Pascal and Bruno

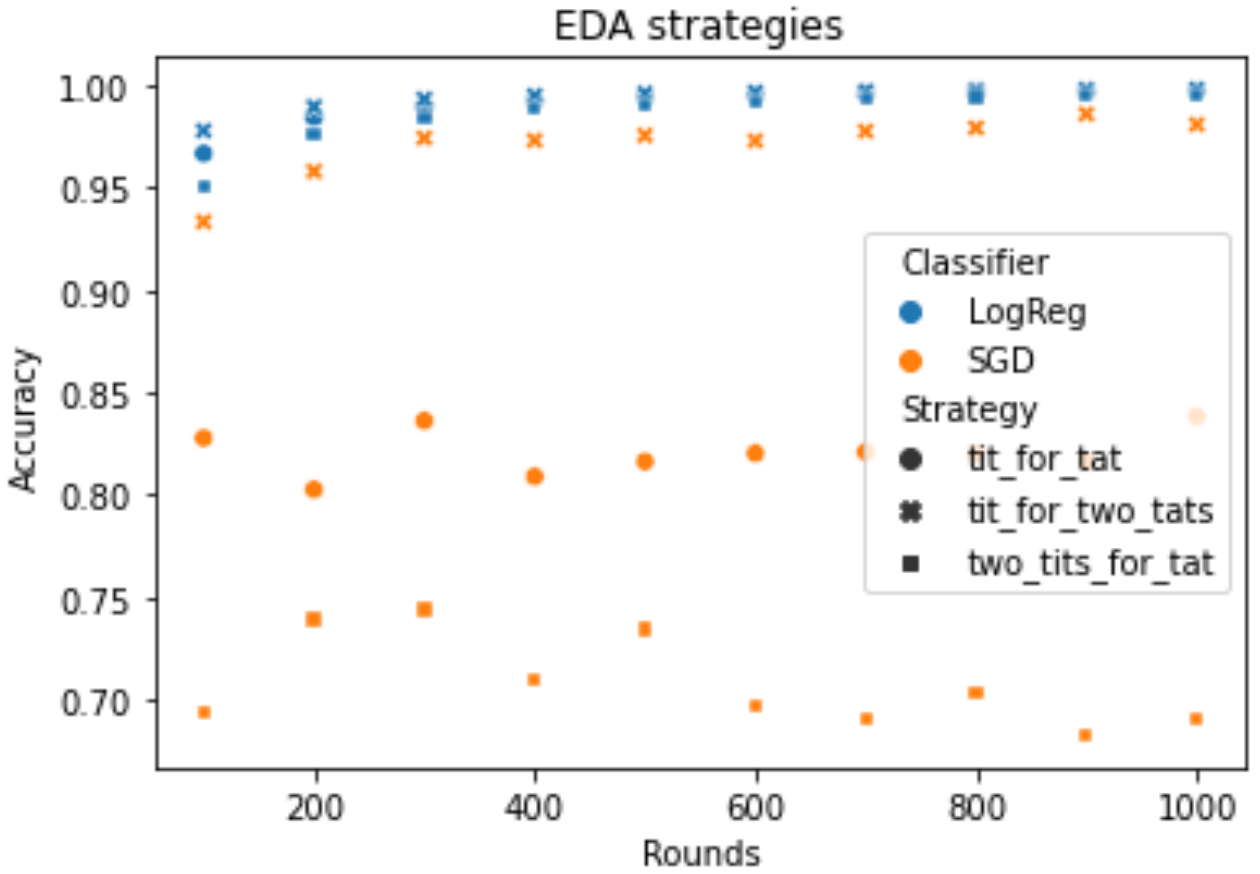
Predicting the next decision in the prisoner's dilemma using ML

Based only on the vector of decisions made previously by the opponent, we tried to predict the next decision using different classification algorithms and engineered features.

Takeaways (all of these points only apply using the specific features we choose, still some patterns seem to be very strong):

- "Tit for two tats" seems to the easiest algorithm to predict, which comes as a surprise, as "tit for tat" would seem less complex
- LogReg performs better through-out the analysis
- Because of the playing-algorithm's simplicity, there is not much more to learn after 200 rounds. To further improve the prediction, one would have to engineer better features or use Neural Network based approaches

Important to note, is the fact that we did not only measure these results, but our code allows for the testing of all possible playing-algorithms in combination with all classification approaches for a selected number of rounds.



Features used

Total True	After False	After True	Last 1	Last 2	Last 3	Correlation 1 and 2	Correlation 1 and 3
Normalized number of True	Average response to False	Average response to True	Opponent's last response	Opponent's penultimate response	Opponent's third to last response	Opponent's last response * own penultimate response	Opponent's last response * own third to last response