Magic unJumble: Solving Word Jumbles on an Android Phone
Debabrata Sengupta, Abhishek Sharma
Department of Electrical Engineering, Stanford University

**Motivation**
- Create an Android app to assist the user in solving the popular daily word ‘JUMBLE’.
- The app should automatically detect the letters and unscramble them, while also highlighting the circled letters.

**Android Implementation**
- Each camera preview frame processed by our algorithm, implemented using an OpenCV JNI Wrapper for Android (algorithm runs on the phone).
- Algorithm selects a ‘best frame’ based on number of word patches and number of circles detected.
- Letter patches of the ‘best frame’ are sent to Tesseract OCR engine running on a server for recognition.
- Output of the OCR engine is sent to a Web API for unscrambling.

**Our Algorithm**
- Current Frame
- Edge Detection, Morphological Operations, Flood Filling
- Area and Shape based filtering
- Text Patch
- Binarization by adaptive thresholding, erosion
- Shapes
- Circle Detection using Hough Transform
- OCR Engine
- Unscrambling using Web API

**Acknowledgement**: The authors would like to thank the course staff, David Chen and Derek Pang for their immense help. We are also grateful to Sam Tsai for his guidance, and setup of the OCR server interface.