Contract Bridge agent using Deep Reinforcement Learning

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October 2024

1 Proposal

The proposed project is to develop an agent that would be able to play a contract bridge (`https://en.wikipedia.org/wiki/Contract_bridge`) game. The biggest difficulty still is the bidding phase of the game and currently still AI-agents cannot outperform humans. However, recent developments in this matter might change it soon. I would like to develop such an agent with a framework to analyze matches and valuation function required for agent to learn the game to play.

2 Dataset

- generated matches from BBO (Bridge Base Online) API or other platforms
- Historical games from tournaments
- Open source bridge engine `https://github.com/lorserker/ben?tab=readme-ov-file`

3 Workplan

1. Collecting data sets from APIs and generating basic level matches (2 weeks)
2. Preperation of Q-learning model (3 weeks)
3. Training agent (1 week)
4. Evaluation of agent and comparing with other (open-source) agents (1 week)

Remark One of the biggest problems will be the development of evaluation function

4 Bibliography

- Article on the development of an agent using deep reinforcement learning https://arxiv.org/abs/1607.03290
- Contract Bridge Bidding by Learning https://cdn.aaai.org/ocs/ws/ws0105/10162-45956-1-PB.pdf
- https://link.springer.com/article/10.1007/s10994-006-6225-2