

'EveAgent': A Regression Learning Agent Submitted to The ANAC 2022 SCM League OneShot Track

Ruben Wolhandler

The Department of Computer Science, Bar-Ilan University, Israel

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1 Introduction

The SCML-OneShot is a new track introduced in 2021. In this track, the one-shot agent only needs to do negotiate, that is, he can focus on many-to-many concurrent negotiation problem without worrying about long-term planning or production planning as in the case of the Standard and Collusion tracks.

The tutorial 'Developing an agent for SCML2021 (OneShot)'[1], written by Yasser Mohammad, presented 4 types of concrete agents: *SimpleAgent*, *BetterAgent*, *AdaptiveAgent* and *LearningAgent*. In my work, I chose to base my agent on the skeleton of the *AdaptiveAgent*, whose concept is to prevent the agent from behaving independently in each negotiation without considering what is happening in others, , i.e. to make him consider other negotiations by using the offered prices in them to limit its concessions.

2 The Design of 'EveAgent'

2.1 Negotiation Choices

Taking inspiration from the stock market, we hypothesize that the price movements can be predicted using regression models over past movements of the price. We also taking inspiration from the agent's winner of SCML 2021 competition that averages the prices of the last buying or selling negotiation respectively. We aim to improve this model by using regression instead of average to have an intuition of future trends. We assume that prices tend to follow a linear trajectory over time (each negotiation is seen as a time point)

At the same way than the "average agent" we keep two lists of the last negotiations, one for the buying prices, and a second one for the selling prices. These lists will be usefully to calculate our regressions. At each Selling or buying

negotiation we add the success value to the list. Each negotiation is viewed as a point in time. And allow us to use the linear regression model.

During a single simulation, the *AdaptiveAgent* [1] keeps track of the best price it received, and then makes concessions over the best price as the simulation progresses.

Our 'EveAgent' improves on top of the AdaptiveAgent, by trying to forecast future prices based on its past lagged prices. When it is our agent's turn, we only accept the price if it is above our linear regression prediction and we propose the price predicted by our regression when we are selling.

3 Evaluation

We tested our 'EveAgent' in simulations against different agents: AdaptiveAgent, which was described in Section 2, and LearningAgent, which separately learns each negotiator. On 10 runs we get 5 times the first place.

Conclusions

We try to improve existing one-shot agents with some success reported on Evaluation. We improve Adaptive agent with the help of one of the famous and one of the simplest machine learning techniques: The Regression.

References

- [1] Yasser Mohammad. Developing an agent for SCML2021 (OneShot). http://www.yasserm.com/scml/scml2020docs/tutorials/02.develop_agent_scml2020_oneshot.html.