

Dice Pip Detection

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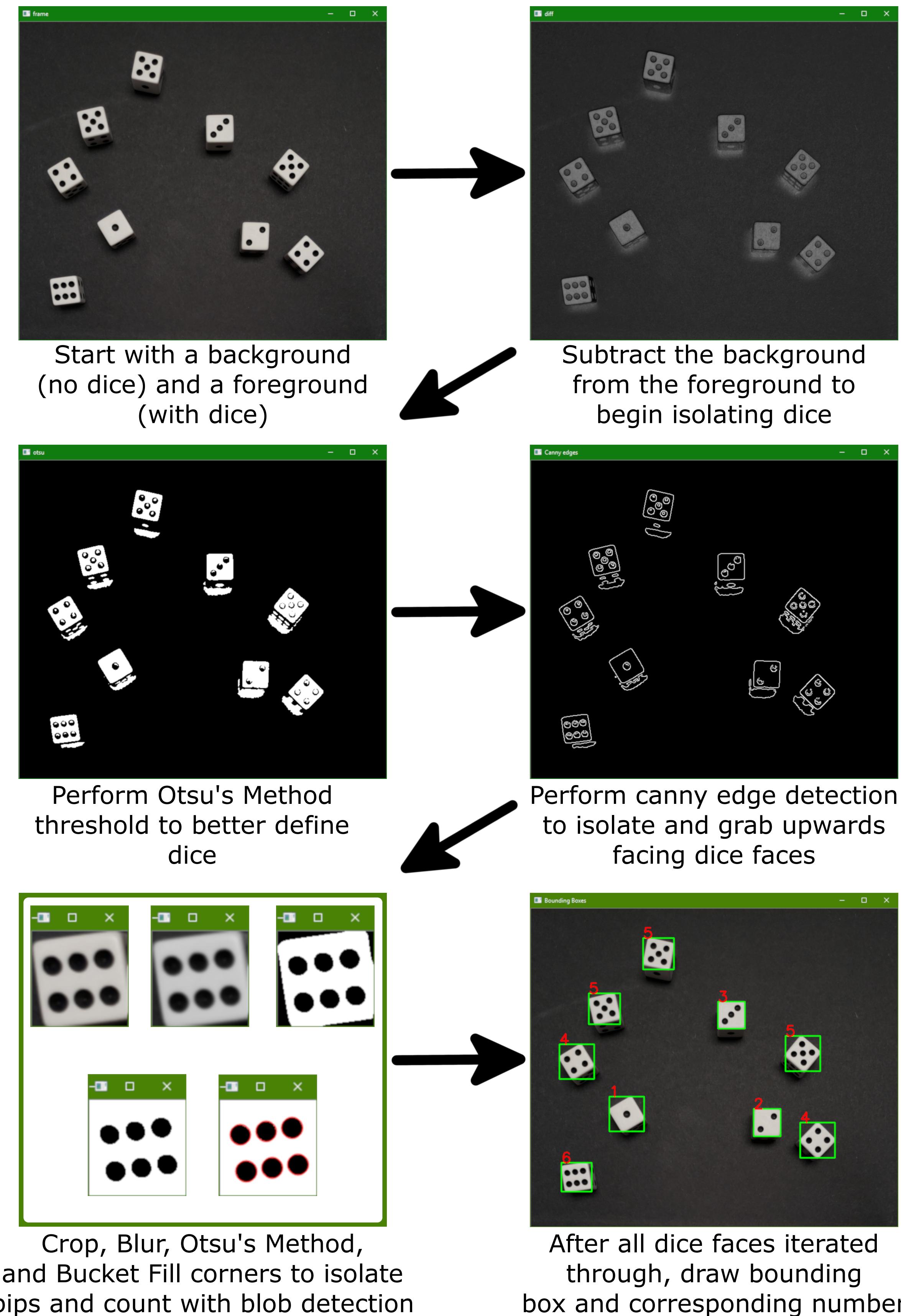
Introduction

Inspired primarily by table-top games, this project was a fun application of machine vision in attempts to enhance the overall experience of dice-based games. Some of the intended applications of this program are to be able to detect and count large numbers of dice, as well as to digitize the analog dice rolling such that it can be used in other applications. Starting from scratch, this program has been developed to a point such that it can detect dice at a 89.13% success rate and count the number of pips with 100% accuracy, with future work being to further improve dice detection capabilities.

Project Goals

1. Create a program that can successfully take an input image/frame and output a digital value(s) corresponding to the value(s) of the pips found on the top of the dice.
2. Have the detection process run quick enough in order to be used on the most amount of devices.

The Process



Results

The program in its current state can detect 89.13% of dice rolled (excluding edge case scenarios) and from those detected dice, it can count the pips with 100% accuracy.

Currently, all of the missed detections are due to an issue in the canny edge detection/contour detection state, in which small gaps in the contours disrupt the programs ability to find the dice.

Conclusions and Future Work

Overall, the results from this project have been promising; the only major issue being the error rate in dice detection.

Future work for this project would include:

- Improving detection/bug fixing
- Broadening dice detection scope (colored dice, numbered dice)
- Machine learning implementation