



Forest Agent

A Smart Negotiation Agent using Random Forest

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Introduction

- The Forest Agent is an autonomous negotiating agent designed for the Supply Chain Management League's one-shot track.
- It uses a popular machine learning algorithm, Random Forest, which employs multiple decision trees to make predictions.
- It builds on the base agent given in the one-shot documentation and is inspired by the solution of "EveAgent," a finalist from the previous year's competition.
- The Forest Agent aims to improve the accuracy of price range predictions using Random Forest regressor.



Random Forest Algorithm

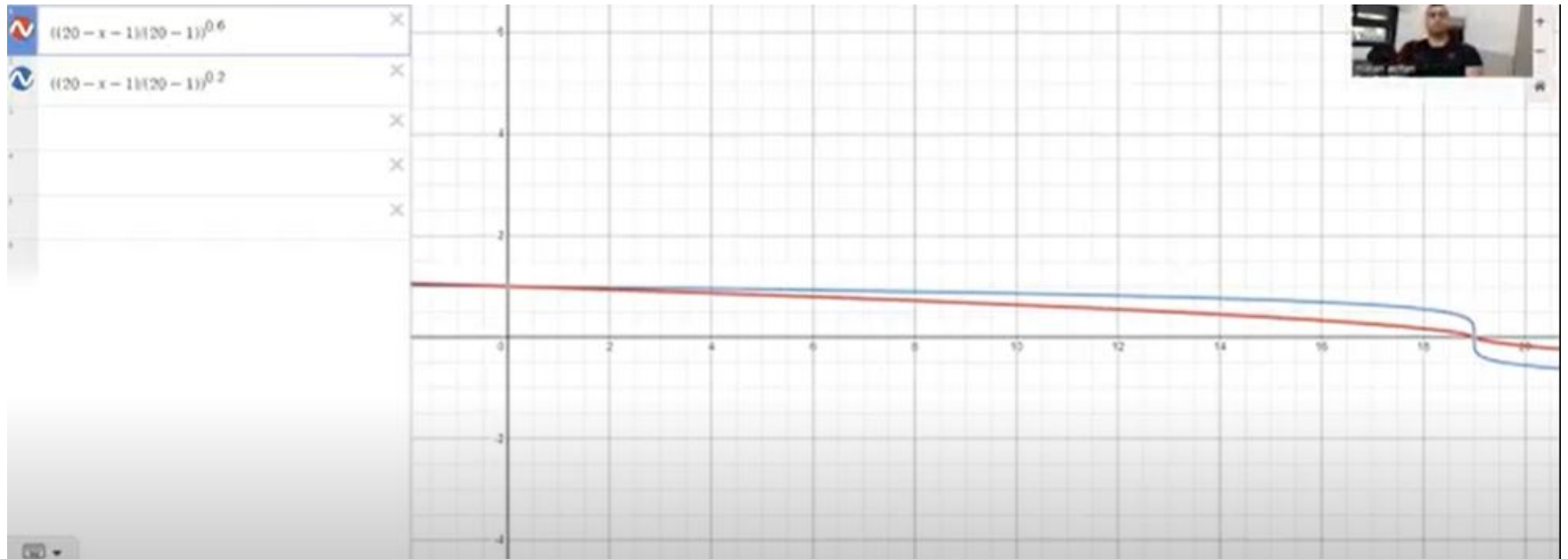
- Random Forest is a machine learning algorithm used for classification and regression tasks.
- It creates an ensemble of decision trees built on different subsets of data and combines the results for a final prediction.
- This method ensures diversity and reduces the risk of overfitting.



Agent's Design

- The Forest Agent is designed to improve negotiations over time by learning from past negotiations.
- Benefits of using Random Forest over linear regression include a more accurate representation of the real world, which is crucial for negotiations.
- The agent applies an exponential moving average strategy to give more weight to recent negotiations.
- The agent also uses adjustable minimum and maximum prices to adjust its offer based on the quantity it needs to buy.

Agent's Design - The Compromise Function



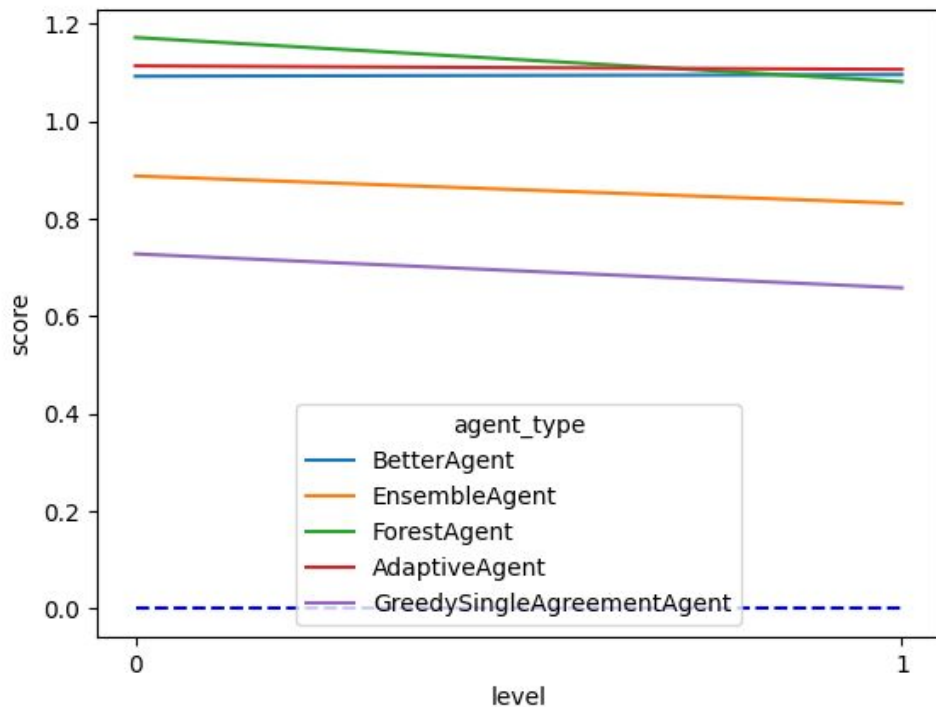


Forest Agent's Strategy

- The Forest Agent's negotiation strategy is based on learning price ranges from previous negotiations' outcomes.
- It can handle the non-linearity behavior of the world changes, which can be challenging in negotiations.
- The agent improves over time by adapting its model based on past negotiations, thereby providing a more accurate representation of the real world.

Evaluation & Results

- Tested versus various agents
- Best scores





Conclusion

- Using powerful machine learning tool
- Optimized compromising
- Improving negotiations