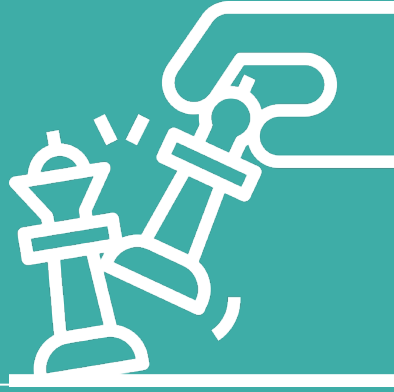
ProC(h)essing



Mid Review

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Pulkit Madaan | 2016257

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Goals and Motivations

- Correctly detect and identify from a visual image through the application of image processing techniques.
  - a chessboard
  - configuration of its pieces
- Such an algorithm could be used to automatically record a game between two players without the need for a digital chess set.
- In addition, image-based detection of chess pieces is a vital step in building chess-playing robots.

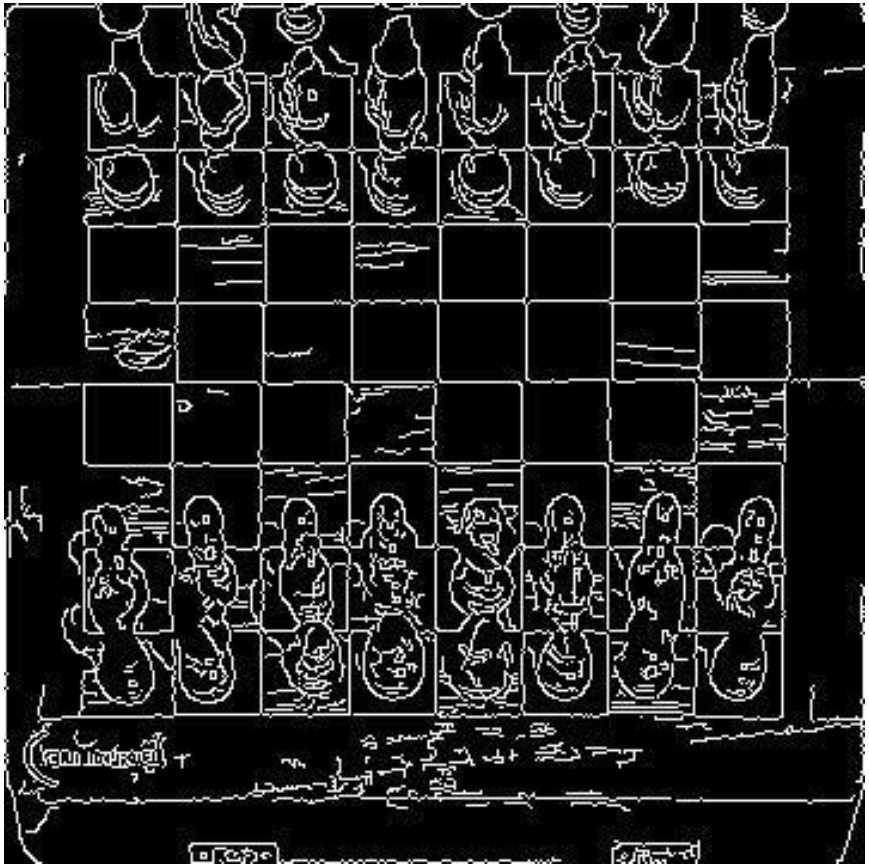
Major Steps

1. Chessboard Detection
    a. detecting the square pattern to detect each square uniquely.
    b. Perspective Transform → Canny Edge Detection → Hough Transform Lines
2. Classifying each square as occupied or unoccupied
    a. detecting the presence of chess pieces on each square identified from step 1.
    b. A major challenge will be to identify the presence of a piece in a case where the color of the square and the color of the piece kept on it are exactly the same.
3. Identifying the exact piece kept on the particular square.
    a. This will involve classification into different classes (types of pieces on a chessboard) after the segmentation and filtering of the raw images and extracting the image of the piece.
    b. Native Image Processing feature extractors (HOG/ SIFT/Eigen Images) can be used for classification in this step.

