CS 3600 Extra Credit – Pharmacy Study

The goal of Dr. Brent Harrison’s research study is to develop a technique that would allow people with little to no experience in machine learning to train reinforcement learning agents by telling stories. In the long term, this technique will allow such people to teach the AI agents of characters in virtual environments, such as non-player characters in video games, to show more believable behaviors. It is a common problem in video games for these non-player characters to exhibit strange or unnatural behavior for the actions they are meant to accomplish. This research study aims to solve this problem by crowdsourcing story graphs of a scenario, going to the pharmacy in this case, and then constructing reward functions in order to direct an agent through a story tree toward an acceptably believable behavior.

With this goal in mind, the purpose of the experiment is to test what humans thought of the scenarios that Dr. Harrison’s AI system came up with. Subjects are shown three different scenarios: a baseline scenario in which the agent was rewarded only for returning home with the medicine, a scenario that was taught by observing other humans complete the task, and a scenario that was taught with crowdsourced stories of humans completing the task. In most cases, AI agents are trained with a large set of data gathered from human behavior. In order to develop a technique to train this agent by telling stories, scenarios constructed using such techniques need to be evaluated against other, more traditional techniques. With the first scenario acting as a control, the other two are then tested and compared against each other in this experiment to determine which one is more believable in the eyes of a human.

To do this, the AI system’s algorithm for story-based learning works by initially making a graph from the crowdsourced stories from people going to the pharmacy, plotting specific points at key events in each story. This graph is then transformed into a story tree by creating a set of all paths, or sequences of events, that are considered acceptably believable. In other words, this story tree represents all of the ways in which a human might complete the task of going to the pharmacy. With the story tree created, the Q-learning algorithm is then implemented with reward functions designed to teach the reinforcement learning agent how to do certain actions, such as going to the doctor, getting money, and buying medicine. Whenever one of these actions is successfully completed, the agent is reinforced by these reward functions, so it becomes more likely to do it again in the future. Eventually, the algorithm finds an optimal end state, or story path in this case, that maximizes the rewards it earns, thus creating, hopefully, a believable agent.