

Playing Card Detection and Identification

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Project Goal

The goal of the project is to write a program that when given an image is able to correctly identify and locate any of the cards in a standard 52 card deck. The program should work in the following conditions.

- Images of a single card on a variety of backgrounds
- Images where the card(s) are not centered and are rotated
- Images containing multiple non-overlapping cards

As stretch goals other conditions could be added. Possible stretch goals include

- Multiple cards overlapping each other
- Extreme perspective distortion
- Light created occlusion (glare on the cards)

Technical Approach Overview

The algorithm will use three steps to accomplish the task; Card Detection, Rectification, and Identification.

In card detection, the area a card occupies within the image will be identified. This can be done with techniques such as gray level thresholding followed by edge detection. Alternatively, (to account for a variety of backgrounds) other techniques may be applied such as a generalized hough transform[4] or a method similar to the bar code detection in lecture 6.

In card rectification, the region from detection is rotated so that its edges lie along the x and y axes. This can be done by using edge detection and hough transforms to get the rotation, and then rotating the image. Additionally, the image may be resized to enable template matching.

In card identification, the card's suit and rank are identified. Some possible approaches to this are template matching, region counting and labeling, and general optical character recognition techniques.

Finally, data will need to be collected for this project. I plan on collecting images myself using a Pixel 3 for the camera. This project will not be using a phone for the image processing.

References

- [1] C. Zheng, R. Green, 'Playing Card Recognition Using Rotational Invariant Template Matching', Proceedings of Image and Vision Computing New Zealand 2007, pp. 276-281, Hamilton, New Zealand, December 2007.
- [2] J. Pimentel and A. Bernardino, "A Comparison of Methods for Detection and Recognition of Playing Cards."
- [3] Martins P., Reis L.P., Teófilo L. (2011) Poker Vision: Playing Cards and Chips Identification Based on Image Processing. In: Vitrià J., Sanches J.M., Hernández M. (eds) Pattern Recognition and Image Analysis. IbPRIA 2011. Lecture Notes in Computer Science, vol 6669. Springer, Berlin, Heidelberg
- [4] D. Ballard, "Generalizing the Hough transform to detect arbitrary shapes," Pattern Recognition, vol. 13, no. 2, pp. 111–122, 1981.