

Negotiator Agent ANAC 2011 competition

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Thijs van Krimpen
Daphne Looije
Siamak Hajizadeh

Brief description of the *Amsterdam* domain

The domain describes a trip to Amsterdam and includes issues like, what time of day to travel, duration of the trip, the type of venues to be visited, the means of transportation and the day of the week.

This domain is moderately large as the utility space has approximately 10000 possible bid configurations. The preference profiles specify a generous win-win scenario, it would be unrealistic for 2 friends to make a trip to Amsterdam and to have it be a zero-sum game. The pareto frontier is therefore quite convex.

The size of the domain enables the agent to communicate their preferences, by means of generating bids, without having to concede far. Also the magnitude of the domain puts agents which use a random method of generating bids at a disadvantage. As the odds of randomly selecting a pareto optimal bid in a large domain are small. So this domain will give an advantage to agents that make some attempt to learn the opponents preference profile, and that is capable of rapidly choosing offers.

Brief description of the HardHeaded agent

The agent is divided into three functional groups, main class `KLH`, `BidHistory` and `BidSelector`. Main class provides the decision making and interfaces with the environment. `BidHistory` stores all the bids made, both those made by the agent itself and those of the opponent. `BidSelector` sorts all possible bid configurations into an ordered `TreeMap`.

Our general strategy is to use a concession function that specifies an increasing rate of concession in time for the agent. Bids are generated in monotonic way which resets to a random value after the dynamic concession limit is reached. On domain with a defined discount factor, time line is split into two phases over which the agent behaves differently. For more detail on the general strategy implemented please refer to “Optimal Negotiation Strategies for Agents with incomplete Information” – S. Shaheen Fatima *et al* 2001.

By using a simple learning module, the agent also tries to chooses bids that are supposedly optimal for the opponent – from a list of equivalent bids for itself, to increase chances of reaching an agreement with over a shorter period of time.