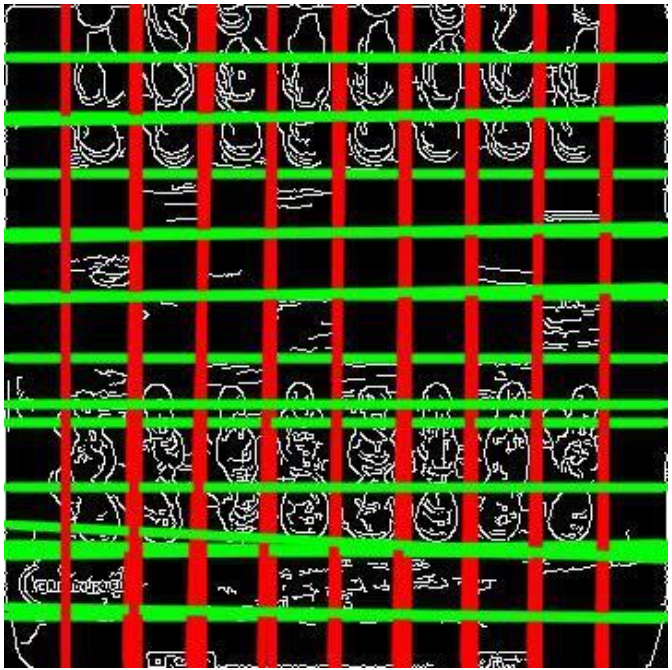
Results (1/4) : [original]

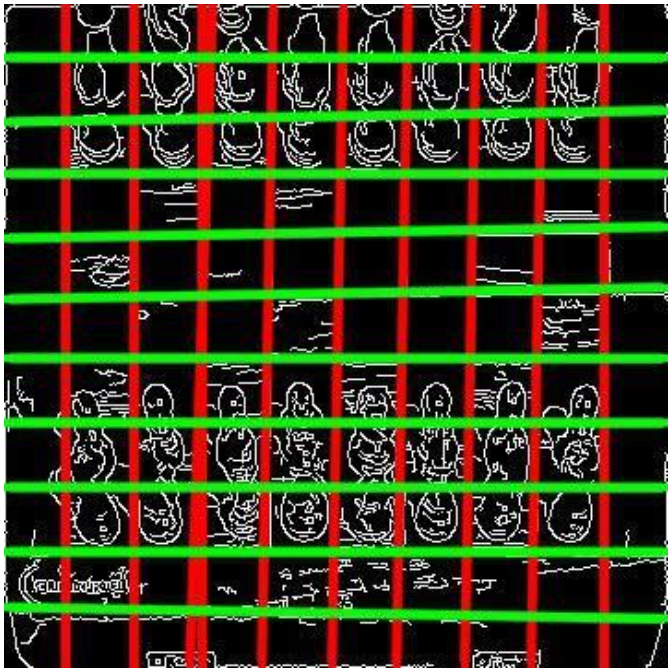
Results (1/4) : [perspective]

Results (1/4) : [canny]



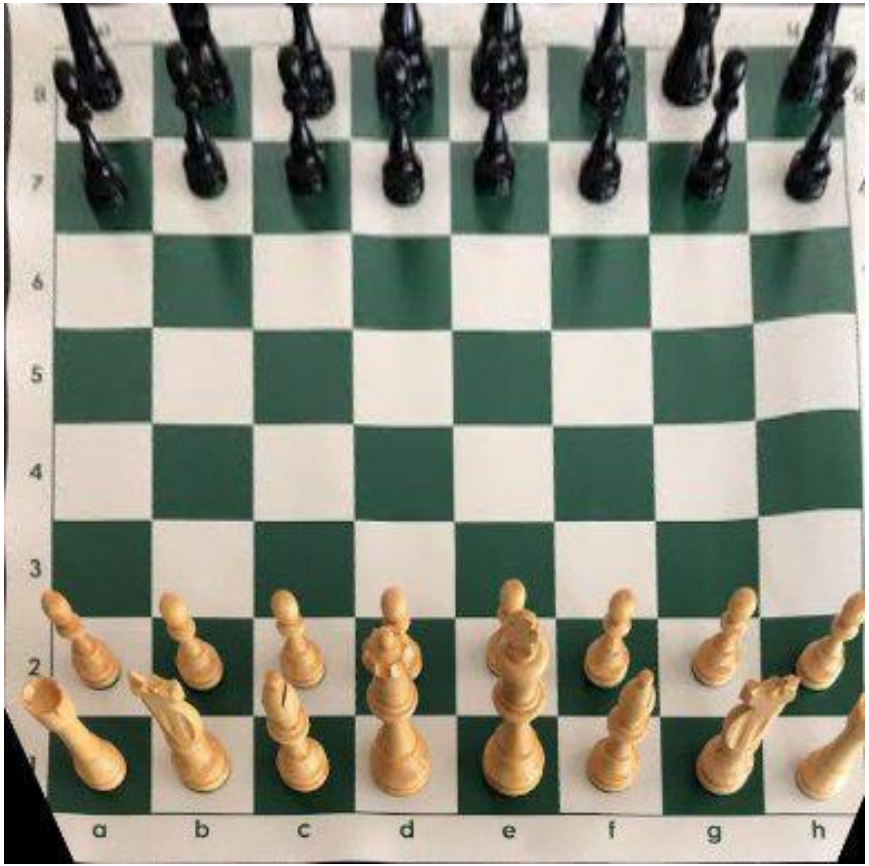
Results (1/4) : [hough]



