

## Journal Report 18

2/17/20-2/21/20

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Period 1, White

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### Daily Log

#### Monday February 17

President's Day.

#### Tuesday February 18

Finished modifying square-segmentation in piece detection to segment squares along the pose-estimated normal to the board, rather than a normal to the image. Adjusted image segments to be from slightly further up on the square, instead of dead on the bottom.

#### Thursday February 21

Changed piece detection to take entire stack of images as input to neural net, which halved my network's prediction times thanks to properties of matrix algebra. (I had previously fed them individually, to take advantage of chess logic, but now I can accomplish both.) Began attempting to extend orthophoto to improve recognition of black pieces on black squares.

## Timeline

Date	Goal	Met
Feb 3	Adjust piece height thresholds, potentially retrain model	NA
Feb 10	Fix chess-logic implementation, label new images, then return to Feb 3rd goal	Done, not returning
Feb 17	Finish slanted square segmentation, return to piece labelling	Done
Feb 24	Finalize orthophoto tweaks, begin piece labelling (March 6th)	Not started
Mar 2	Finish piece labelling, train new model for States (March 6th)	Not started

## Reflection

My partner came to the realization earlier this week that he was feeding in lattice points one-at-a-time to his neural network, rather than feeding them in a batch, as is standard. He told me his prediction times dropped significantly.

Thank god he told me that. My piece detection now runs through the same number of images in about half the time—on the test image I’m working with, the twenty squares marked as significant by the orthophoto detection run in about 4.5 seconds, including the chess logic. They used to take over 10 to process.

This means I can now focus on making sure the orthophoto catches all pieces on the image, rather than prioritizing speed gains. It currently struggles with finding black pieces on dark squares, because of the nature of Canny edge detection. I’m looking into either using the Canny info from the row above to influence a given square, as pieces tend to overlap the row above them, or into increasing the contrast with CLAHE, as my partner has done for board detection.

Once I complete that, I’ll have to relabel my entire dataset, because I shifted the way images are projected. (See below: before on the left, after on the right.)

I think it’ll ultimately result in a higher accuracy model, but obviously my current model isn’t equipped for such a dramatic perspective shift across every piece. I’ll adjust the data augmentations accordingly as well, reducing shear and rotational transforms, but increasing brightness and color contrast in an effort to classify in less-than-ideal conditions.



Figure 1: Before and after this week's projection work.