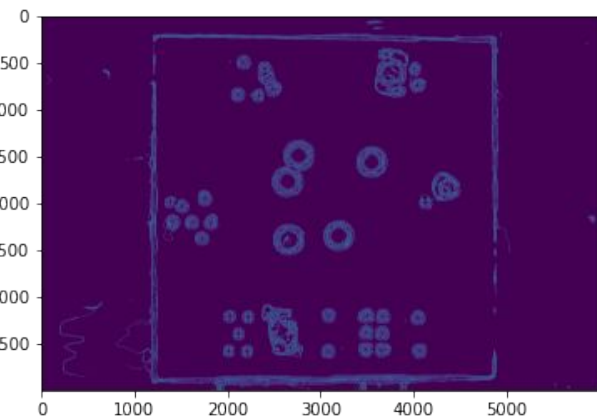# IAPR - Project

Lavinia Schlyter
Simon Gilgien

Detecting table:
Use edge detection and Hough lines to isolate table
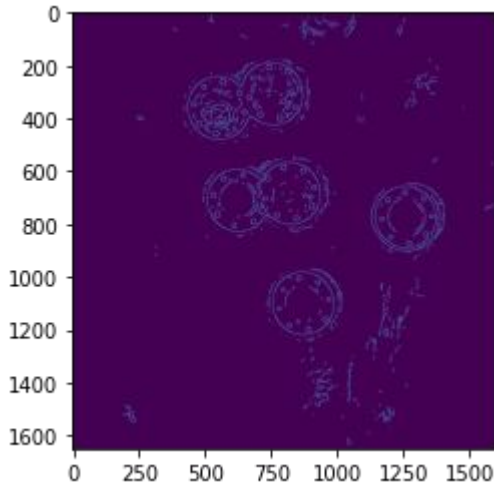

Grayscale → Blur → Canny
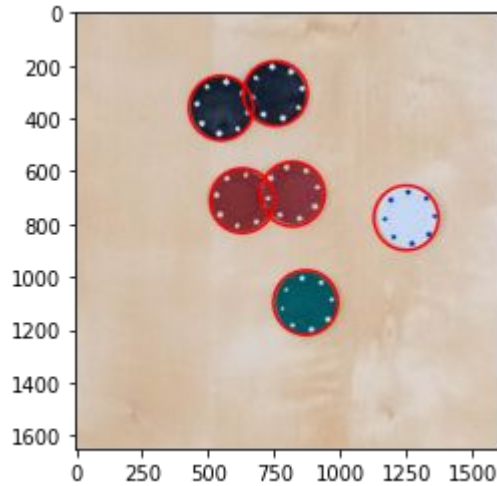

Hough lines on contours

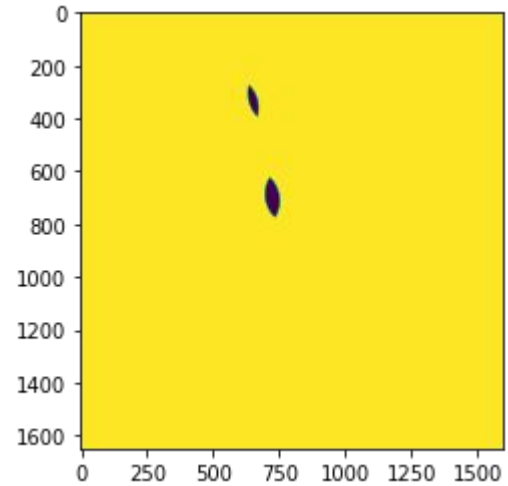Extract corners and perspective transform