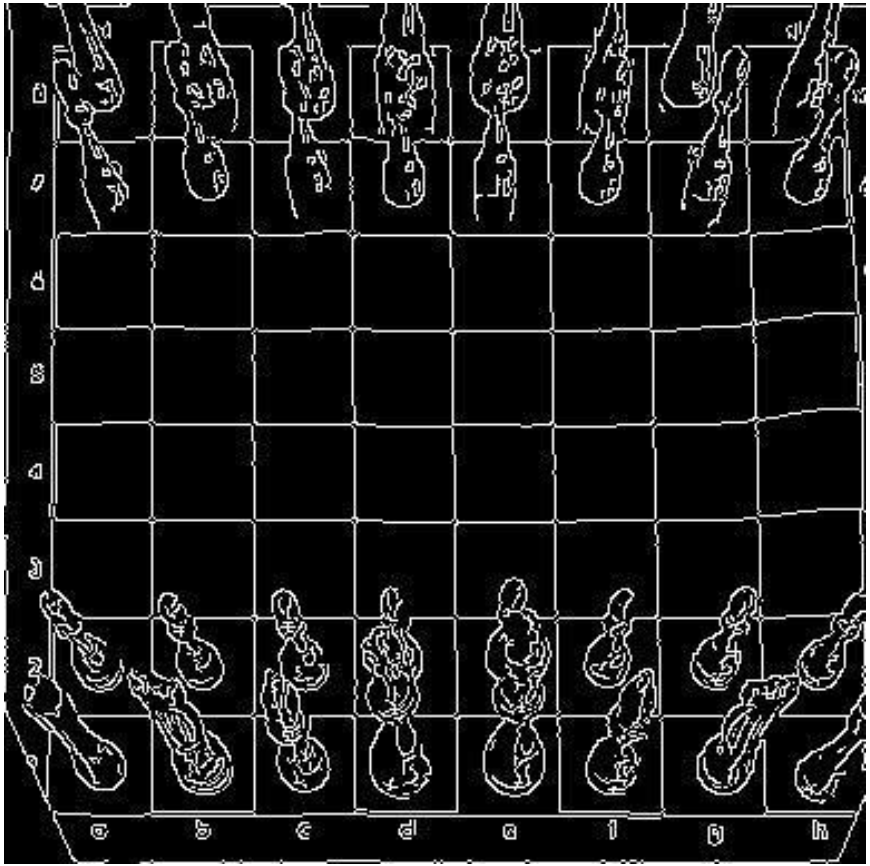


Results (2/4) : [original]

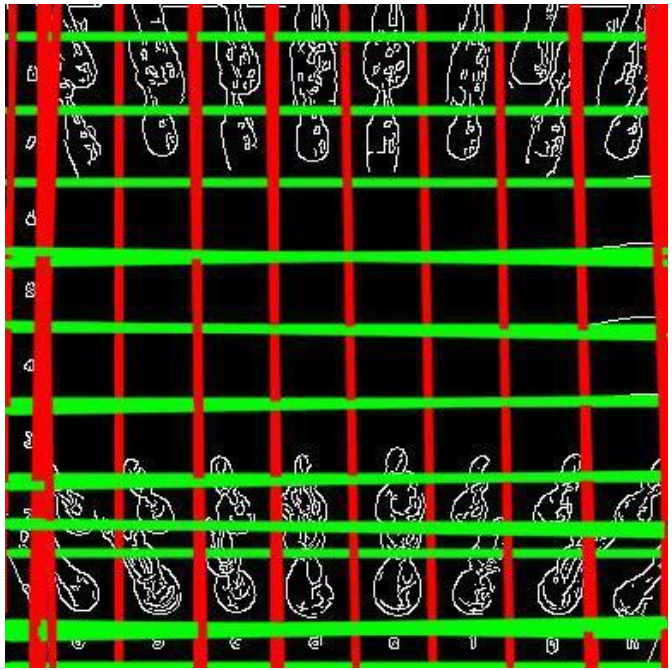
Results (2/4) : [perspective]

