Agent (luffy) Performance in TAC Competition

AGENT SYSTEMS (DV2541)

Agent name: Luffy

Siva Venkata prasad Patta
931221-7137
sipa15@student.bth.se

Venkata Sesha Sowjanya Mudregeda
940329-5703
vemu15@student.bth.se

Workload division

Member Name	Strategies	Coding	Reporting
Siva Venkata Prasad Patta	50%	50%	50%
Venkata Sesha Sowjanya Mudregeda	50%	50%	50%

I. Introduction

Trading Agent Competition is a game consisting of eight travel agents and each travel agent acts on behalf of eight clients. An agent is actually a computer system which is capable of acting independently on the behalf of its user or owner [1].

The game is explained in a very detailed manner in the website where the designing of the game has been done. This game requires an Artificially Intelligent Agent, which could participate in an auction and bid on the behalf of an agent, who does business with clients. We, as students of the course Agent System and a part of this assignment, try to design an agent, which fulfils the mandatory requirement for an agent to participate in this game and also win it if possible.

II. Strategies

Flight

Tickets are bought through bidding and auctioning. The TACAIR Company auctions the flight tickets where an agent needs to quote a bid. The agent quoting the highest bid gets a ticket. In this scenario, our agent initially identifies the category of auctioning with the getAuctionCategory() method; if the category is CAT_FLIGHT, then luffy quotes a bid through sendBid() method in order to buy a flight ticket. The price initially quoted by the owner is the askPrice. If the agentPrice is greater than the askPrice, a ticket is allotted at that cost. This task is accomplished using the method setAllocation(). The quantity of the tickets is also specified when the agent quotes for tickets. Hence, the allocation is dependent on the quantity stated.

If the agentPrice is less than the askPrice, then our agent updates the bid to a value which is 10 USD more than the askPrice. As the price quoted by our agent is greater than the askPrice, the tickets are allotted by the owner. This transaction is updated in the method updateBid(); which is later submitted using submitBid().

The next step is to give the flight tickets to clients depending on their preferences. The number of days for the trip, number of passengers and other details are taken into consideration and sold accordingly to the best possible value, keeping in mind the client utility value. The travel package's feasibility is changed accordingly so that the client utility value is maximized. The whole process of selling the flight tickets is accomplished through calculateAllocation() method.

Hotel

The owners quote their askPrice for the hotels Shoreline Shanties and Tampa Towers. If our agent identifies the category of auction in getAuctionCategory() to be CAT_HOTEL, then it enquires about the type of hotel, which is identified with the method getAuctionType(). If it is TYPE_GOOD_HOTEL, then luffy quotes a bid and deals with both the cases in the following manner.

When the agentPrice of the hotel is greater than the askPrice, then according to the rules, the hotel room is allocated to our agent using the setAllocation() method. In case it is less, then the bid is updated to a value greater than the askPrice by 30USD.This task is accomplished by the updateBid() method, and then submitted using submitBid().

If the getAuctionType() gives the result TYPE_CHEAP_HOTEL, then our agent quotes a bid in the following manner.

When the agentPrice of the hotel is greater than the askPrice, then according to the rules, the hotel room is allocated to our agent using the setAllocation() method. But, if it is less, then luffy updates the bid equal to the askPrice, and the bid is submitted using submitBid(), after updating the bid using updateBid().

Now that all the types of hotel rooms are bought by our agent, they are allocated to the clients according to their preferences and choices. We used a strategy for allocation as well, which is as follows.

The agent, i.e., luffy initially looks for clients who booked their tickets at a higher price and allocates them with a cheaper hotel, which is TYPE_CHEAP_HOTEL, and the clients who booked their flight tickets for a higher price are allotted the hotel TYPE_GOOD_HOTEL. This is done to balance the package expenditure for the client. But, if the client is not satisfied with our allocation, they are given a chance to exchange their hotels according to their preferences. This results in increment of client-utility value.

Entertainment

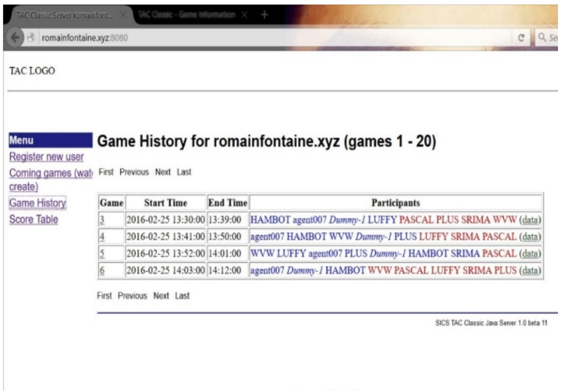
This is the final auctioning, which is different from the other two, as it is 2-way auction. When the owners quote their askPrice, luffy identifies the category as CAT_ENTERTAINMENT and quote the bid using sendBid() method. When the agentPrice is greater than the askPrice, the tickets are allocated to our agent. The bid is updated when the agentPrice is less that askPrice to a value equal to the askPrice. The agent will now sell the tickets that were bought at the auction.