Chip detection
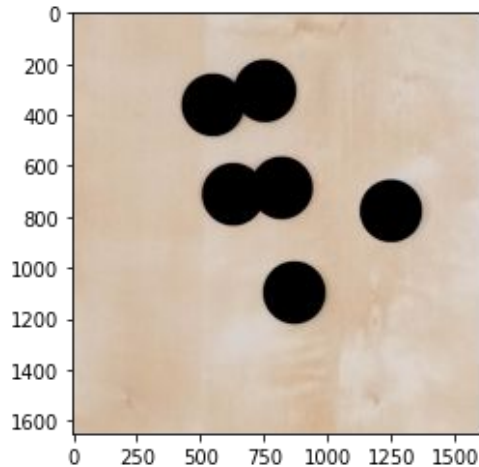

Grayscale → Blur → Canny

Hough transform for circles
(with narrow radius bounds and
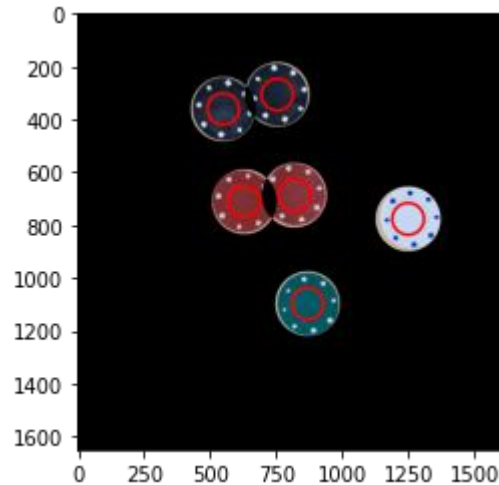minimum distance between circles)

Overlap mask

Chip identification

Get mean table color (LAB)

Mean color of each chip (LAB)
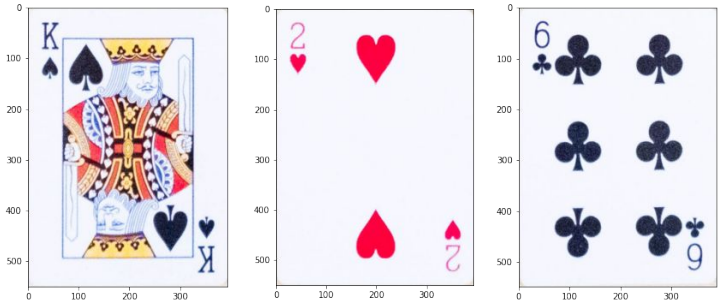(interior only, excluding overlapping areas)

CK: 2
CR: 2
CG: 1
CW: 1
CB: 0

Color classification
(absolute and difference values)

Detect bottom cards:
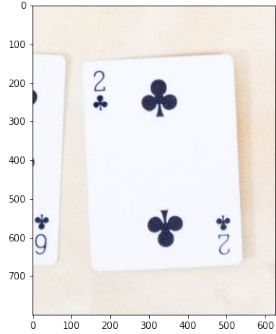# Use edge detection, rectangular contours, cropping
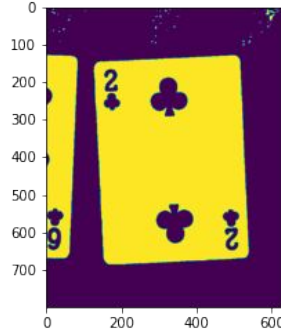

Grayscale → Blur → Canny
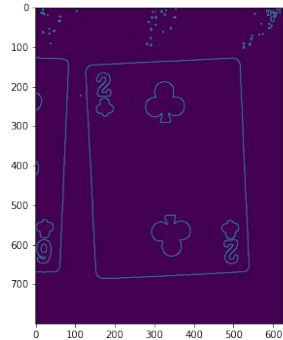

Find external contours → minAreaRect → Card order

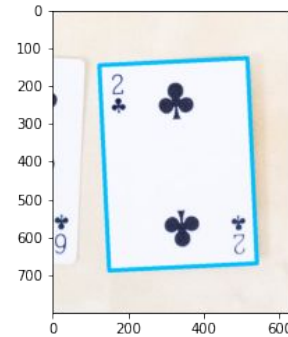# Bottom cards not found:

