Individual Reflection

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Teamwork

Team Organization and Coordination: In this project, I played a significant role in organizing and coordinating our team's efforts. I arranged regular meetings, typically once a week, to discuss updates, progress, and any issues or bugs encountered. These meetings were crucial for our collaboration, allowing us to brainstorm solutions and explore potential improvements collectively. Our project's success was truly a team effort, relying on each member's contributions.

Communication: For daily communication, I set up both a WeChat group and a discussion section on GitHub. These platforms facilitated the exchange of ideas and announcements, ensuring everyone was on the same page.

Adherence to Software Engineering Principles: Throughout the project, I adhered strictly to software engineering principles. I solicited feedback from my teammates and provided constructive criticism to help improve our code quality and overall performance. Additionally, I created a separate branch for my code development and used meaningful commit messages to document changes, making it easier for the team to track progress and understand updates.

Technical Contribution

My primary technical contribution was developing the main Monte Carlo Tree Search template used in our group submission. This included designing the reward function integral to our agent's decision-making process. Both our final submission and the tournament submission were based on my MCTS agent, showcasing the impact of my work on the project's overall success.

The MCTS template I implemented involved creating the core structure and algorithm that allowed our agent to simulate potential moves and evaluate their outcomes. I spent considerable time refining the reward function to ensure that our agent could make the most strategic decisions based on the game's state. This process involved rigorous testing and fine-tuning to balance exploration and exploitation within the search tree.

Additionally, I integrated several enhancements to the MCTS algorithm, such as implementing a pruning mechanism to discard less promising branches and optimizing the selection criteria for node expansion. These improvements were critical in increasing the efficiency and performance of our agent, allowing it to compete effectively in the tournament setting.

Finally, I combined the MCTS agent with the group's other contributions to create a comprehensive and cohesive final submission. I ensured that our agent could interact with the game environment and other

agents seamlessly, enabling it to make informed decisions and adapt to changing circumstances during gameplay.

Written Contribution

Home and Introduction: I developed the Home and Introduction page, providing an overview of our project and outlining its objectives.

Problem Analysis: For the Problem Analysis page, I authored the Problem Characteristics section, where I detailed the fundamental analysis of the Splendor game.

Monte Carlo Tree Search: I wrote the 2.1 Monte Carlo Tree Search page, which was directly based on my agent. This page includes a comprehensive explanation of the algorithm, its implementation, and a detailed description of the reward function.

Experiments: In the Experiment page, I made significant contributions by describing the Group Agent section. This included a real-scenario example to illustrate our findings.

Conclusion: I authored the Conclusion page, summarizing our project's outcomes and reflecting on both our achievements and challenges.

Learning

Through this project, I gained a deep appreciation for the importance of teamwork. Initially, we were uncertain about the task ahead, but through collective effort and division of labor, we efficiently tackled each step. Working together not only made the project manageable but also enhanced our productivity and effectiveness.

From an AI perspective, I learned a great deal about the practical application of artificial intelligence in game strategy. After completing our code, I personally tested our agent in several matches and found it to be more rational and optimized in its choices than a human player. Although our AI is not yet perfect, this experience demonstrated the potential for future advancements in the field.