ANAC 2022 Academic report

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In this report I will present my bidding agent, I called my agent ThirdAgent.

Bidding Strategy:

My main goal in striking a deal is to maintain a fair profitable outcome for my agent, while meeting the other party's favorite needs in order to achieve an agreement.

Therefore, the goal of our agent Is to behave reasonably against the other party while not losing sight of our own interest. To achieve that we balance our own needs (a fair utility score) with an evaluation of the other agent's needs (their own personal favorite needs).

My agent saves history of bid for each opponent to learn their favorite items,

also accepts bid if the utility is equal or greater than 2/3. Offers a bid if the utility

for our agent is 1/3 and try to find the best offer for the specific opponent with the help

of his bid history along the sessions.

Using frequency analysis model with walk-down strategy and Boulware-style concession.

Finds the best offer for us and the opponent to reach desirable agreement and results, in the walk down strategy, stops until offered utility value is equal to 1/3 (third of our goal/utility).

There is a public dictionary that stores the names of our opponents and their history of bids from all the sessions, which is used and updates in all sessions.

Walk down/ top down – From the highest utility to the lowest, by sorted structure.

The advantage of this approach is that decisions can be made and implemented very quickly. This is particularly important when time is limited.

Boulware concession - places random bids and accepts when it receives an offer

with sufficient utility.

Acceptance Strategy:

Using the heuristic function defined above, the acceptance strategy is rather straightforward.

We accept bid if either:

- The utility score of the bid is equal/higher than 2/3 , meaning that this bid is quite valuable for us.

-If 90% of the rounds towards the deadline have passed

and no progress made. Then switching to the concession strategy.

-Else if 75% of the rounds towards the deadline have passed the our agent will use acceptance strategy here called : AC_NEXT

Opponent Modelling:

Adding new bid/offer to the history, if issue is not recorded in the

"issue_to_numeric" then assign a numeric representation of the issue and save it in the

dictionary.

Same for values, if there are missing numerical representation for them. Create one in

dictionary value to numeric.

If issue doesn't exist in the categorical-numerical mapping in dictionary "map_issues_to_numeric_and_initialize" then initialize. Same goes for values.

After that, we analyzing opponent's profile by calculating the mode and variance of values per issue. We also are mapping from categorical to numerical with values from the issue.

Learning method:

Saves history of bid for each opponent to learn their favorite items, and while the sessions my agent keep track of frequencies of the values in bids received by

the opponents over period of time.

After that sorting those bids that high frequencies (all the bids even from pervious sessions with the specific agent) based on the utility values in order to find his favorite needs and the best offer.