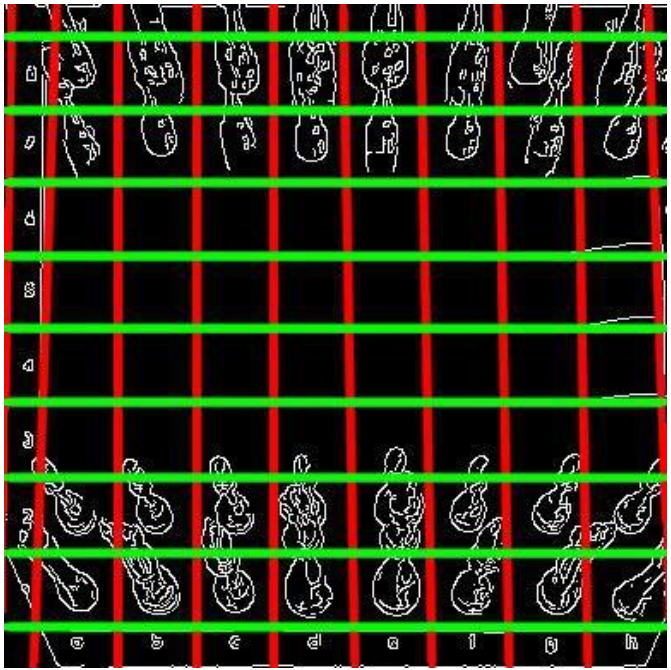


Results (2/4) : [canny]



Results (2/4) : [hough]

