WordleAssist

Evan Phaup

Problem Statement

“My goal is to develop an assistant to help word game enthusiasts play the game Wordle. On sites that allow people to play, there are no built-in tools to help in eliminating words from the guess pool. Since winning streaks are important to those who play this game, having an assistant lessens the probability of not guessing the correct word in six tries and is a more ethical alternative to simply looking up the correct word. This application, WordleAssist, will not only display a sorted list of best guesses as determined by a minimax algorithm, but it will also serve the dual-purpose of assisting in games played on the application and on a browser.”

Platforms Used

Stakeholder Analysis

Stakeholder	Characteristics
Casual Wordle Players	**Background:** Play Wordle every day due to its quickness and ease-of-access. Isn't anymore skilled than the average person. **Expectations:** A tool to help make the game easier without outright spoiling the answer. Also like the option to be able to play multiple games. **Preferences:** Want a convenient tool that is intuitive in use.
Word Game Enthusiasts	**Background:** Have a lot of experience with games like Wordle, word searches, and crossword puzzles. Likes to play Wordle multiple times in a day. **Expectations:** A tool that helps the train to be better word game players. Would like to get to the point where they know best guesses in most circumstances. **Preferences:** Wants a system that can process multiple Wordle games in a small amount of time.

Use-Case Scenarios

- ***Daily Assistance***
  - **Actor**: Phillip, a casual daily player
  - **Goal**: To use WordleAssist to keep Wordle streak alive.
  - **Preconditions**:
    - Phillip has WordleAssist installed.
    - Phillip has a win streak on the official Wordle website.
  - **Scenario**:
    - Phillip opens up Wordle on his browser and begins to play a game.
    - He then opens the WordleAssist application, clicking on the “assistant” tab.
    - After making a guess on the official Wordle site, Phillip enters his answer into WordleAssist, marking each letter as green (in the right spot), orange (in the word but in the wrong spot), or red (not in the word, and then submits it.
    - WordleAssist utilizes its algorithm to generate and show a sorted list of potential guesses, with guesses that are the most likely to eliminate the most potential guesses displayed first.
    - Phillip repeats this process until he runs out of guesses.
  - **Postconditions**:
    - Phillip successfully extends his streak.

Use-Case Scenarios

- ***Wordle Training***
  - **Actor**: Kelly, a word game enthusiast
  - **Goal**: To use WordleAssist to practice at Wordle.
  - **Preconditions**:
    - Kelly has WordleAssist installed.
  - **Scenario**:
    - Kelly opens up the WordleAssist application and navigates to the game tab.
    - Kelly enters her initial guess of a five-letter word.
    - WordleAssist provides feedback by displaying if each letter was correctly guessed in the right position (green), in the wrong position (orange), or incorrectly guessed (red), and updates its list of best guesses for Kelly to see.
    - Kelly plays many different games in a row, testing out different recommended starting words each time to see which are the most consistent in eliminating words.
  - **Postconditions**:
    - Kelly successfully plays multiple games back-to-back, gaining experience that will make her more practiced at Wordle.

Best Guess Algorithm

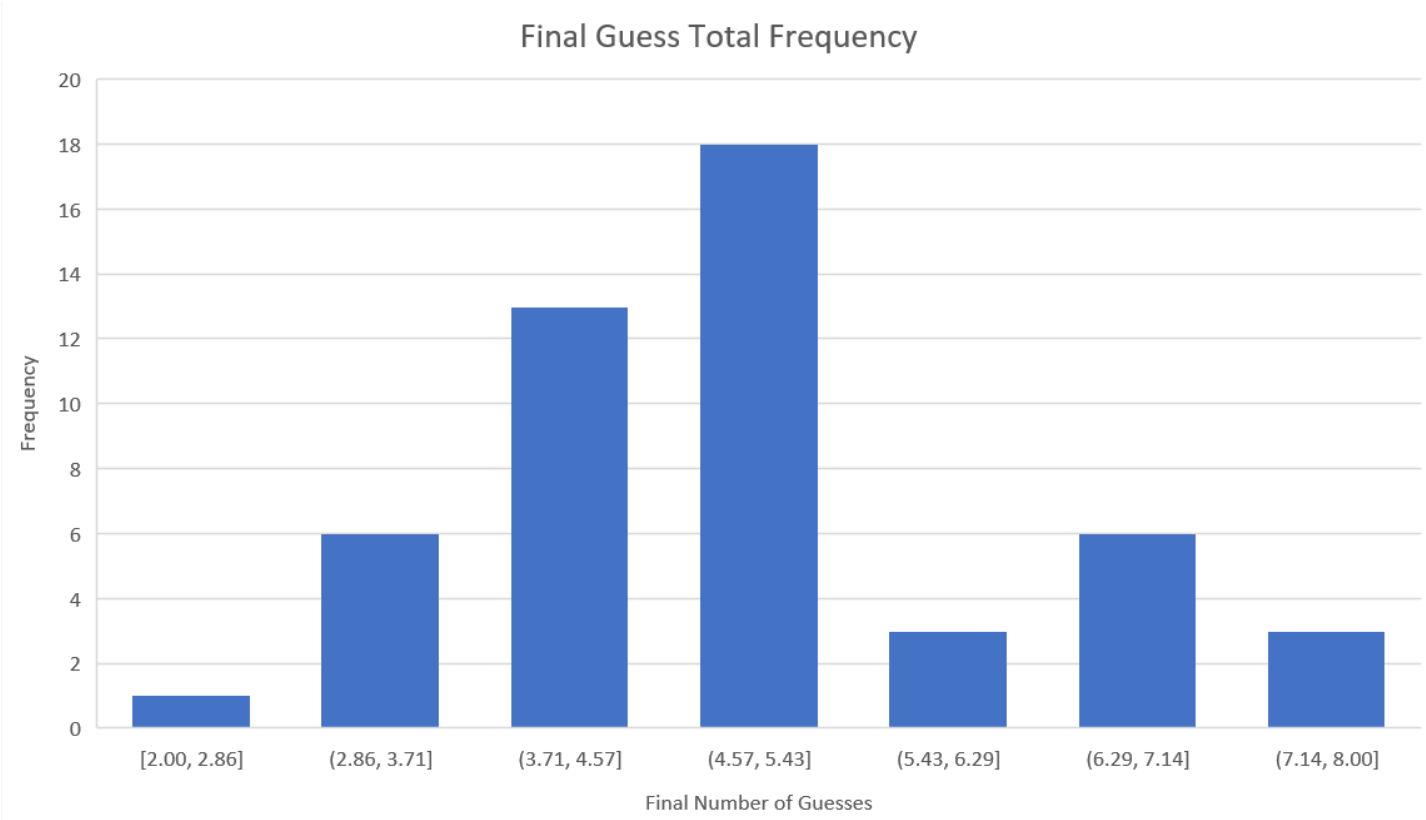
First, words that are deemed “impossible” based on prior guesses are removed from the list of potential guesses.

