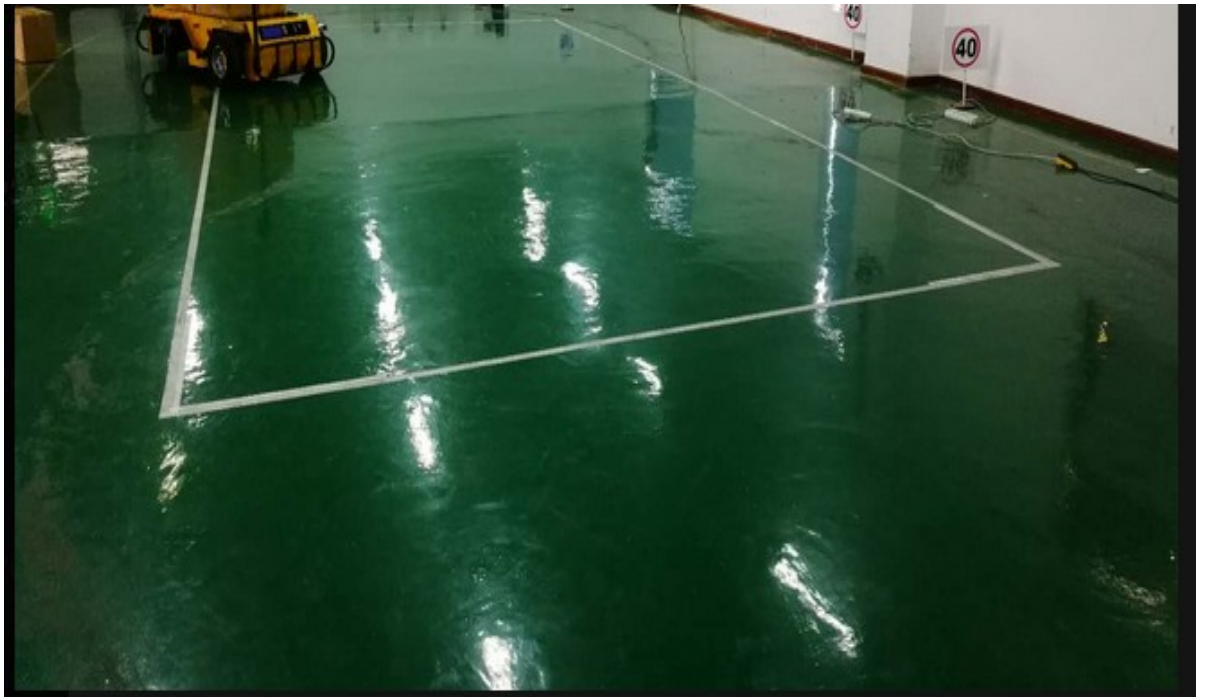
Example Separation of Floor Track



cv::inRange( ) Thresholding Colour Images

https://docs.opencv.org/2.4/modules/core/doc/operations_on_arrays.html#inrange

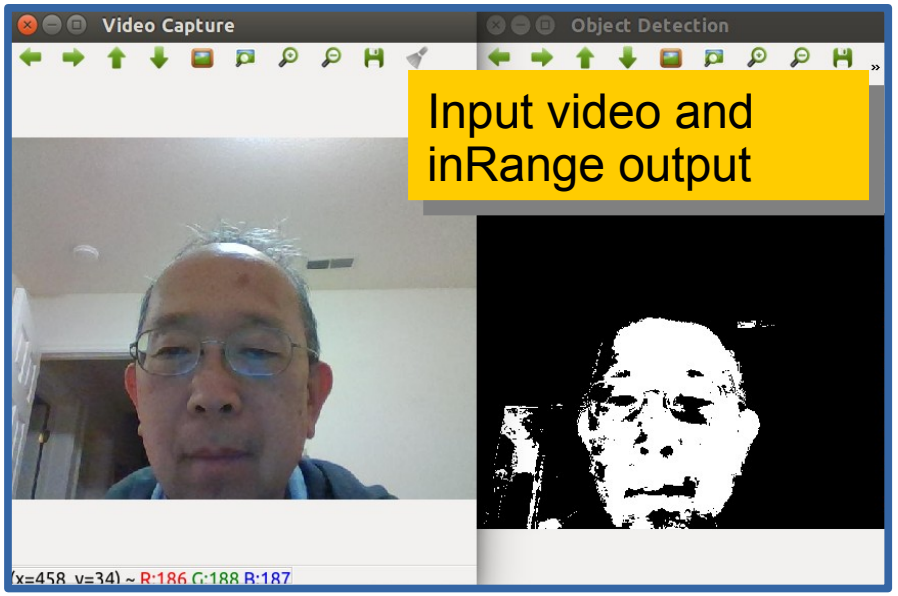
```
C++: void
inRange(
      InputArray src,
      InputArray lowerb,
      InputArray upperb,
      OutputArray dst)
```