Rough crop
Based on other
found cards

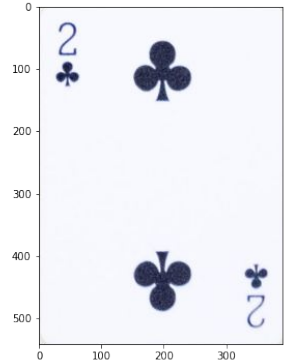Lab colorspace → threshold
white → Closing

Outcome →

Canny
filter
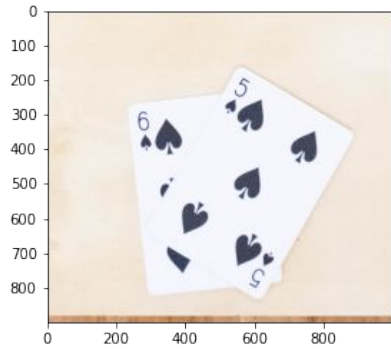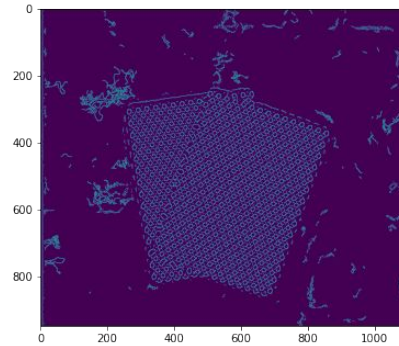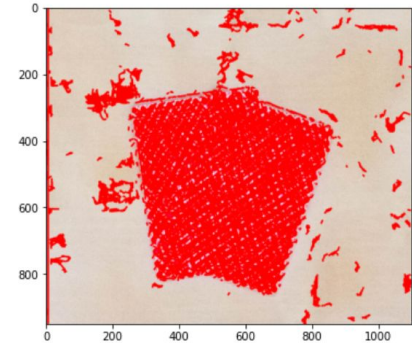

Find external contours → minAreaRect
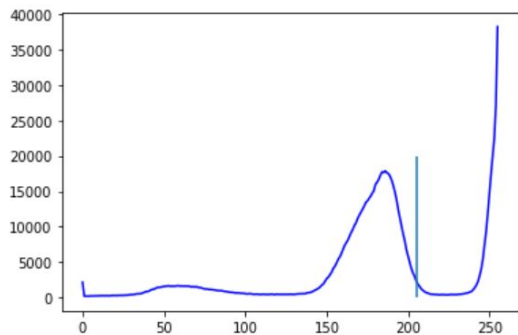
Player cards

Crop and rotate

Canny

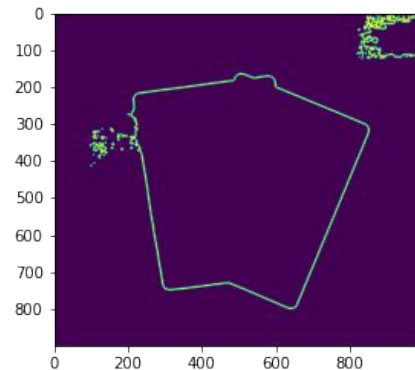Hough lines to detect face down players by thresholding number of lines

Player cards

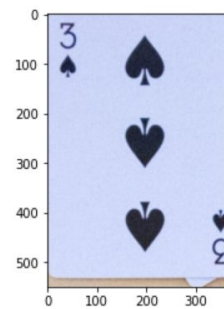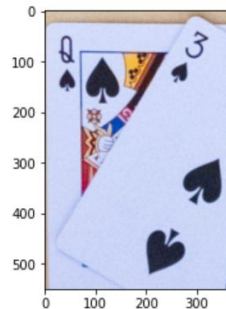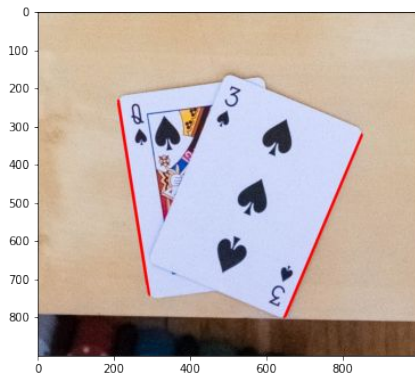B channel adaptive
threshold histogram

