Augmented Reality Tic-Tac-Toe
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Abstract
This project implements an augmented reality version of tic-tac-toe. In this game, the user draws an X on a paper board. Using a webcam and digital image processing techniques, the computer then determines the board state. Using this information, the computer chooses a move and displays the move in the appropriate place on the screen.

Algorithm

Acquire Homography
1. Reference Frame
2. Current Frame
3. Get SURF Keypoints
4. Calculate Homography $H'$
5. If $\Delta H < \text{Threshold}$ Update $H$

Detect Player Move
1. Extract Tic-Tac-Toe Quadrant
2. Use “X” Template Matcher
3. Rectify with $H$
4. If new “X” in 3 consecutive frames, indicate new move

Update Board
1. If new move, query game agent for computer move
2. Display Board and Computer Moves

Setup
1. Python 2.7
2. Numpy
3. OpenCV
4. Webcam
5. Computer

Game

References
1. OpenCV
2. EE368 Course Notes
3. Dr. Roland Angst