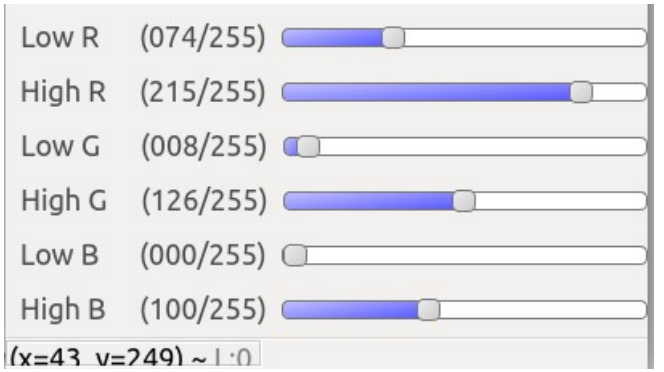
src – first input array.
lowerb – inclusive lower boundary array or scalar.
upperb – inclusive upper boundary array or scalar.
dst – output array, CV_8U type.

$$\texttt{dst}(I) = \texttt{lowerb}(I)_0 \leq \texttt{src}(I)_0 \leq \texttt{upperb}(I)_0 \wedge \texttt{lowerb}(I)_1 \leq \texttt{src}(I)_1 \leq \texttt{upperb}(I)_1$$

Finding Lane Lines with Colour Thresholds
https://medium.com/@tjosh.owoyemi/finding-lane-lines-with-colour-thresholds-beb542e0d839
Joshua OwoyemiSelf-driving Car Engineer, PhD Candidate in Computer Vision and Robot Manipulation, Sharing technology insights.