Thresholded image

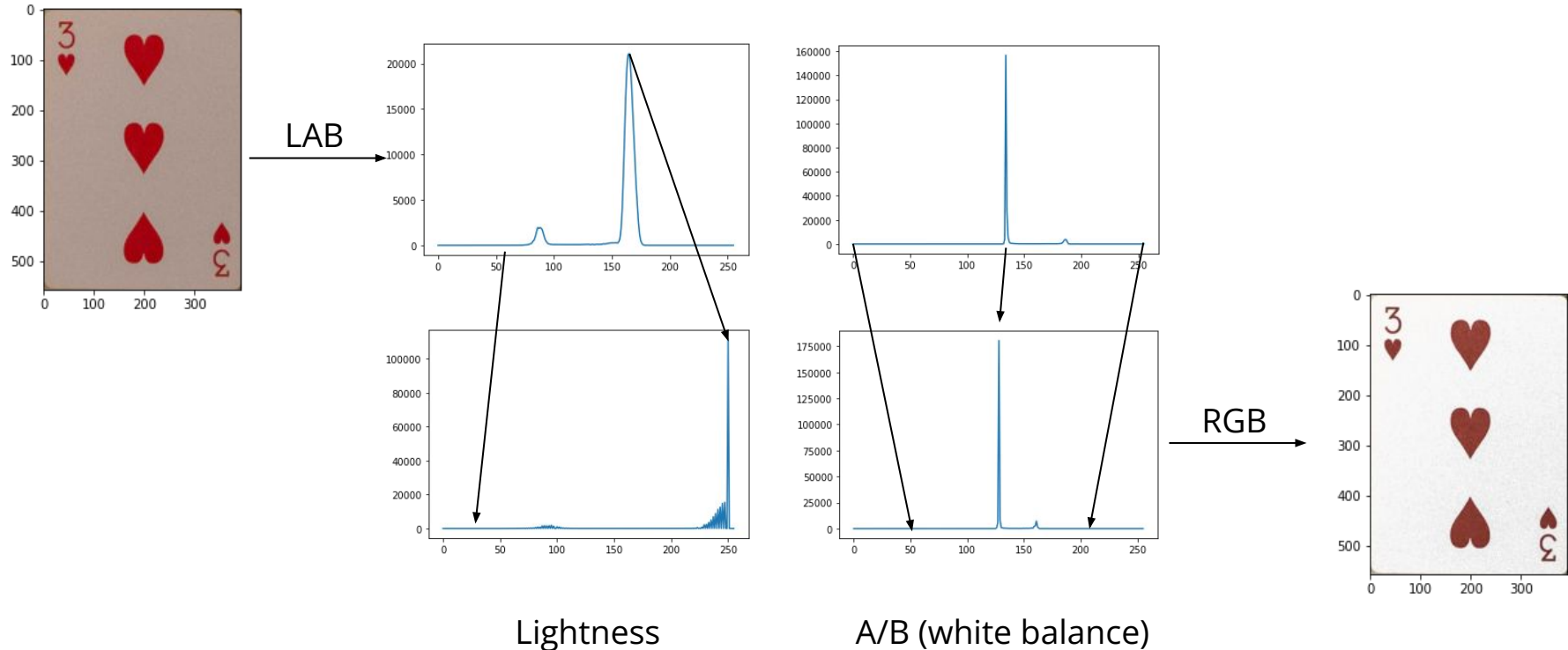External contours

Hough lines
to find the edges
of the cards

Rotate and crop
card

Output

Card color equalization: histogram peaks

LAB
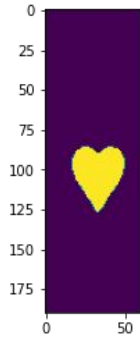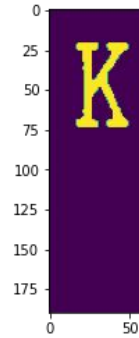
RGB

