

myBG Documentation

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1 Overall description

I worked on this project for about 50 hours from August to November 2023. The goal is to code from scratch the video game Hearthstone Battlegrounds (BG), and then doing some Reinforcement Learning on it.

1.1 Motivations and forecasts

I wanted to do that to improve my general coding skills and my skills in reinforcement learning. Working on that was rather motivating me since it is a video game I like, this why I got into this.

Today (November 5, 2023), I'm not sure I want to devote any more time to this project, as I have a lot of other work to do, and I'm not sure it's very efficient in terms of work time compared to the upgrading of my skills.

1.2 Detailed description

I still have made a full plan of the project, even if I'm currently at step 1.

Here are the different steps

- Step 1 : Code an alpha version of BG.
- Step 2 : Code a bot that plays (randomly for the moment) at this alpha version of the game.
- Step 3 : Add a visualization feature that allows to see what the bot does.
- Step 4 : Do some Reinforcement learning on that alpha version, in order to find the relevant architectures and maybe modify the alpha version accordingly.
- Step 5 : Build a full version of the video game based on the alpha one, that includes all the minions and their mechanics.
- Step 6 : Add a visualization feature that allows a (human) player to follow instructions of the reinforced bot.
- Step 7 : Train a base model with RL on the full version of the game without hero powers and anomalies.
- Step 8 : Fine tune that model by adding the choice of hero powers. Then Fine tune that model by adding anomalies.
- Step 9 : Test the bot on the real game (needs to retrieve information from the game).

1.2.1 Details of step 1

Here some details about step 1:

The *toy model* **includes** :

- Actions :
 - Buy and sell some minions from the shop.
 - Play some minions from the hand to add to the warband.
 - Refresh, freeze and upgrade the shop.
 - Reorder the minions of the warband.*
- Two full minion's clan.*
- Display of win/loss statistics for each fight (like FireStone does for example).
- Special abilities of minions : Taunt, Divine shield, Windfury, Deathrattle and Reborn.
- Triple minions.*
- Manage the mean number of actions a human player can do each turn (this mean changes each turn according to many things).*

**not coded yet.*

The *toy model* **does not** includes :

- Actions not included :
 - Play other cards than minions.
 - Hero powers.
- Special abilities not included : Claw, Venomous, Poisonous, Magnetization, Spellcraft etc.
- Other clans.
- Anomalies.

Currently, I'm still at step 1, see the * to see what's left to do.

2 Code Documentation

The purpose of this section is to document my code. I have not yet taken the time to do so. I'm not sure I will. The code is partially commented.