paper: Explicit AI Timetable Generator for Colleges and Universities – Open Journal of Applied Sciences, 2025

<https://www.scirp.org/journal/paperinformation?paperid=144830>



The screenshot displays the 'Smart Classroom & Timetable Scheduler' web application. The interface features a top navigation bar with links for Dashboard, Timetable, Classrooms, Settings, Login, and Register. The main content area is divided into two sections: 'Add New Class' and 'Smart Features'.

Add New Class Section:

- Class Name:** A text input field with the placeholder 'Enter class name'.
- Select Day:** A dropdown menu currently showing 'Monday'.
- Time Slot:** A dropdown menu currently showing '8:00 - 9:30 AM'.
- Classroom:** A dropdown menu currently showing 'Room 101 (Capacity: 40)'.
- Schedule Class:** A blue button to submit the class information.

Smart Features Section:

- Auto-Schedule:** Intelligent algorithm to avoid conflicts and optimize resources.
- Room Utilization:** Monitor classroom usage and optimize space allocation.
- Conflict Detection:** Real-time detection of scheduling conflicts.
- Notifications:** Automatic alerts for schedule changes.
- Optimize Timetable:** A blue button to optimize the current schedule.

Weekly Timetable Section:

This section shows a weekly schedule grid with columns for each day of the week (Monday to Saturday). Each cell in the grid displays the time slot, subject, and room number.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8:00 - 9:30 AM Mathematics Room 101	9:45 - 11:15 AM Physics Room 102	8:00 - 9:30 AM Mathematics Room 101	11:30 - 1:00 PM Computer Science Lab 201	9:45 - 11:15 AM Physics Room 102	8:00 - 9:30 AM Mathematics Tutorial Room 101
11:30 - 1:00 PM Computer Science Lab 201	2:00 - 3:30 PM Chemistry Lab 202	3:45 - 5:15 PM Robotics Club Lab 201	2:00 - 3:30 PM English Room 101	2:00 - 3:30 PM Art Workshop Auditorium	11:30 - 1:00 PM Science Fair Prep Lab 202

Below the timetable grid, there are three summary cards:

- 12 Classrooms**
- 28 Weekly Classes**
- 92% Utilization Rate**

At the bottom right, there is an 'Export Timetable' button. The footer text reads: 'Smart Classroom & Timetable Scheduler | Developed for SIH Hackathon | © 2025'.