

I. Technical Approaches

In this section, we present two solutions for the current competition.

1. The first approach involves employing Reinforcement Learning (RL) and training the model using the self-play technique.
2. The second approach entails utilizing a semi-automated gameplay system in cases where model in the first approach proves inefficient.
 - a. **Self-Play Reinforcement Learning**

The training loop is illustrated by the following diagram:



The network bank stores previous versions of the agents to pull into the Game Logic as opponents.

PPO updates the current version of the network being trained and fires a callback that saves the network to the bank if the current version has outperformed previous versions.

The self-play wrapper converts the 2-players base environment into a 1-player environment that can be learnt by the PPO engine.

b. Semi-automated Gameplay System

The semi-automated game play system mainly based on humans giving future actions to each Craftsman. By using a simple Breadth-First Search (BFS) algorithm, Craftsmen independently determining the shortest possible moves to execute assigned actions.

II. Functionality

We use python, flutter and related libraries.

The system serves the following key functions:

- Retrieving match information and transitioning between matches.
- Providing the next move and sending the results.
- Offering manual strategic input, or allowing the system to autonomously determine the next move and send the results.