Motivation and Concept

- The desire is to create a general robust word search solver using image processing methods.
- Using MATLAB, the user provides an image of a word search puzzle they would like to solve. The output is an image of the solved puzzle (color-coded).
- Goals are efficiency, accuracy, and ability to handle a wide variety of input images

Overview

Pre-processing:
- Hough transform for rotation alignment/correction
- Morphological top-hat filtering for background suppression

Optical Character Recognition:
- Performed on the word bank and character grid separately
- Used Tesseract OCR Engine

Display Result:
- Draw lines over words in word bank that were found in the grid
- Draw lines in the grid with corresponding color to show the location of the found words

Word Search Algorithm:
- Root function is horizontal search in character matrix
- Add directional search to find words in all directions
- Wrap it all up and report the location, direction (start point in grid), and order (forwards/backwards) for each word

Experimental Results

- U.S. Prohibition
- NOVELTY CANDY

Future Improvements

- Improve automation: automatically detect and separate word bank from letter grid
- Increase OCR accuracy with appropriate pre-processing improvements
- Add support for multiple languages
- Add mobile support for interactive word-search solving based on camera input and user touch control