Visual Chess Recognition

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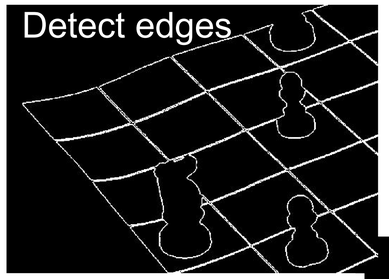
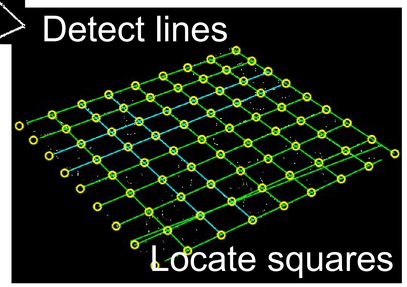
Recognizing the Board



Binarize red and green channels

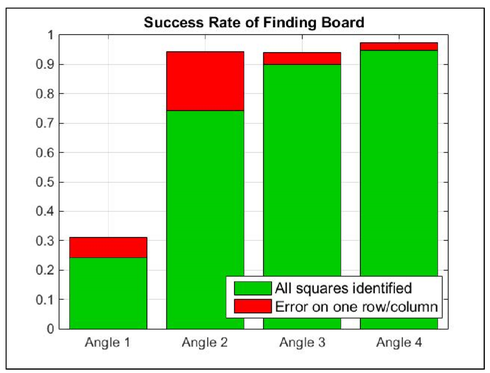
Morphological edge detection



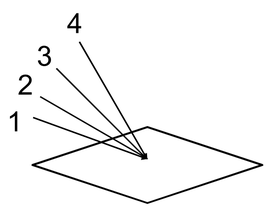
Hough transform

Separate lines into sets by theta value

Estimate homography



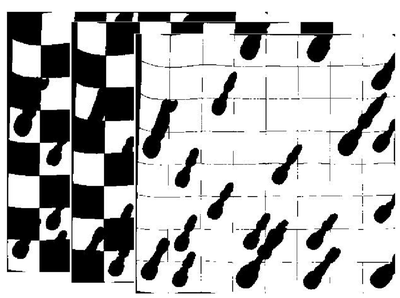
Test angles



Invert transform on red and green channels

Detect square color

Locate pieces



Objective

Detect a chessboard and identify pieces on it using image processing techniques

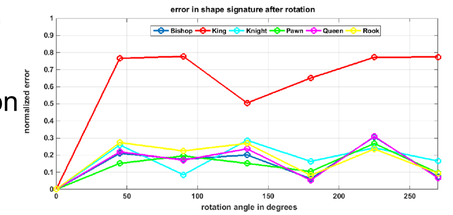
Possible improvements

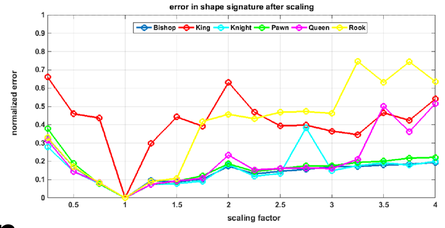
- Use corner detection to correlate with lines.
- Improve algorithm to find initial square.
- Use size variations between chess pieces to improve piece recognition.
- Try another shape signature that is more robust to scale and rotation or use 3D object recognition.
- Process images from different views to recognize occluded pieces.

Recognizing the Pieces

Shape signature

Fourier descriptors with tangent space transformation

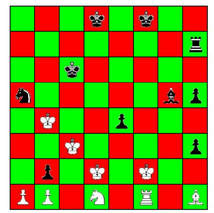




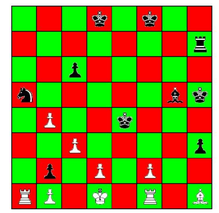
Pieces recognition

Nearest neighbor search

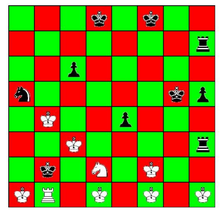
Segmentation



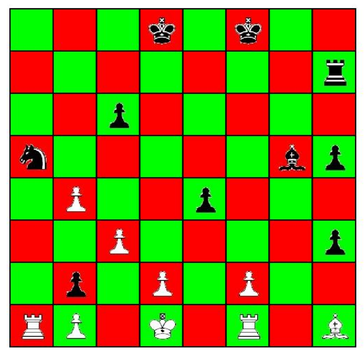
Edge detection



Color detection



Minimum distance



Side info