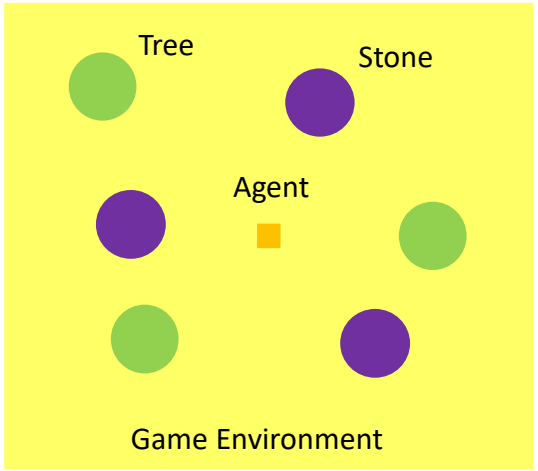
Deep Q-Learning and Hierarchical Reinforcement Learning in Exploratory Games

Lauryn Brough, Emmett Tomai
Department of Computer Science, The University of Texas Rio Grande Valley

- Most research into AI and Machine Learning focuses on matching and exceeding human level performance in games, which leaves games that involve a more creative elements such as exploring untouched
- Our goal is to develop methods of encouraging machines to explore the game environment while still efficiently accomplishing goals as well as increase adaptability and application of skills
- Use of an Options Model to train policies at the start, by penalizing previously failed actions that are repeated (PAFR – Penalize Action Failure Repicks), and use of an Advisor Model to solve problems of previously failed actions and encourage exploration
- Results: Options provided higher win rates and better rewards in shorter amounts of time however showed instability



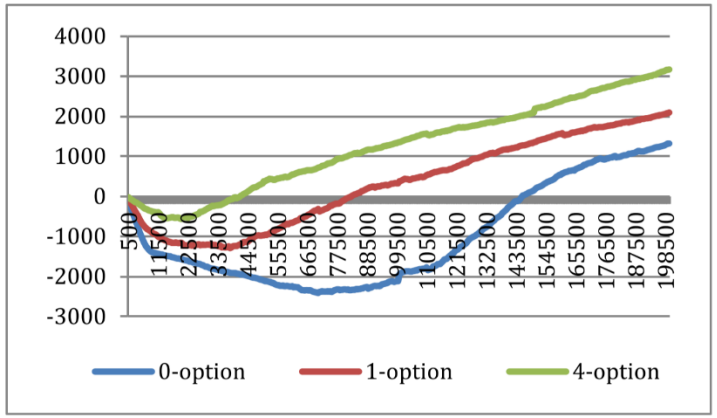


Figure 5. Cumulative reward learning curves for the three network modes on the second recipe task.

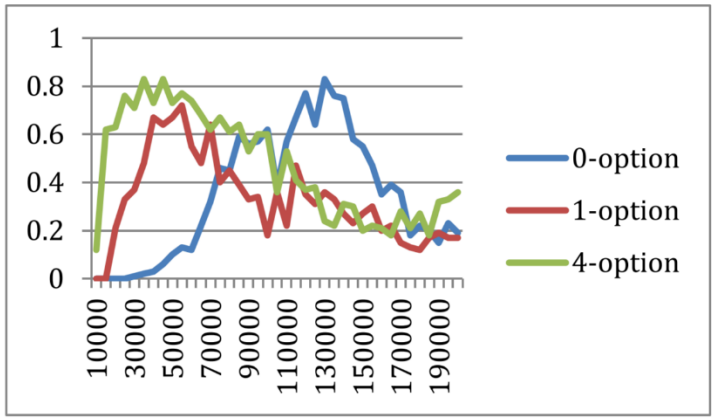


Figure 6.Verification win rates for the three network modes, second recipe task, predetermined set of 1000 random scenarios.

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