

The game of Wordle has a system for deducing a hidden five-letter word through strategic guessing. The guessing system uses letter placement and feedback to advance toward the solution. Feedback can only be obtained by submitting valid five-letter words as guesses, with each guess revealing which letters are correct (green), present but misplaced (yellow), or absent (gray). A useful AI agent would help plan which words to guess based on the accumulated feedback, optimizing the information gained from each attempt. The optimal result would be identifying the target word in the minimal number of guesses, given constraints on the valid word list and the six-guess limit.

The Performance Measure:

The following elements will be added together and then the negative of the sum will be used to produce the performance measure. The best agent will have the greatest performance measure. Note that the perfect score is 1, which is unobtainable, unless the target word is guessed on the first try.

- $1 * (\text{number of guesses used to find the word})$
- $10 * (\text{number of letter locations that reveal no new information})$
- $20 * (\text{number of guesses that reveal no new information})$
- $+1000$ Penalty if word is not guessed in the six guesses limit

Additionally the following measure is used in the search process to best guide towards a solution. But because it is too large and unpredictable it would not provide the user with much information if used in the performance measure.

- $1 * (\text{number of possible words given the available knowledge})$

The Environment is:

- Observability: Partially observable. The puzzle starts with zero information given about the words other than the letter count. And information is obtained through exhausting guesses.
- Uncertainty: Stochastic. The actions are deterministic. However, the result of the actions and which guesses will reveal new information is unknown until a guess is submitted.
- Duration: Episodic. Each word is a separate game, and resets all counters.
- Stability: The game is static
- Granularity: Discrete. All values are discrete. All values are incremented in whole numbers
- Participants: Single-agent.
- Knowledge: Known. The game system is known and the progression and duration of the game is known, the word is unknown but that falls under observability.

The Actions (Actuators):

- Submit a valid 5 letter string as a guess. This will provide feedback on letter correctness and consume one of the six available guesses.

The Percepts (Sensors):

- A 5 letter string denoting the feedback

e.g. "ccwae"

- ❖ c → Correct letter and in correct position
- ❖ w → Letter exists but in wrong position
- ❖ a → Letter is absent
- ❖ e → empty feedback, no guess made yet
- Additionally the list of valid words used to select the secret word is made available through data access of the package.

Intended Search Strategy:

A combination of frequency analysis and word filtering techniques.