Object Detection of Multi-Step Lego task

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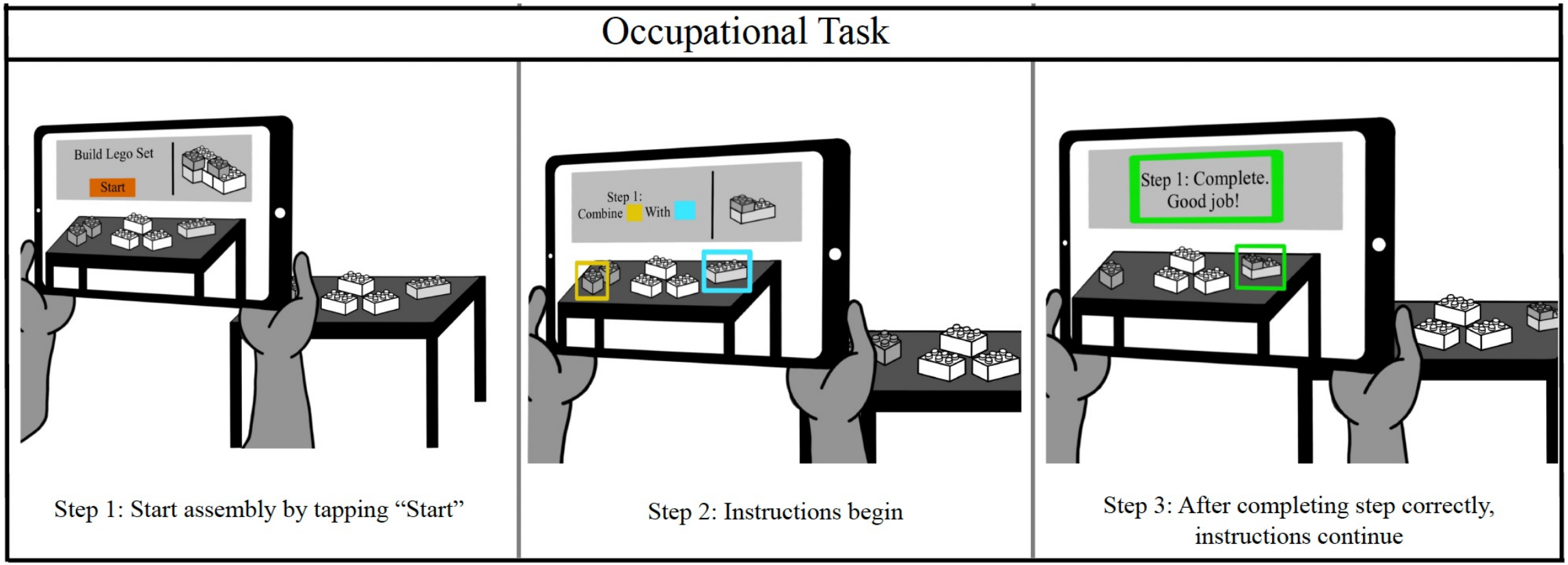
Research Purpose



Method

Preprocessing

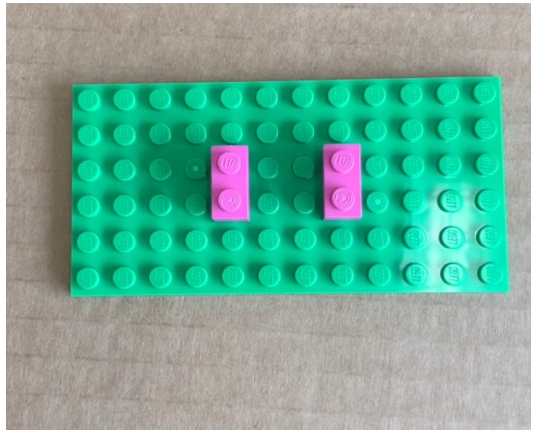
Color-based detection

Shape-based detection

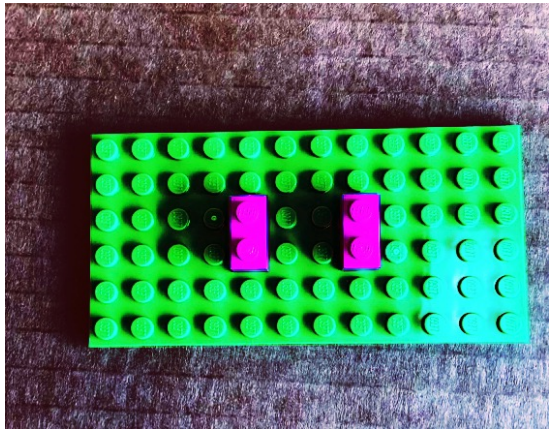
Assembly detection

Difficulties

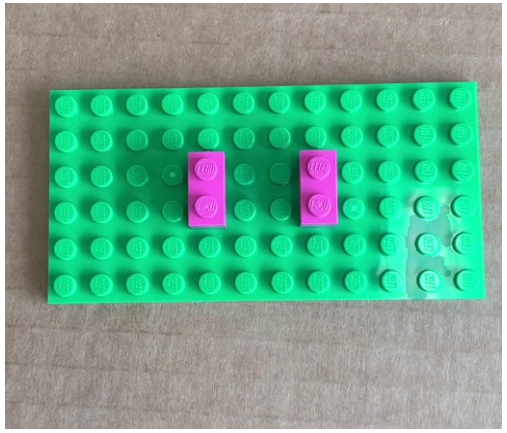
- Edge detection when the colors of Legos were the same.
- Finding a specific Lego on the constructed set



