Reinforcement Learning Tutorial Document

Project Repository:

For any instances in the tutorial document that reference to my repository, refer to this GitHub repository: https://github.com/m-a-s-h-e-d/rl-osu-mania

Prerequisites:

- Access to internet for installations
- Python 3.10.X for model training

Installation:

It is recommended to install based on the provided files in the repository as newer versions maybe released that break the model.

1. Download the repository provided above

Alternatively:

1. Download the osu! V1 client here or in the provided installer on my repository
2. Download the gosumemory here or with the zipped project in my repository
3. Unzip gosumemory anywhere (recommended in the executables directory)

Setup:

If for whatever reason you are already logged in, remember to log out of your account if you would not like to risk being banned.

1. Setup a virtual environment in the ***/rl-osu-mania*** directory with Python 3.10.X
2. Activate your virtual environment and install all required libraries to run model
3. Run gosumemory & osu! client
4. Modify the model parameters in ***settings.yml*** to match the osu!mania keybindings in your client (DEFAULT: D/F/J/K), you can find the keybindings by pressing **[CTRL + O]** and typing in **"osu!mania layout"**
5. (OPTIONAL) Modify the model parameters for rewards
6. Use **window_helper.py** in **samples/** directory to tune the image capture of the **osu_env.py** for the agent to see the environment correctly

7. **Run start.py from the /program directory** to hook the program to the running osu! client and the gosumemory WebSocket for game status and statistics
8. Navigate to a chart of your choice to start training the model on
9. Press **[Enter]** in the console opened by Python to begin training
10. Refrain from entering any keys while the training is running
11. Models will be saved upon reaching the result screen if they are better than other models in the history

Adapting for Other Environments:

To use my code for other environments, you need to create a new OpenAI Gym environment for the space. You can follow the **osu_env.py** OsuEnv class and modify the implemented functions. You will also need some way to handle actions, calculate rewards, and pass states to the environment. The **memorywebsocket.py** module is used for this purpose, but you can use some form of computer vision or data in a file.