Bot Fight - Multi-Agent cooperation

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1 Introduction

2 Bot-Fight Environment

For the purposes of the experiments we implemented a game environment we called "Bot-Fight". It consists of a 2D environment with two teams of bots and some obstacles. The idea was to implement different types of agents controlling these bots, which can move around the environment and fire straight forward. The obstacles in the environment could block bullets and prevent bots from moving through them. This game was also human playable. All of these game elements are showcased in Figure

3 Rule-Based Bots

The first iteration of an agent in our game was a simple rule based bot that always faced towards the first opponent and fired when the opponent was visible. This then evolved into an early version of the state-based agent by implementing A* pathfinding. The bot moved towards the opponent if they were not visible and fired at them if they were.
When playing against humans, these bots were too rudimentary to be of challenge. Even though they didn't struggle with controls like humans sometimes do, they were not avoiding bullets or using strategies to approach the enemy. The bots also knew everything about the game world, which made boring game experience. In video games, bots typically know their immediate surroundings, not the entire world.

4 State-Based Bot

Improving on these ideas, we discretized

5 Deep Q-Learning

6 Monte Carlo Tree-Search

7 Conclusion