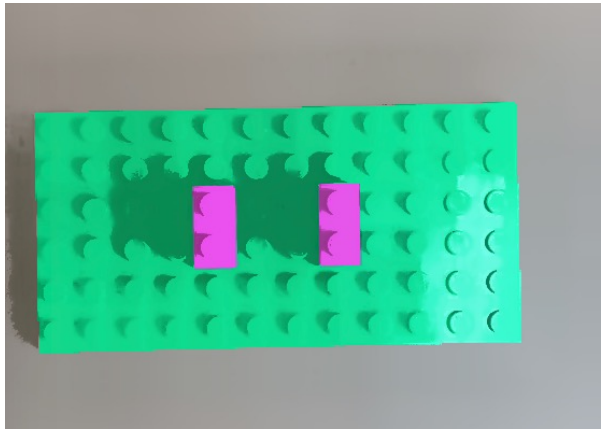
Original



After histogram equalization



After filtering glare



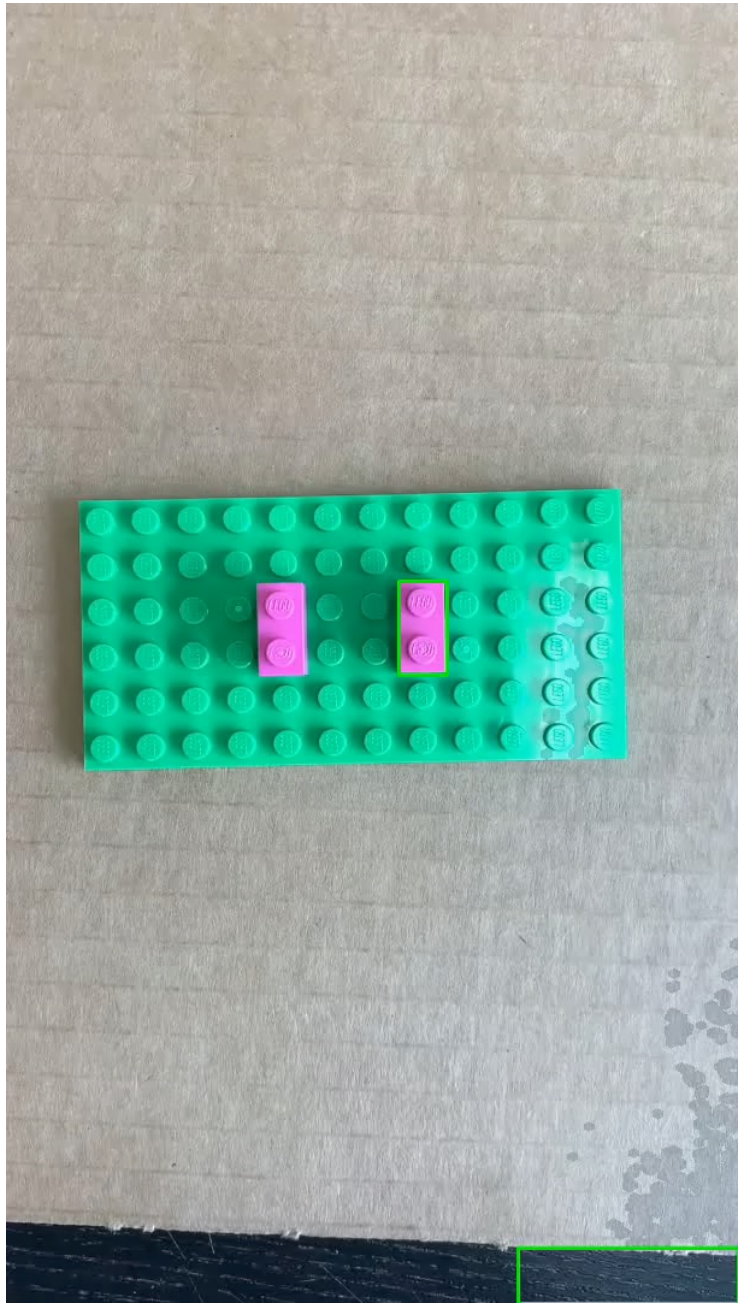
After mean shift filtering

Results

- For contrasting colors, I could detect the Lego blocks and their location on the base. I could also detect the next purple Lego and the next blue Lego

- I was able to determine how many boxes were found and assume the step the user was on.

- I performed the tests on images and videos and was able to detect areas of interest.



Future work

- ML with more data collection for stronger results
- AR integration
- Real-time video input

- The final website will have a step by step example