Image Analysis and Pattern Recognition

FINAL PROJECT

GROUP 14

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Outline

Crop the Table

Finding the chips

Extracting objects from cards

Classifying the contours of the found objects

Sorting together the Shapes and Numbers

Creating the output

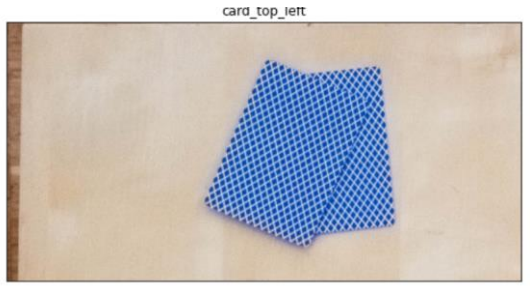
Crop the Table

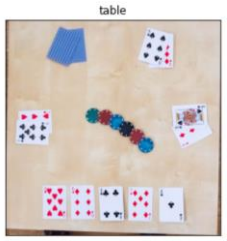
Find a threshold that distinguishes the table fom the background

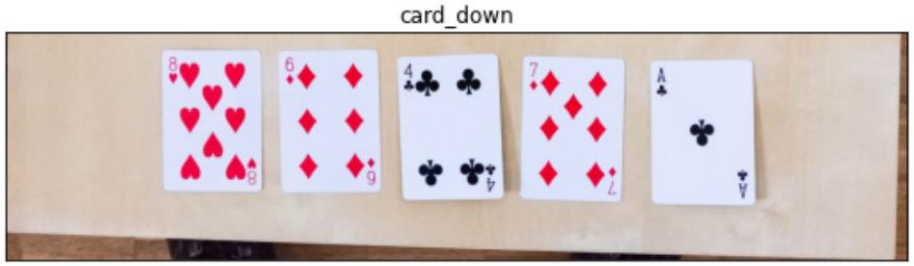
- By finding peaks in a histogram

We find the table as the longest contour

Crop the parts of the table as they are always in a similar position





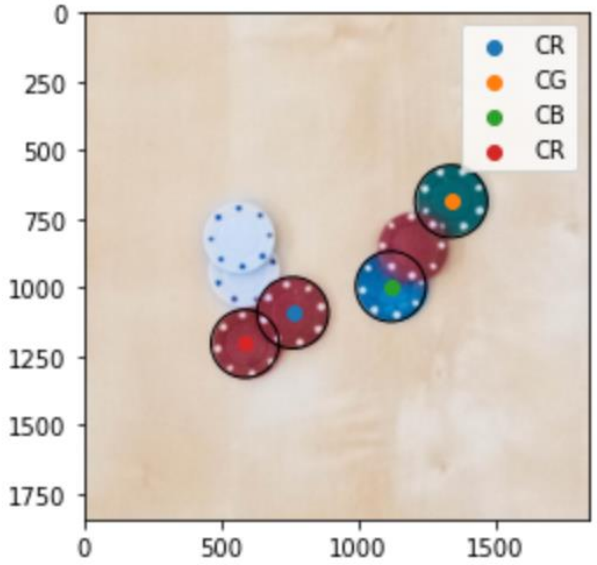


Finding the chips

Augment picture lighting if it is very dark or very light

Find the chips in the image with cv2.HoughCircles

Determine their color via the HSV-Channels



Extracting objects from cards

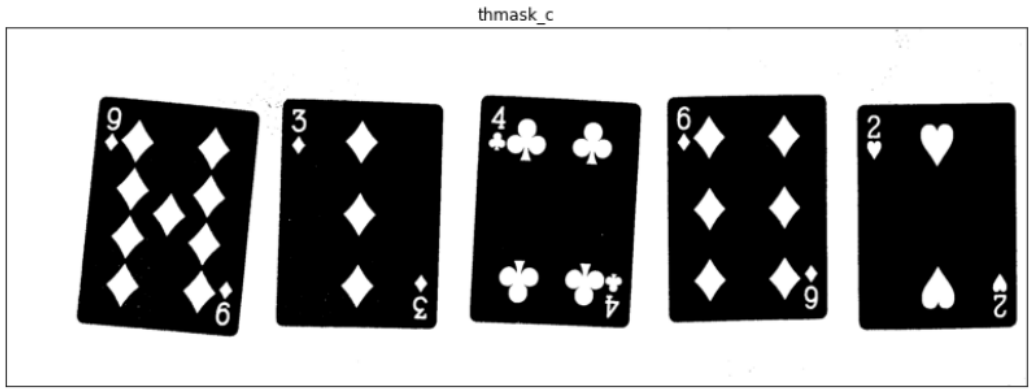
We find another threshold that seperates the cards from the table