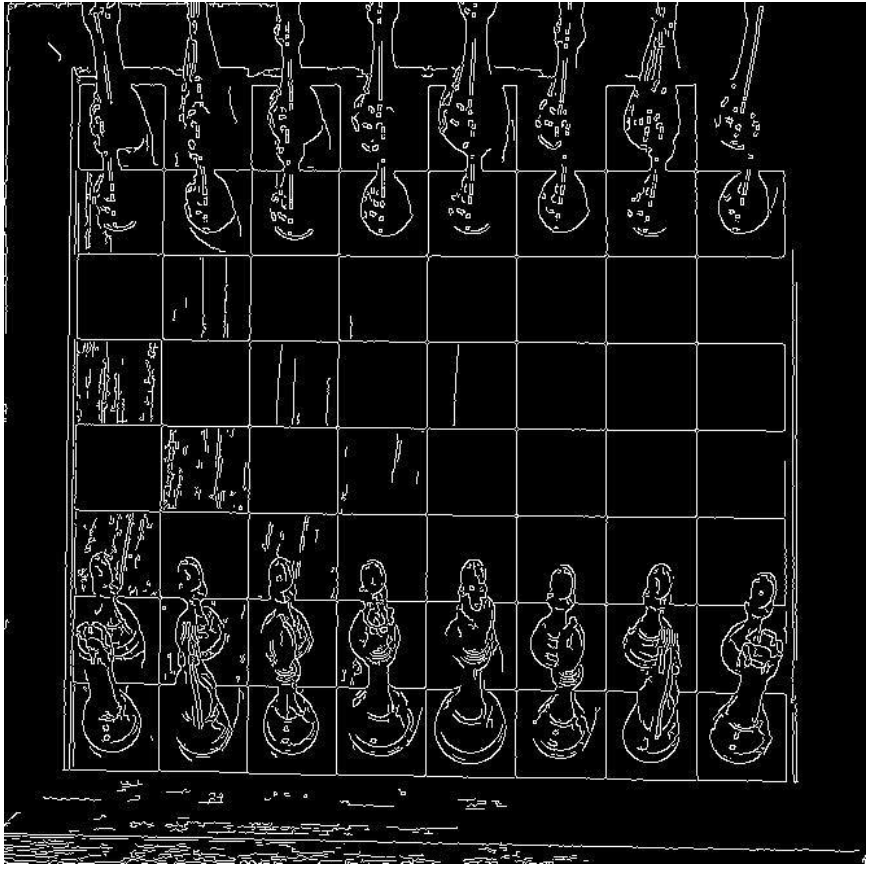




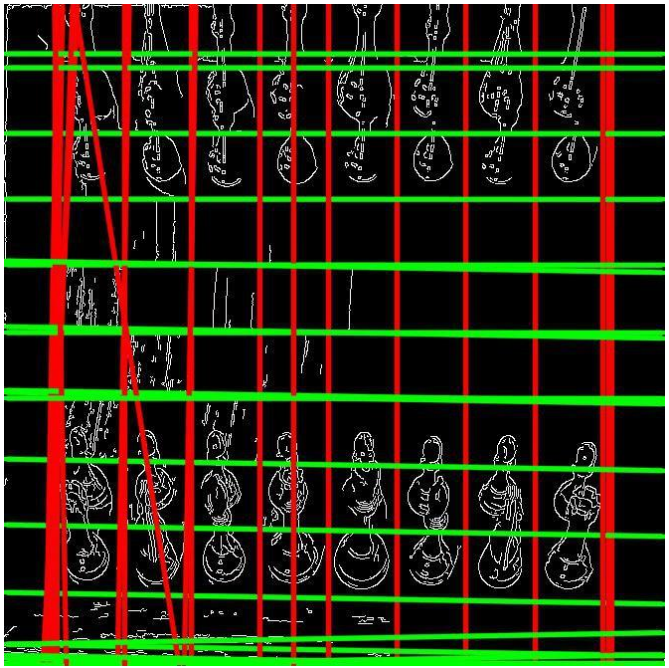
Results (3/4) : [original]

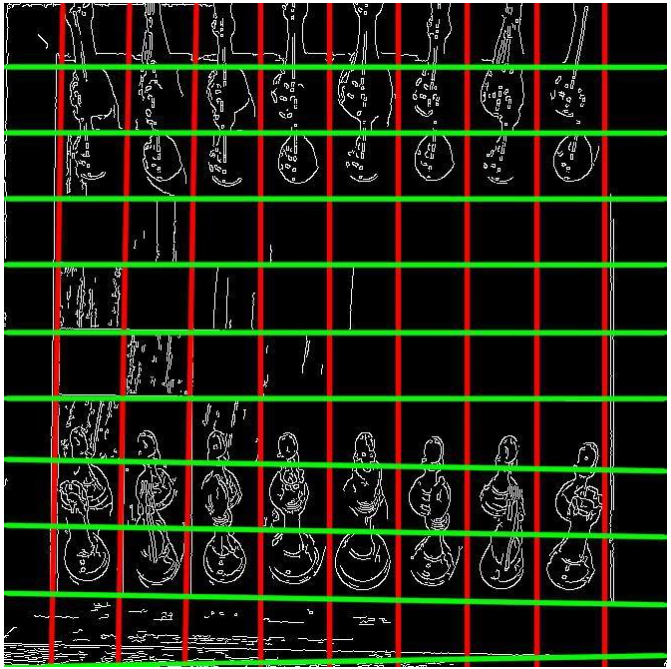
Results (3/4) : [perspective]

Results (3/4) : [canny]



Results (3/4) : [hough]

