CS 182: Final Project

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Project Update

Progress

So far, we have focused our efforts on setting up the OpenAI Gym environment (a task surprisingly laden with unsolvable errors) and understanding the Atari environments.

For our observation space, we have looked into the RAM states, which are lists of 128 integers, and the image states, which are three-dimensional arrays containing pixels and RGB colors. While the latter is a more intuitive representation that is easy to visualize, the former is at least 300x smaller and constantly sized across all Atari games. As such, we are leaning toward using the RAM states. Fortunately, the action space is more straightforward; each action is assigned an integer value, and for our purposes it is relatively unimportant to know which action is which value.

We have also written skeleton code for MDPs and RL, since these can be applied to the action and observation spaces as they currently stand.

Problems

There are two main problems we are currently running into, the second of which is a consequence of the first.

The interpretation of the observation space is quite difficult compared to Pac-Man; the image states can have agents that occupy multiple pixels or non-agent objects (mainly projectiles) that are numerous, temporary, and strangely behaved. While we could use some hard-coding on a specific game in order to extract all agent and non-agent entities, our original project goal was to generalize our code for many Atari games.

Though distinguishing between agents and the environment is not necessary for MDPs and RL under the current representations, our inability to do so at the moment makes classical search inapplicable to many of the Atari games. Given this, we acknowledge the possibility of eliminating classical search from our scope for the sake of maintaining generality, unless we are able to discover a solution for this.

Presentation

We would prefer to present at the poster session.