

DogAgent

An agent submitted to the ANAC
2024 SCM league

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1. Introduction

In the real supply chain

- ◆ Companies have fixed costs
 - We need to do the least amount of trading to make a profit.

In the SCML track

- ◆ Companies do not have fixed costs
 - We need not be forced into an unfavorable contract.

Our goal is

- ◆ minimize the cost of inventory and penalties for insufficient inventory



2. The design of DogAgent

2.1 Counter Strategy

◆ In the scml world, there is a cost to inventory.

- this inventory cost is small compared to the shortfall penalty

◆ the basic strategy

- Keep enough inventory to reduce the shortfall penalty.
- By selecting the optimal contract, profits can be obtained consistently.



2. The design of DogAgent

2.2 Offer Strategy

◆ The price setting is important

- price concessions are made according to the steps of the game.

◆ In the final phase of the game

- concessions are made up to 25% compared to the initial state.
 - ✓ This will maintain high productivity and stable profits throughout the entire game.



2. The design of DogAgent

2.3 Future Negotiation

◆ Send future contract offers to other agents to increase deal opportunities

- it is difficult to perfectly predict future conditions, and the risk of penalties such as inventory shortages is high.

◆ DogAgent does not negotiate future contracts, but concentrates on current contracts.



3. Evaluation

Evaluation the Performance of Agent

◆ Simulations were done with `anac2024 std()` method include in the template. The parameters are as follows.

- `n_steps = 10`
- `n_configs = 5`
- `competitors = [DogAgent, DoNothingAgent, BuyCheapSellExpensiveAgent]`



3. Evaluation

The results of the tournaments are shown in Table 1.

- ◆ The two default agents have decreasing scores in all tournaments.
- ◆ our agent's score is increasing in three tournaments.
- ◆ we were able to obtain stable scores compared to the default agents.

Table 1: Score of tournaments

tournament	DogAgent	DoNothingAgent	BuyCheapSellExpensiveAgent
1st time	1.19	0.40	-0.36
2nd time	0.92	0.74	-0.10
3rd time	1.10	0.52	-0.05
4th time	1.00	0.70	0.65
5th time	0.94	0.72	-0.36
Average	1.03	0.616	-0.044



4. Conclusions

- ◆ Our strategy is to reduce shortfall penalty and inventory cost as much as possible to obtain stable profit.
- ◆ The results were better score than other agents
- ◆ There is still room for improvement
 - increase productivity by optimizing the use of future contract offers.