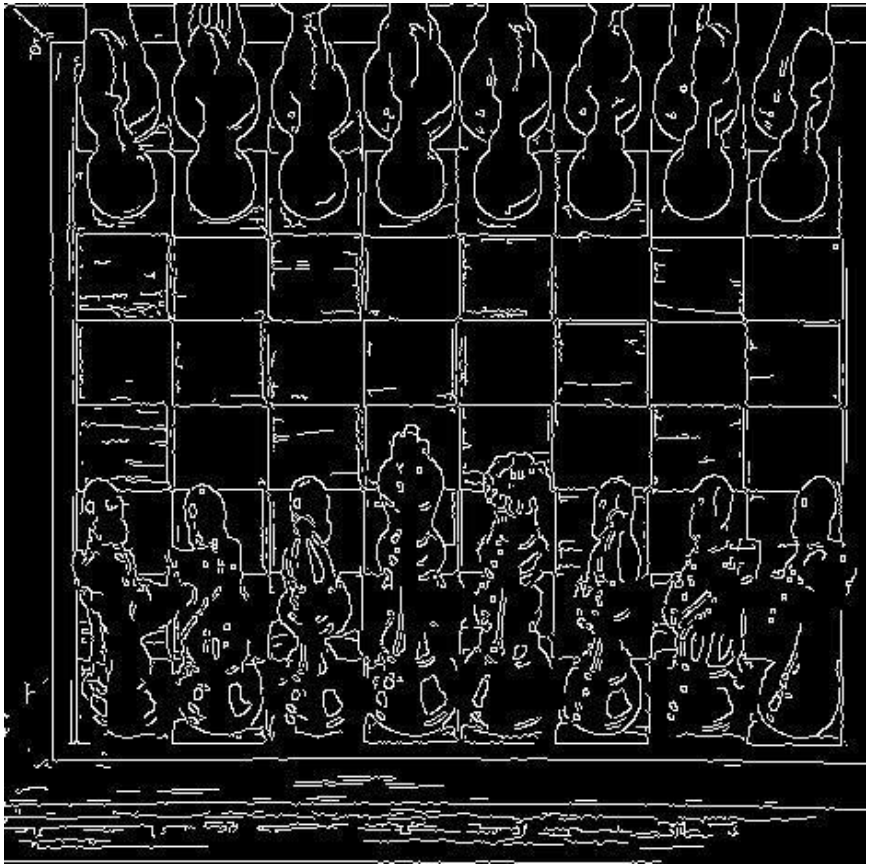




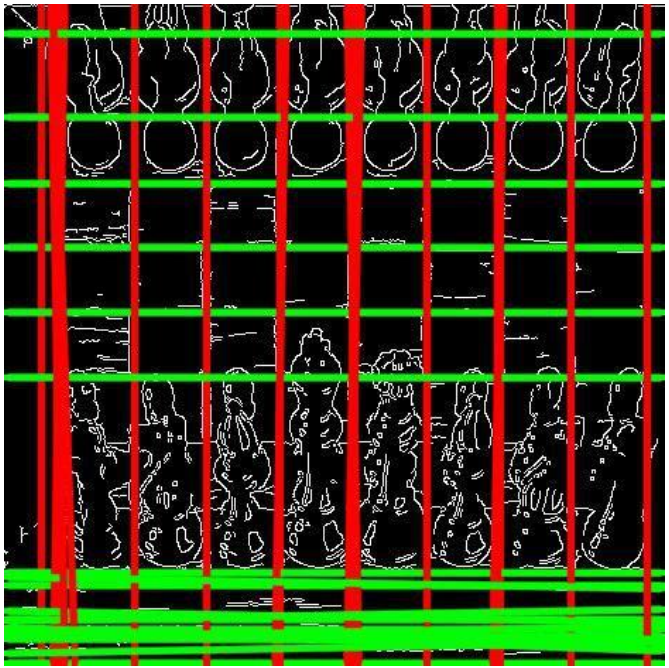
Results (4/4) : [original]

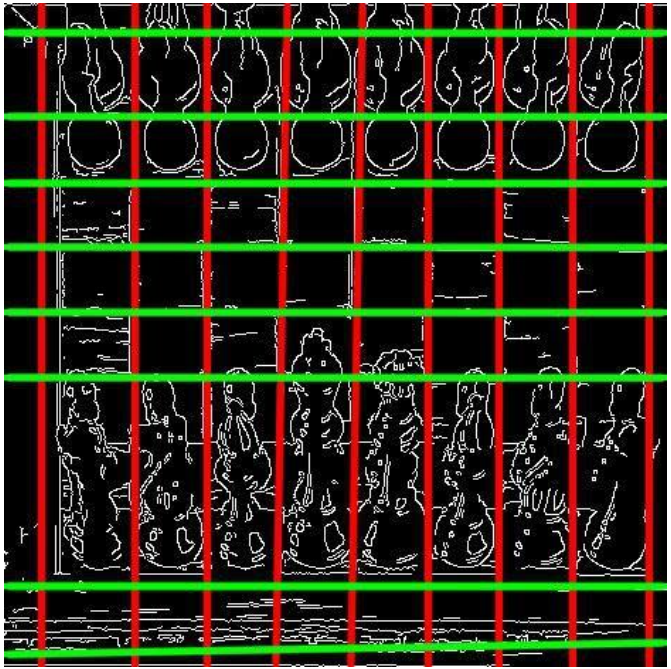
Results (4/4) : [perspective]