Lightness
A/B (white balance)
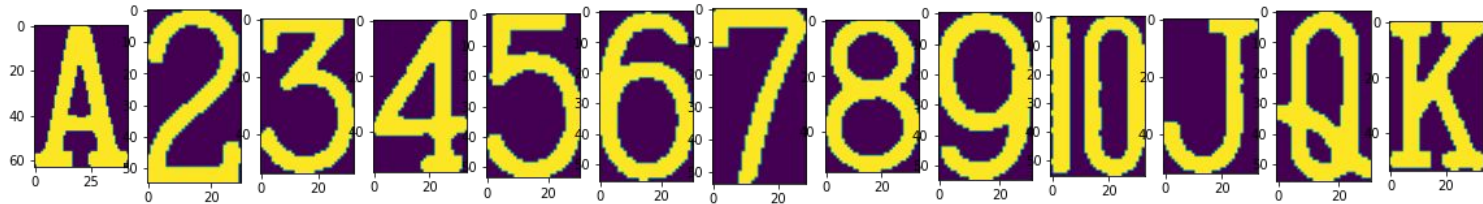
Digit and symbol extraction
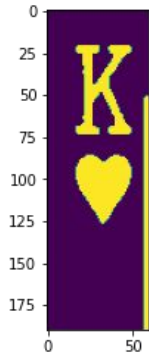
Crop, threshold, opening + closing
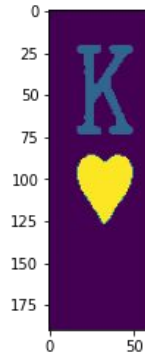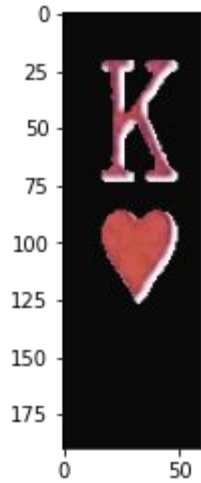

Connected components + remove noise

Separate digit and symbol

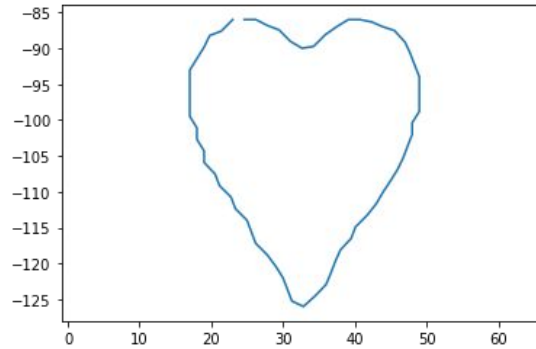Reference digits from the reference image
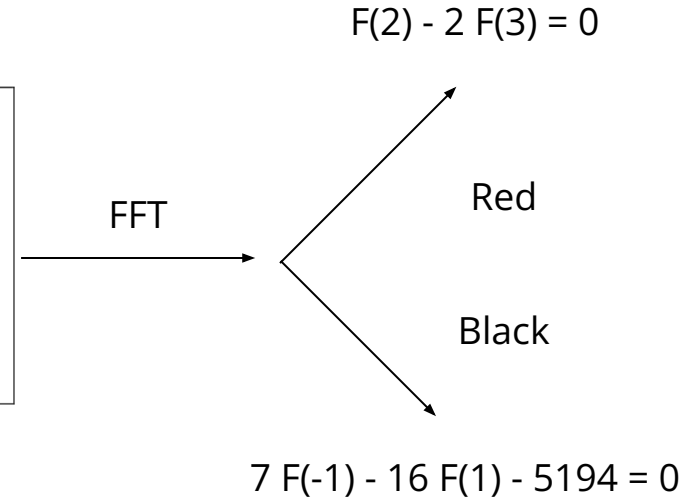
Symbol detection: Fourrier descriptors

$F(2) - 2 F(3) = 0$

FFT

Red

Black

$7 F(-1) - 16 F(1) - 5194 = 0$

Mean color (LAB)
=> discriminate red/black cards

External contour interpolated
to 64 points

Separation line
(distance = confidence)

