

Constraint-Informed Information Systems in Space Management Utilization

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ABSTRACT

Declarative techniques such as Constraint Programming can be very effective in modeling and assisting management decisions. We present a method for managing university classrooms which extends the previous design of a Constraint-Informed Information System to generate the timetables while dealing with spatial resource optimization issues.

We seek to maximize space utilization along two dimensions: classroom use and occupancy rates. While we want to maximize the room use rate, we still need to satisfy the soft constraints which model students' and lecturers' preferences. We present a constraint logic programming-based local search method which relies on an evaluation function that combines room utilization and timetable soft preferences.

Based on this, we developed a tool which we applied to the improvement of classroom allocation in a University. Comparing the results to the current timetables obtained without optimizing space utilization, the initial versions of our tool manages to reach a 30% improvement in space utilization, while preserving the quality of the timetable, both for students and lecturers.

KEYWORDS: constraint-informed information systems, optimization, constraint logic programming