Starcraft Terran Agent

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Abstract

Documentation for the Reactive Agents hand in for Tec de Monterrey Campus Querétaro Sistemas Inteligentes Ago-Dic 2019 as a Starcraft Terran bot capable of winning against up to medium difficulty. The attack strategy depends on making a rush of Marines and Marauders. The bot builds a Refinery, a couple of Supply Depots and then two Barracks with a Tech Lab addon, which researches Combat Shield for increasing Marine HP.

Fig. 1: In-game screenshot of the agent running

Introduction

A reactive agent is an agent that can perceive its environment and react to it in a similar fashion to reflexes. This means that the agent can access to pre-set behaviours that are triggered when certain conditions are met. They are the most basic form of 'Artificial Intelligence'. These agents are formed by sensors (which are the conditionals run for the environment) and actuators (Step function returns)

Starcraft II is the second installment of the Starcraft series (go figure). The game's genre is Real Time Strategy with a space-fantasy setting. You get to control the Terran (technologically advanced humans), Protoss ('holy' aliens) and Zerg (insect-like hive minded aliens). The game is a major deal in South Korea and many other places of the world, becoming a staple in the e-sports world.

In order to monitor and control the Starcraft II environment, I will use the PySC2 module, which allows us to convert on-screen (and embedded, off-screen) information and can send actions to the workspace as 'returns' within an ever-looping 'Step' function, which runs a set of conditionals and reacts depending on the set parameters.

Installation

In order to run this code, you must have:

- Starcraft 2 (can be the Free to play variant).
- Python 3.
- The PySC2 module for python (installed with 'pip install pysc2' in the command line.

Afterwards, just run the python code.

Implemented behaviors

- Selection and management of idle workers
- Camera movement
- Building of a Refinery
- Building of Supply Depots (enough to have over 40 Food Cap)
- Building of Barracks
- Installation of Tech Labs
- Research of 'Combat Shields' (+10 HP for Marines)
- Training of up to 15 marines and up to 6 marauders
- Attack routine

Possible improvements include relative or hard-coded positioning for the buildings (to make the base more compact and make sure that there are no position problems due to random positionings), the implementation of more complex strategies (I found a few when researching pro-players, for example, a Ghost rush or a Cyclone rush would be very interesting) and obviously a more complicated agent (such as model or goal based).

I intended to beat a very hard AI opponent but I needed to implement more complex behaviors such as Stimpack research (and activation when in combat) but that got out of my reach due to the lack of documentation and time (also, my Python skills weren't as sharp as they are now).

Useful Links

Documentation for the PySC2 module:

https://github.com/deepmind/pysc2/blob/master/docs/environment.md#available-actions

Starcraft II Wiki:

https://liquipedia.net/starcraft2/Main_Page

This man commentates and gives insight to pro player matches (for more complicated strategies): https://www.youtube.com/channel/UCZNTsLA6t6bRoj-5QRmqt_w