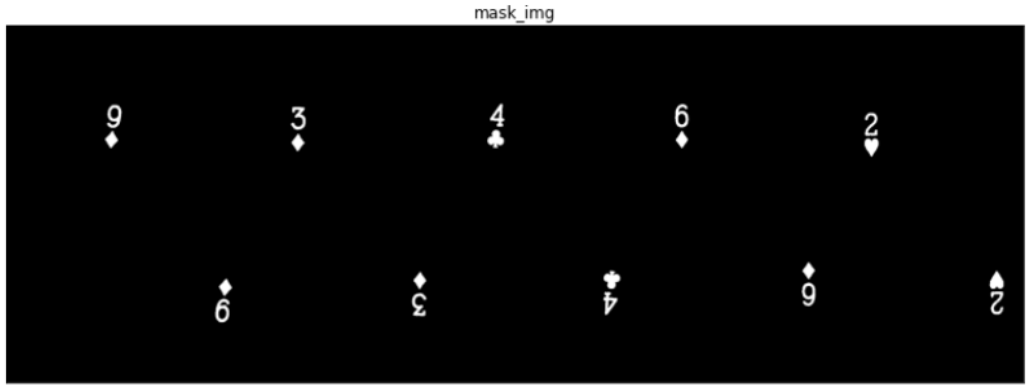
- By extending the histogram and finding local maxima and minima

Find the object in the image with help of the skimage.measure.label (object labeling)

Deleted object, that were to big

This gives us the relevant suits and numbers in the image



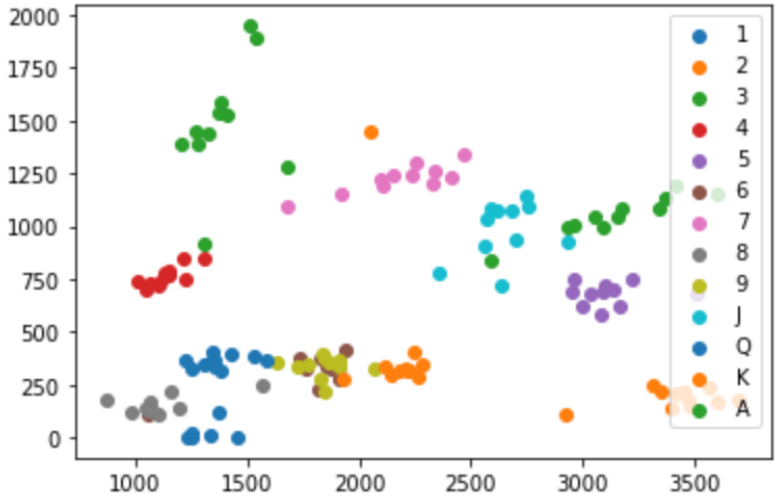


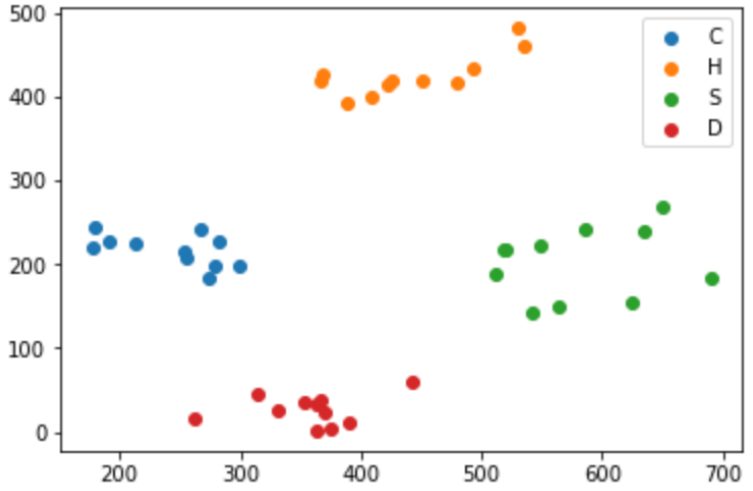
Classifying the contours of the found objects

Identify contours in the last image and detect from their position whether it is a number or a suit

We build a dataset of labeled contours and computed their fourier descriptors

We classify the fourier descriptors of the new contours by kNN



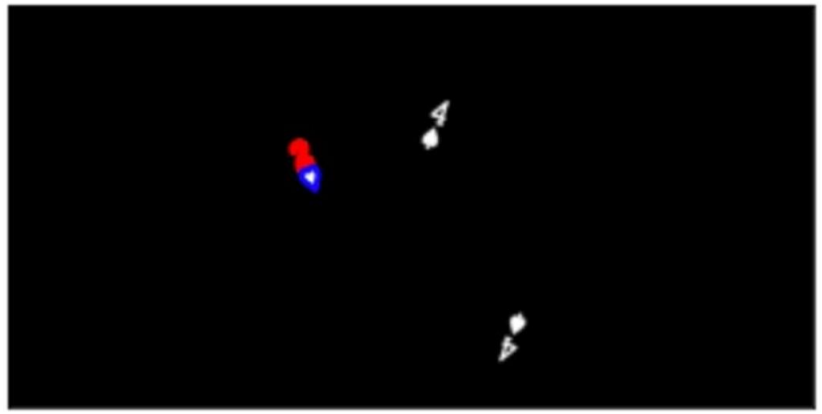


Sorting together shapes and numbers

We take the x-value of the contours and sort them from left to right.

That way, we find the contours, that are close to each other and mark them as a group of one card.

Put the results in the wanted form and create output



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The prediction is 2 2
The prediction is 15 H
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Difficulties

For light images, it is hard to detect the contours of the white chips

When the picture is very dark, it is very hard to find a good threshold for the mask, so we don‘t find clear contours of the suits and number

Deep learning

6 and 9 and Q are very close and hard to distinguish with Fourier Descriptors