The clients who chose GOOD_HOTEL are given entertainment tickets of museum and amusement park for free and tickets of alligator wrestling for a value equal to the askPrice. In a similar manner, the clients who stay in CHEAP_HOTEL are given the entertainment tickets of amusement park for free and the tickets of alligator wrestling and museum for the askPrice.

As the prices are optimal and the travel package is also feasible, the client utility value is maintained at the same level.

III. Results & Analysis

The games played by agent LUFFY are 4, 5, and 6.



TAC Classic Server romainfont...
TAC Classic - Game Information
romainfontaine.xyz:8080
TAC LOGO
Menu
Register new user
Coming games (wat create)
Game History
Score Table

Game History for romainfontaine.xyz (games 1 - 20)

First Previous Next Last

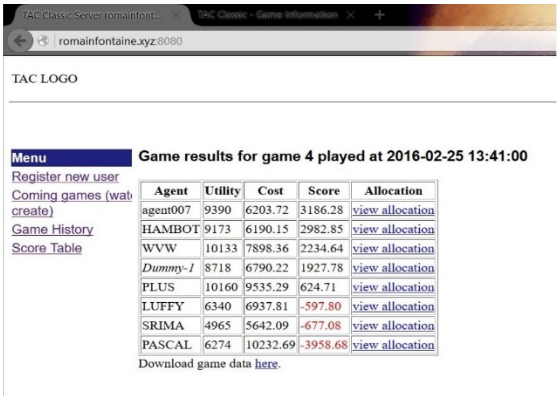
Game	Start Time	End Time	Participants
3	2016-02-25 13:30:00	13:39:00	HAMBOT agent007 *Dummy-1* LUFFY PASCAL PLUS SRIMA WVW (data)
4	2016-02-25 13:41:00	13:50:00	agent007 HAMBOT WVW *Dummy-1* PLUS LUFFY SRIMA PASCAL (data)
5	2016-02-25 13:52:00	14:01:00	WVW LUFFY agent007 PLUS *Dummy-1* HAMBOT SRIMA PASCAL (data)
6	2016-02-25 14:03:00	14:12:00	agent007 *Dummy-1* HAMBOT WVW PASCAL LUFFY SRIMA PLUS (data)

First Previous Next Last

SICS TAC Classic Java Server 1.0 beta 11

The results obtained are as follows:

1. Result of game 4: utility=6340, cost=6937.81, score=-597.80



TAC Classic Server romainfont...
TAC Classic - Game Information
romainfontaine.xyz:8080
TAC LOGO
Menu
Register new user
Coming games (wat create)
Game History
Score Table

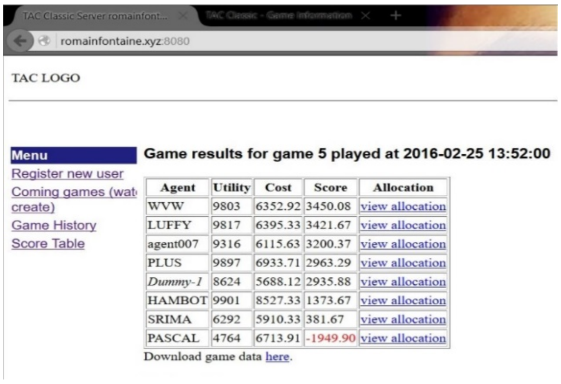
Game results for game 4 played at 2016-02-25 13:41:00

Agent	Utility	Cost	Score	Allocation
agent007	9390	6203.72	3186.28	view allocation
HAMBOT	9173	6190.15	2982.85	view allocation
WVW	10133	7898.36	2234.64	view allocation
Dummy-1	8718	6790.22	1927.78	view allocation
PLUS	10160	9535.29	624.71	view allocation
LUFFY	6340	6937.81	-597.80	view allocation
SRIMA	4965	5642.09	-677.08	view allocation
PASCAL	6274	10232.69	-3958.68	view allocation

Download game data here.

The agent's utility is lesser than the cost, which results in a negative score. If the investment in flight could be reduced and hotels increased, then the agent would be able to acquire a positive score.

