

CS221 Fall 2018 - 2019 Homework 5

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By turning in this assignment, I agree by the Stanford honor code and declare that all of this is my own work.

Problem 1: Minimax

$$(a) V_{\min\max}(s, d) = \begin{cases} \text{Utility}(s) & \text{IsEnd}(s) \\ \text{Eval}(s) & d = \text{max depth} \\ \max_{a \in \text{Actions}(s)} V_{\min\max}(\text{Succ}(s, a), d) & \text{Player}(s) = a_0 \\ \min_{a \in \text{Actions}(s)} V_{\min\max}(\text{Succ}(s, a), d) & \text{Player}(s) = a_1, \dots, a_{n-1} \\ \min_{a \in \text{Actions}(s)} V_{\min\max}(\text{Succ}(s, a), d + 1) & \text{Player}(s) = a_n \end{cases}$$

Problem 3: Minimax

$$(a) V_{\text{exptmax}}(s, d) = \begin{cases} \text{Utility}(s) & \text{IsEnd}(s) \\ \text{Eval}(s) & d = \text{max depth} \\ \max_{a \in \text{Actions}(s)} V_{\text{exptmax}}(\text{Succ}(s, a), d) & \text{Player}(s) = a_0 \\ \frac{1}{|\text{Actions}(s)|} \sum_{a \in \text{Actions}(s)} V_{\text{exptmax}}(\text{Succ}(s, a), d) & \text{Player}(s) = a_1, \dots, a_{n-1} \\ \frac{1}{|\text{Actions}(s)|} \sum_{a \in \text{Actions}(s)} V_{\text{exptmax}}(\text{Succ}(s, a), d + 1) & \text{Player}(s) = a_n \end{cases}$$

Problem 4: Evaluation function (extra credit)

- (b) My evaluation function is a linear combination of current score, average distance from all ghosts, average distance from all foods and count of nearby foods. My expectation is that state which has high current score, high average distance from ghosts, small average distance from foods and there are a lot of foods nearby seems to be a promising state. I also tried to combine the closest distance from any ghost but with several parameters I tried that seemed not to work.