Results (4/4) : [canny]

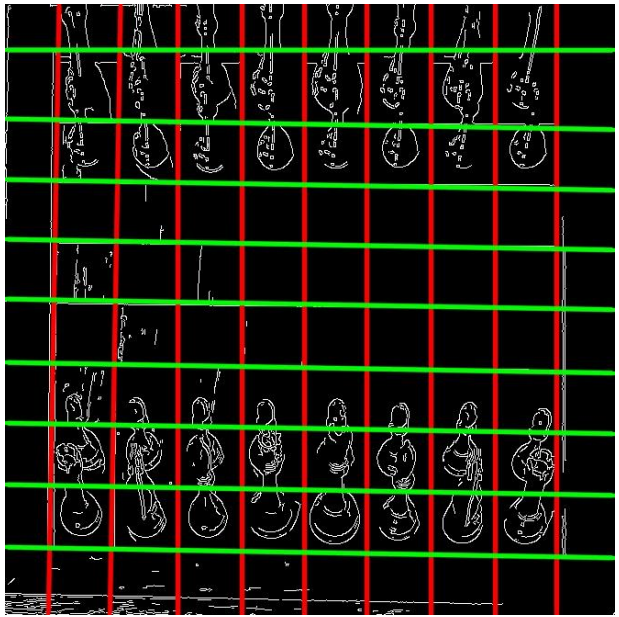


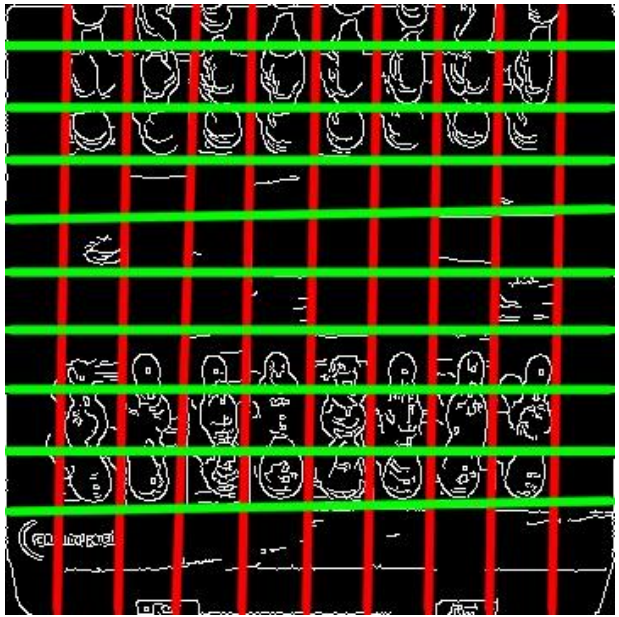
Results (4/4) : [hough]

