Automatic Handwritten Flowchart Conversion

Digital Image Processing Project
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https://github.com/sayhitosandy/Flowchart_Converter

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Progress

Dataset: Handwritten flowcharts consisting of rectangles, diamonds, circles. Arrows are straight. No text inside the shapes for now.

Image Processing Techniques:

1. Take the jpg image from a mobile camera, as an RGB, and convert to grayscale.
2. Resize so that the image aspect ratio is maintained.
3. Perform binarization using a locally adaptive threshold, to accommodate for different lighting conditions in different areas (The foreground is darker than the background in this case).
4. Bitwise invert the image.

Progress

5. Noise removal - Small areas of color which are incorrectly created during binarization are removed by finding the connected components, calculating their areas, labeling them, and removing ones with areas less than a certain threshold.
6. Fill the closed areas in the image, and find the edges using this filled image.
7. Find the Hough transform of the edge-highlighted image, and find out the various angles in the image. The most commonly occuring angle is calculated from this, and the image rotated to restore its correct orientation.
8. The filled, rotated image is then decomposed to first remove the arrows from the image, then retrieve the arrows by subtracting this image from the filled, rotated image. Noise removal of shapes with small areas are done wherever required.