Digit detection

Sum of squared difference
"convolution" with reference digit

=> Select minimum error
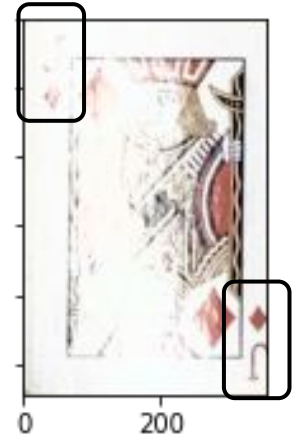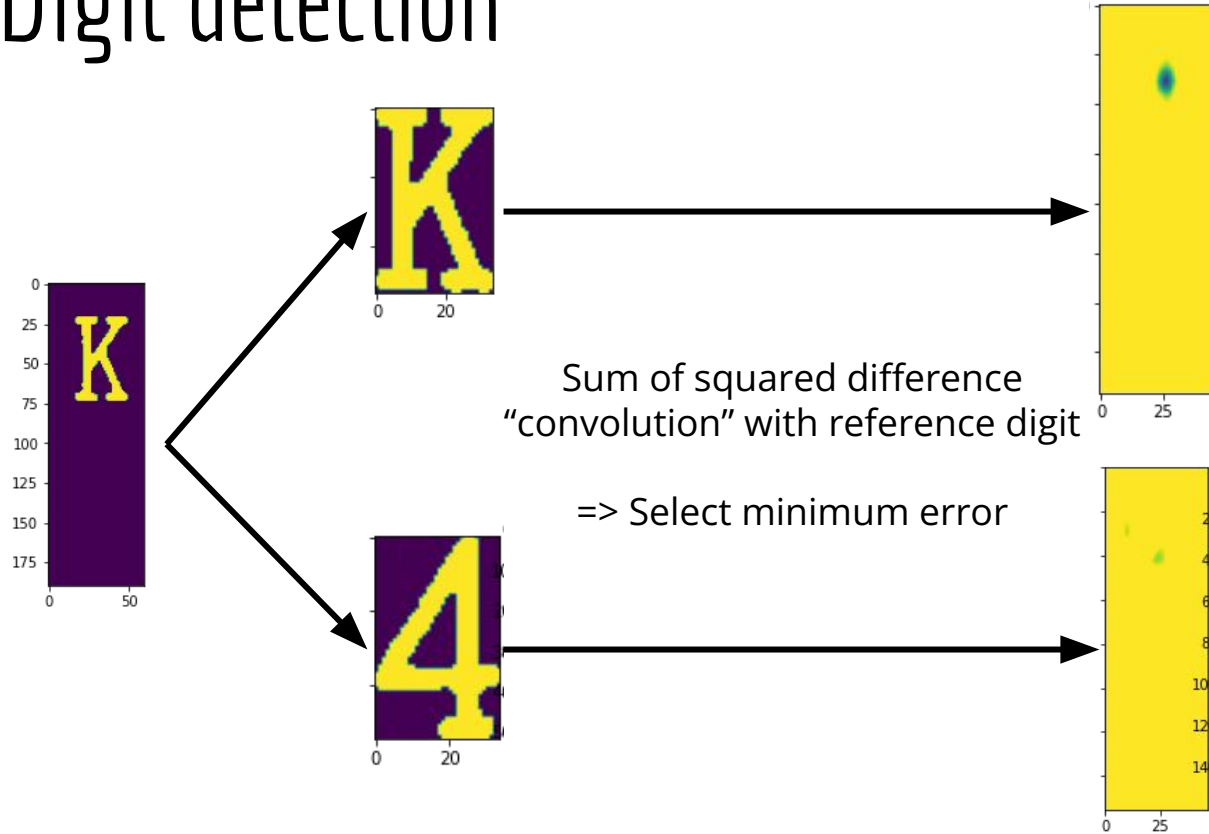
Try both corners if
available

=> Minimum error

Edge cases