AutoTimely: An Automatic Timetable Generator

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Abstract: *Academic scheduling is a complex and time-consuming process that requires balancing multiple constraints such as faculty availability, subject distribution, and classroom capacity. Manual timetable preparation often results in scheduling conflicts, uneven workload distribution, and administrative inefficiency. This research proposes AutoTimely, an intelligent, automated timetable generator designed to address these challenges using optimization algorithms. The system integrates Genetic Algorithm (GA) and Constraint Satisfaction Problem (CSP) techniques to generate efficient, conflict-free schedules. The GA component handles optimization through selection, crossover, and mutation operations, while CSP ensures hard constraints are satisfied. The proposed system is developed using Python (Flask), HTML/CSS/JavaScript, and JSON for data storage. Experimental validation using real institutional data demonstrated that AutoTimely reduced scheduling time by 40% and minimized conflicts to less than 2%. The study concludes that hybrid optimization models can significantly enhance academic timetable generation, providing a scalable and efficient solution for educational institutions.*

Keywords: Automatic Timetable Generator, Genetic Algorithm, Constraint Satisfaction Problem, Flask, Optimization