Arguing Agents : Project Plan

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Problem & Relevance

For this project we want to look at the problem of scheduling, or booking appropriate rooms for lectures or practicals. Due to various factors such as different room sizes, the number of course enrolments, equipment requirements and preferences of lecturers, we have a problem that contains both desires, which have the possibility of being fulfilled, and requirements, which need to be fulfilled. Together with the fact that there are resource limitations on the number of rooms and timeslots, we think that an artificial intelligence solution is useful here to create schedules that satisfy these needs.

State of the Art

The state of the art scheduling software seems to be Syllabus Plus. It is currently being used by the University of Groningen, along with a very large number of other universities and colleges throughout the world. Syllabus Plus is described as an artificial intelligence solution, which operates by first processing the foundation data, including locations, staff and preferences. Secondly, the program imports and refines all available student data. Lastly, Syllabus Plus uses a constraint satisfaction problem solver to create a schedule out of the hard constraints, soft constraints, rules and preferences that were extracted out of previous data.

The state of art for arguing and scheduling is described in recent paper by Kuo et al. [2011]. Here each agent makes their own proposal for a schedule, after which the utilities for each proposal per agent is calculated. This is used to calculate a risk. The agent with the lowest risk has to drop one of their proposals and a new round starts. If an agent can make no more proposals argumentation begins. Here the agent that can make no more proposals argues with one agent at a time until one of the agents concedes one of their constraints. Their believes get updated and new proposals are generated for each agent. This process continues until consensus is reached.

New Idea

Our aim is to take a personal approach to the scheduling problem and perceive each lecturer as an agent who wants to fulfil his or hers desires. We go over each of the room/time combinations and each agent can put forward a claim to this room/time. The agents that put forward a claim then have to defend this claim using arguments. Once there is only one agent with a defensible claim it gets assigned that room/time. This process continues until all classes are scheduled.

Results

We hope that by creating a forum in which agents can attack or defend various claims a schedule that takes all preferences and constraints into account and adequately satisfies the desires of all agents. With regards to the evaluation of our results we plan to asses our success through the number of constraints that are fulfilled and the number of desires that are satisfied.

References

Jong Yih Kuo, Hsuan-Kuei Cheng, Yong-Yi FanJiang, and Shang-Pin Ma. Multi-agent automatic negotiation and argumentation for courses scheduling, 2011.