ML Hackathon

Team Number: 2

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Section: D

Key Observations: What were the most challenging parts? What insights did you gain?

Ans: The most challenging part was implementation of Reinforcement Learning with HMM model. We got a win rate 22.3% with HMM alone but when implemented with RL we got 12.55%. So, improving that was the most challenging part.

Strategies: Discuss your HMM design choices. Detail your RL state and reward design and why you chose them.

Ans: The HMM modeled letter transitions and emissions separately for each word length. The RL state encoded the masked word, guessed letters, remaining lives, and HMM probabilities. Reward policy was -5 repeated, +20 correct guess, -2 wrong guess, +100 win game and -100 lose game.

Exploration: How did you manage the exploration vs. exploitation trade off?

Ans: Exploration was handled using an ε-greedy policy with gradual decay to balance randomness and learning.
Early in training, higher ε encouraged exploration, while later it favored exploitation.

The HMM's probabilities guided exploration toward more likely letters, reducing random guesses.

Future Improvements: If you had another week, what would you do to improve your agent?

Ans: If we had another week, we would explore different RL algorithms like policy gradient based, soft-actor critic,etc. Also we would explore different reward policies and compare and contrast them.