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Research Topic

Scheduling and Planning

Research Problem

How do you formulate a mixed optimization-goal satisfaction problem that is responsive to new requirements that incrementally constrain the problem further over time?

Problem Statement

Given a fixed number of processes, process priorities, scarce resources, and a random number of constraints that may change over time, construct a tool to automate the human decision process for scheduling the processes in a manner that the schedule can be easily modified to accommodate dynamic new requirements and constraints.

Problem Description

Develop scalable execution driven techniques for complex organization planning and scheduling. In complex organizations many processes may compete for scarce resources and they may need to be executed in a particular order. This lays the basis for research in scheduling and planning. Practical problems can rarely be formulated as static optimization (scheduling) or goal satisfaction (planning) problems. Many problems are at the intersection of these research fields and they have a dynamic dimension as new requirements incrementally constrain the problem further. Computers are used to automate human decision making in these problems.

Computer Science Perspective

Traditional solutions to problems in scheduling and planning in complex systems are computationally large. Reacting to incremental changes efficiently is not possible without the aid of a computer. Computers make efficient solution techniques tractable for many practical problems.

Disciplines Actively Involved

Management, Operations Research, Statistics

Other Discipline Involved

Operations research involves many of the optimization methods and decision analysis discussed in this research. Scheduling is a classic operations research problem. Planning problems are often studied in the field of management research. The research also relies heavily on applied statistics.

Actively Involved Discipline is defined as a discipline associated with an investigator working on the research problem.

References

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- Cesta, A., A. Oddi and S.F. Smith, "[A Constraint-Based Method For Project Scheduling with Time Windows](#)", *Journal of Heuristics*, Volume 8, 2002, pp 109-136.
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