Project Vulpix

Weekly Progress Report #8

3/21/19 – 3/27/19

This weekly summary report for the eighth week of Project Vulpix will describe the progress of the team as well of each individual member. It will also describe the problems encountered last week and the solutions the team agreed on, as well as what is planned for next week.

The team added a secondary AI in order to have the two engines playing against each other to see how it is behaving. As of right now both AIs are using pure randomness and to change that the team is currently working on implementing the Monte Carlo search tree engine which will be presented on next weekly report.

The group also statistically analyzed the UCT (Upper Confidence Tree) which is a combination of the MCST and UCB (Upper Confidence Bound) concepts. Some group members were able to find the formula that the UCT uses for the status of the game. After concluding that the upper bound means the optimal decision in the real world (Outside of mathematics), the team agreed that node selection during tree descent is achieved by choosing the node that maximizes the probability, by using the Upper Confidence Bound formula below:

$$v_i + C \times \sqrt{\frac{ln\, N}{n_i}}$$

where:

- Vi: the estimated value of the node
- (which is the number of wins for the node considered after the i-th move divided by the number of simulations for the node considered after the i-th move)
- C: tunable bias parameter or the exploration parameter
- N: Total number of times that its parent has been visited
- ni: Number of times the node has been visited

In addition, the team began working on adding some functions, such as energy effects and energy values and some things related to the Pokémon game.