UOAgent Strategy

Matsumoto Hirotada

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Tokyo University of Agriculture and Technology

`h-matsumoto@katfuji.lab.tuat.ac.jp`

1   Introduction

The Automated Negotiating Agent Competition (ANAC) is an international tournament that has been running since 2010 to bring together researchers from the negotiation community. I joined Automated Negotiation League (ANL) and proposed the UOAgent. This agent is intended to obtain high individual utility.

2   Design

My objective is to obtain high individual utility. To achieve this, I developed a bidding strategy and an acceptance strategy. These strategies are characterized by aiming for agreement in time while obtaining the highest possible utility. These strategies are described in detail following section.

3   Bidding strategy

My agent uses two different proposal strategies for the first and second part. When time is $time \geq 0.975$ or the last step, it is the secondpart. Otherwise, it is the first part. Throughout, no bid will be offered that does not meet the following conditions:

$$utility \geq \begin{cases} 0.40 + reserved\_value & reserved\_value \leq 0.4 \\ 0.80 & 0.4 < reserved\_value \leq 0.8 \\ reserved\_value & 0.8 < reserved\_value \end{cases}$$

where $utility$ is the individual utility value obtained by bidding and $reserved\_value$ is the utility value you get if the negotiation is not successful.

In the first part, the target value of the bid is defined as:

$$value = 1.0 - (1.0 - threshold) * time^{5.0}$$

$$threshold = \begin{cases} reserved\_value & reserved\_value \geq 0.85 \\ 0.85 & otherwise \end{cases}$$

where *time* is the normalized elapsed time of the negotiation. Finally, the bid with the highest social welfare, with individual utility ranging $value \pm 0.02$, is offered.

In the second part, target value will be determined based on previous partner bids. Specifically, it is defined by the following equation:

$$value = lowest\_bidding\_value$$

where *lowest_bidding_value* is the lowest opponent's utility of the opponent's previous bids. Finally, the bid with the highest social welfare, with individual utility ranging from *value* to $value + 0.02$, is offered.

4 Acceptance strategy

Accept the partner offer when the following conditions are met.

$$utility \geq \begin{cases} reserved\_value & when\ the\ last\ step \\ 1.0 - (1.0 - reserved\_value) * time^{50} & otherwise \end{cases}$$

This strategy allows for higher utility while ultimately achieving a successful negotiation.

5 opponent modeling

Our agent does not use any opponent modelling.