A minimax algorithm is then employed to assign an impact score to each word, with higher scores being assigned to words that, if guessed, are more likely to eliminate a higher number of potential guesses.

Finally, words with the same impact score are sorted based on unique letter count, with words containing the most unique letters being ranked ahead of words containing the least unique letters.

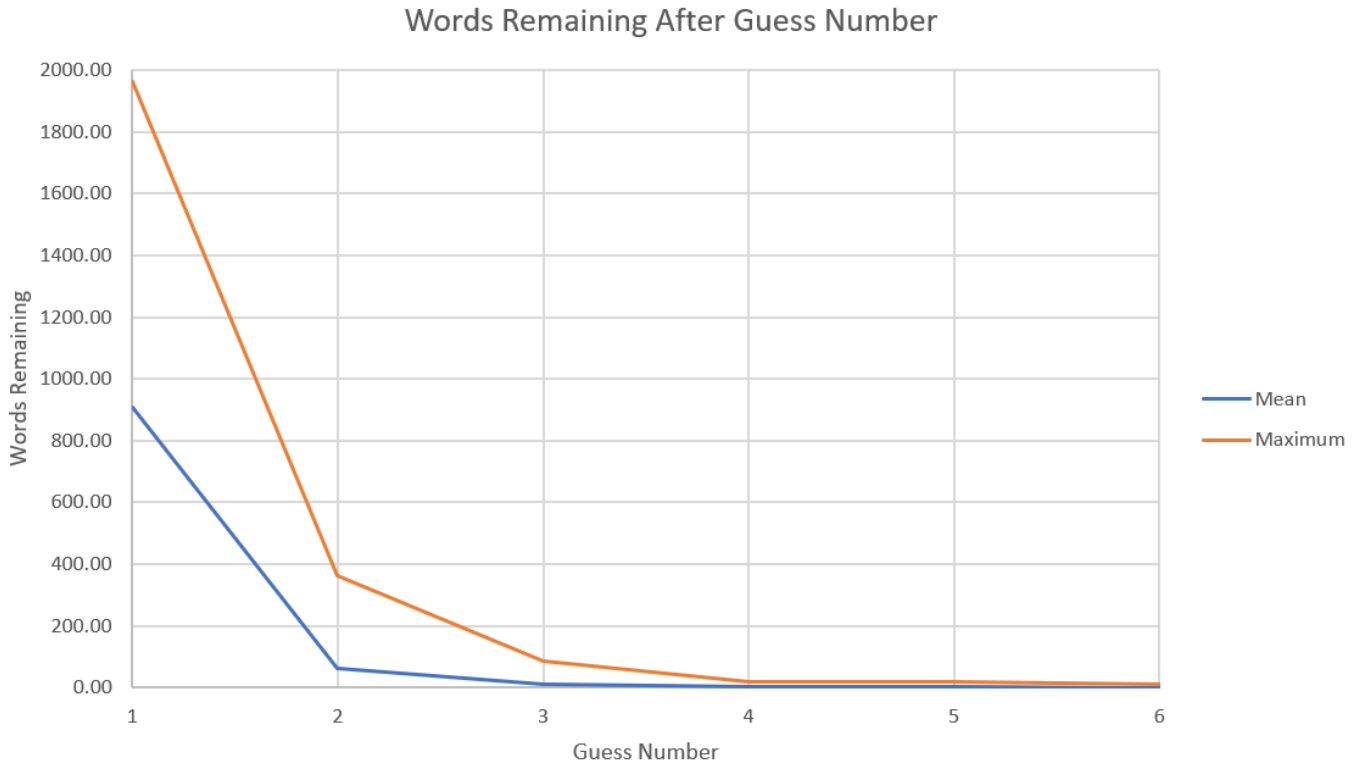
Demo

Results



# of Guesses:	2	3	4	5	6	7	8
Frequency:	2%	12%	26%	36%	6%	14%	6%

Results



# of Guesses:	1	2	3	4	5	6
Max. Words Left	1963	362	84	19	17	9
Avg. Words Left	908.94	60.58	9.56	3.02	1.36	0.62

Lessons Learned

Was able to further develop my understanding of minimaxing and its applications, as well as the value of combining separate algorithms together to accomplish a single task.

Further developed ability to incorporate algorithms into responsive GUI development.

Division of time and labor as a one-person team.

Q & A

GitHub Repo