
Applying Reinforcement Learning to Wordle

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1 Introduction

Wordle, created by Josh Wardle, is a game in which the player has 6 guesses to attempt to guess a random 5 letter word. Every guess, each letter either returns as green, yellow, or gray. If its green, the letter is where it belongs in the word. If it's yellow, the letter is in the word, but in a different position. If its gray, the word doesn't contain the letter [5]. Because it already has a built in reward structure our team thought it would be an interesting game to try to solve.

Applying reinforcement learning techniques to solve games is something that the team at Deep Mind has done multiple times [2]. Reinforcement learning has also been applied to solve Scrabble [3] — a game fundamentally similar to Wordle. There are existing programmatic solutions to Wordle, the most prominent of which being the 3 blue 1 brown solution [1]. There is also a Reinforcement Learning version that exists that uses DQN and A2C [4]. This reinforcement learning solver was trained on ???

We intend to develop an OpenAI gym environment to train the agent in, and then create multiple agents to compare performance of different algorithms on this problem. If time allows, we will compare not only our own implementations, but some of the solutions using traditional NLP methods.

2 Project timeline

1 April - Literature Review and algorithm selection

3 April - Proposal Due

5 April - Environment Completed

15 April - Algorithms Completed

17 April - Checkpoint due: benchmarks completed

1 May - Improvements completed

6 May - Demo days results due

References

References

- [1] 3 Blue 1 Brown.
- [2] DeepMind.
- [3] SomeoneElse.
- [4] Unknown.
- [5] Wikipedia.