2. Result of game 5:utility= 9817, cost= 6395.33, score=3421.67


TAC Classic Server romainfont...
TAC Classic - Game Information
romainfontaine.xyz:8080
TAC LOGO
Menu
Register new user
Coming games (wat create)
Game History
Score Table

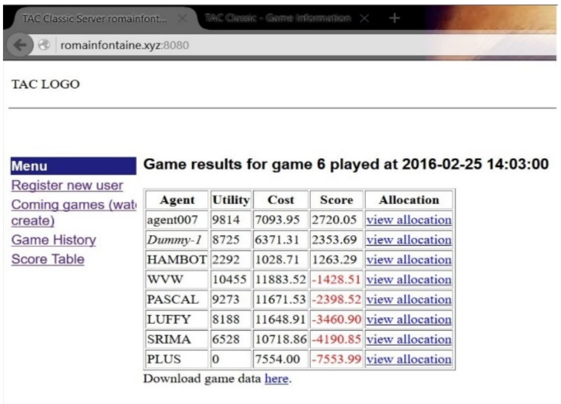
Game results for game 5 played at 2016-02-25 13:52:00

Agent	Utility	Cost	Score	Allocation
WVW	9803	6352.92	3450.08	view allocation
LUFFY	9817	6395.33	3421.67	view allocation
agent007	9316	6115.63	3200.37	view allocation
PLUS	9897	6933.71	2963.29	view allocation
Dummy-1	8624	5688.12	2935.88	view allocation
HAMBOT	9901	8527.33	1373.67	view allocation
SRIMA	6292	5910.33	381.67	view allocation
PASCAL	4764	6713.91	-1949.90	view allocation

Download game data here.

The agent's utility is greater than the cost thus, ensuring a positive score. Here, the bidding went according to our planning and strategy, which gave us an advantage over other agents.

3. Result of game 6:utility= 8188, cost=11648.91, score=-3460.90


TAC Classic Server romainfont...
TAC Classic - Game Information
romainfontaine.xyz:8080
TAC LOGO
Menu
Register new user
Coming games (wat create)
Game History
Score Table

Game results for game 6 played at 2016-02-25 14:03:00

Agent	Utility	Cost	Score	Allocation
agent007	9814	7093.95	2720.05	view allocation
Dummy-1	8725	6371.31	2353.69	view allocation
HAMBOT	2292	1028.71	1263.29	view allocation
WVW	10455	11883.52	-1428.51	view allocation
PASCAL	9273	11671.53	-2398.52	view allocation
LUFFY	8188	11648.91	-3460.90	view allocation
SRIMA	6528	10718.86	-4190.85	view allocation
PLUS	0	7554.00	-7553.99	view allocation

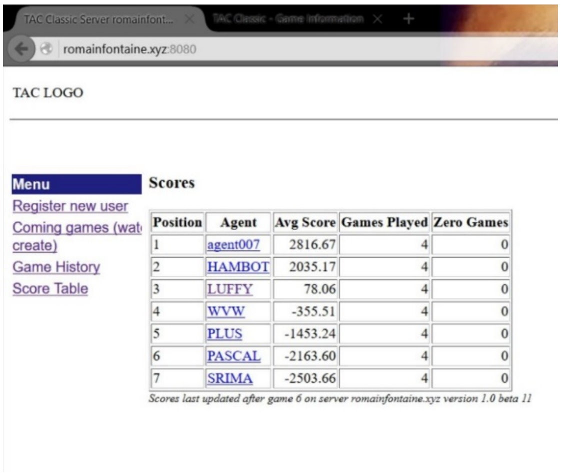
Download game data here.

Here, the utility and the cost are varying a lot thus, proving our planning of the strategy to be complete failure. The rectification of this mistake is better discussed in the Analysis section.

Analysis:

The designing of the agent has been done in a proactive manner, with prior planning. The strategy to react to events in the environment has already been decided before hand due to which the agent automatically reacts to situations instead of waiting for events to take place.

We think that the performance of the agent could be improvised if the purchasing of flight tickets can be reduced. It will eventually decrease the cost spent by the agent during auctioning process and increase the client utility value.


TAC Classic Server romainfont...
TAC Classic - Game Information
romainfontaine.xyz:8080
TAC LOGO
Menu
Register new user
Coming games (wat create)
Game History
Score Table

Scores

Position	Agent	Avg Score	Games Played	Zero Games
1	agent007	2816.67	4	0
2	HAMBOT	2035.17	4	0
3	LUFFY	78.06	4	0
4	WVW	-355.51	4	0
5	PLUS	-1453.24	4	0
6	PASCAL	-2163.60	4	0
7	SRIMA	-2503.66	4	0

Scores last updated after game 6 on server romainfontaine.xyz version 1.0 beta 11

IV. CONCLUSION

By participating in the TAC, we grasped an overall idea about auctions and bidding in a real time scenario. This assignment helped us know the areas where we could enhance our strategy in order to win the game. Considering the limited time constraint we could not properly understand the strategy used in Dummy Agent, as the number of games we played are less. This in turn affected our performance, as working over the strategy already written as a program and making changes to the existing code was an exhausting task. Nevertheless, playing this game helped us understand the subject in a practical manner compared to the subjective learning from a syllabus textbook.

V. REFERENCES

[1] M. Wooldridge, An Introduction to MultiAgent Systems. John Wiley & Sons, 2009.