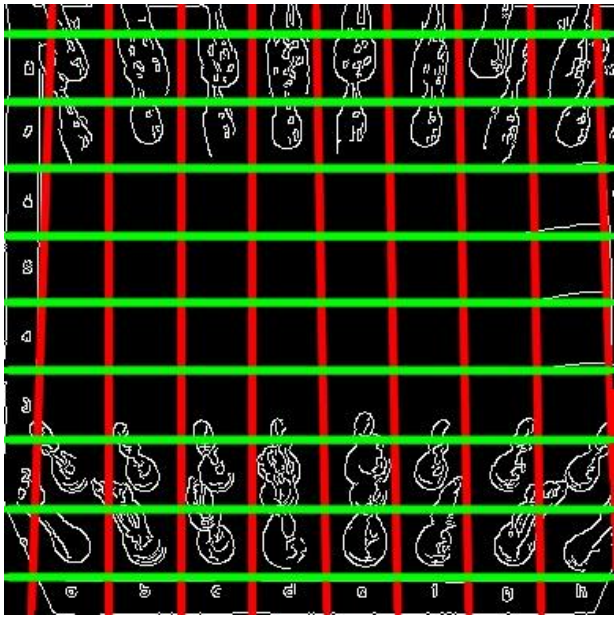




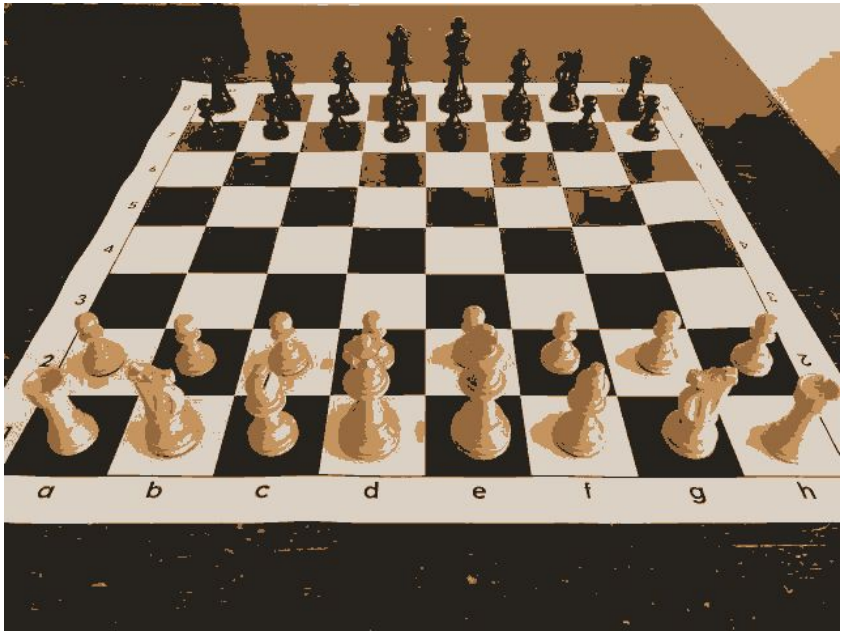
Final Lines Created





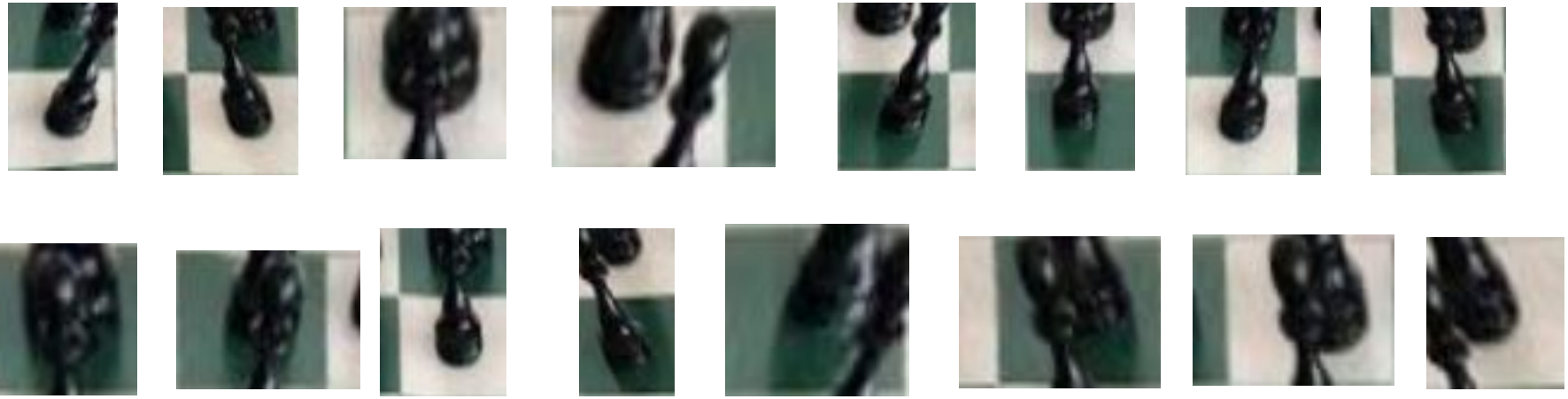


Mean Shift Output



Pice Detection (White)

Pice Detection (Black)



Final Chessboard

Problems and Limitations Faced

- Many pieces when viewed from our perspective, are present in more than one squares. Therefore, to detect the original square of a piece was challenging.

- Many pieces overlap with another piece and therefore recognition of pieces was difficult.

- In case of identification of inappropriate lines, we may get squares with unwanted emptiness, or multiple pieces depending on the error in lines.

Thank You