Requirement 8 Report - Scripting AI Behavior

***How are scripts implemented in a Minecraft machine learning algorithm? How do they affect the AI's behavior during and after execution?***

For different MineRL versions, the possibility of scripted crafting or "autocrafting" varies [1]. For versions before v1.0.0, autocrafting is allowed and built into the library. However, in v1.0.0, autocrafting is not allowed.

***To what extent can scripts automate a task before the algorithm is considered a game bot?***

This seems to be a more opinionated topic with no clear answer. Early versions of MineRL implemented scripting for various tasks, while the newest version no longer offers them in favor of "more realistic action spaces" [1]. The best option is likely to restrict scripts to what would be possible for a person to do relatively quickly or purely based on memory.

***What tasks can be scripted with the information and data provided by the packages that interface with Minecraft, such as Overwolf and MineRL?***

MineRL offers a variety of scripts, mostly in crafting and completing small / trivial tasks as part of its library and environments. The Overwolf.utils API can be used to send keystrokes to a game, thus an action that could be done with specific keystrokes could be scripted [2]. However, if Overwolf is implemented through a user client that joins the MineRL environment, then we cannot use Overwolf to script actions for the AI, we could only script actions for the user, such as following the AI or executing game commands.

***How do scripts handle variations in the game state? This includes topics such as different tool efficiencies, block hardness, and the player's current position.***

Scripts are processed in steps, but most libraries don't offer more information beyond this [3]. The best assumption is that a chosen action is processed for a given number of steps that is typically enough to complete that action for most, if not all, possible scenarios.

***Are there open-source preexisting scripts that could be used to spend development time elsewhere? To what extent will we need to create our own scripts?***

The MineRL library we are planning on using has all necessary scripts already created [1]. Some versions of the library offer no scripts, and do not offer a method of implementing them with relative ease. However, the version we are choosing provides them for us.

**References**

[1] MineRL, "MineRL Versions", *readthedocs.io*, https://minerl.readthedocs.io/en/latest/notes/versions.html (accessed Sept. 22, 2023).

[2] Overwolf, "overwolf.utils API", *Overwolf*, https://overwolf.github.io/api/utils (accessed Sept. 22, 2023).

[3] Labonne, Maxime. "Reinforcement Learning in Minecraft: Create a Bot to Find Diamonds," *Media*, https://towardsdatascience.com/create-a-bot-to-find-diamonds-in-minecraft-d836606a993a (accessed Sept. 22, 2023).