cv::inRange( ) Example

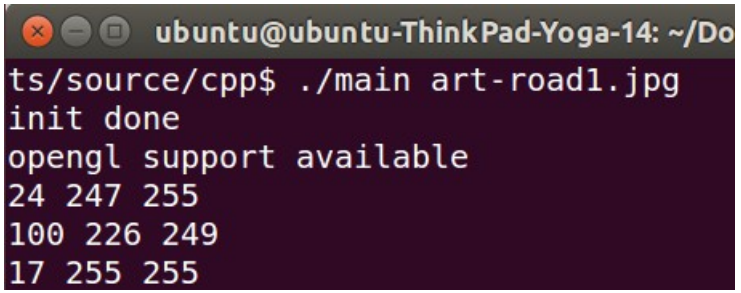




My ColorPicker.cpp

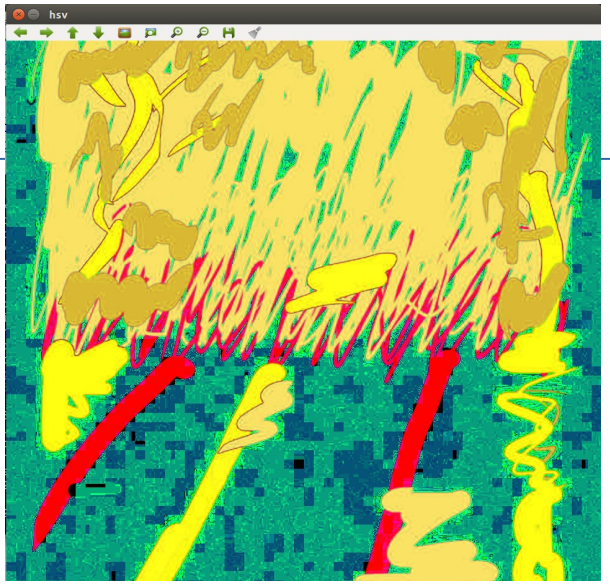
```
//-----------------------------------------------------------------*
// program: colorPicker.cpp;  Coded by: HL on line *
// soure.                                                          *
// purpose: hsv color picking                                      *
// last update: April 28, 2018.                                    *
//-----------------------------------------------------------------*
#include "opencv2/opencv.hpp"
#include <iostream>
using namespace cv;
using namespace std;

Mat im_hsv;
void pick_color(int e, int x, int y, int s, void *)
{
    if (e==1) // left mouse down
    {
        Vec3b p = im_hsv.at<Vec3b>(y, x); //pixel value
        cerr << int(p[0]) << " " << int(p[1]) << " " << int(p[2]) << endl;
    }
}
```

```
int main( int argc, char** argv )
{
    namedWindow("hsv");
    setMouseCallback("hsv", pick_color);

    if (argc<2) return -1;
    Mat im_bgr = imread(argv[1]);
    if (im_bgr.empty()) return -2;

    cvtColor(im_bgr, im_hsv, COLOR_BGR2HSV);
    imshow("hsv", im_hsv);
    waitKey();

    return 0;
}
```



~/Documents/SJSU/CMPE297/CMPE297VideoAnalytics/lec/lec5-binary-image/lec5-2-Contours-Moments/source/cpp$ ./main art-road1.jpg

Right click to pick pixel color



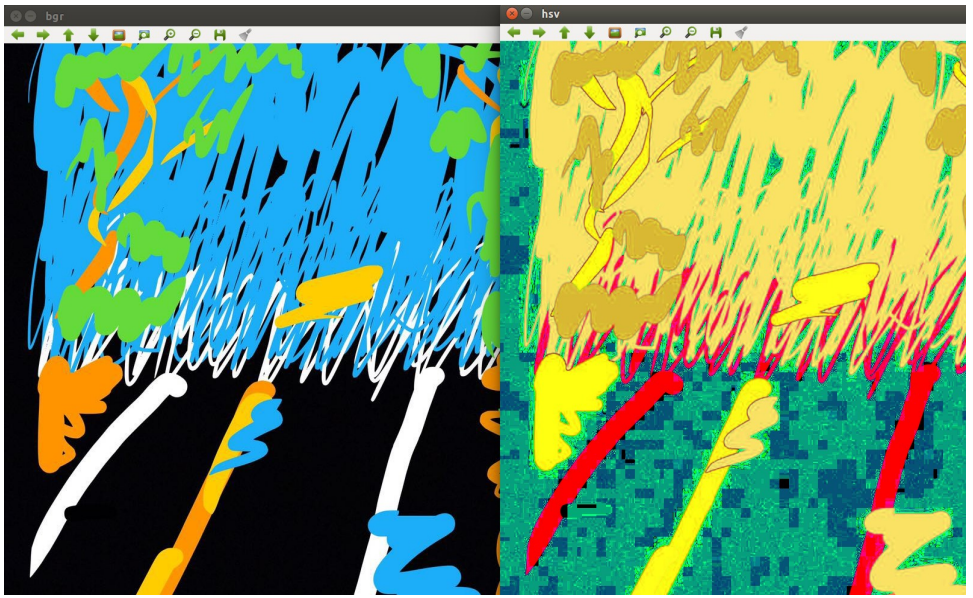
Display image in hsv space

My ColorPicker.py

/Documents/SJSU/CMPE297/CMPE297VideoAnalytics/lec/lec5-binary-image/lec5-2-Contours-Moments/source/py$

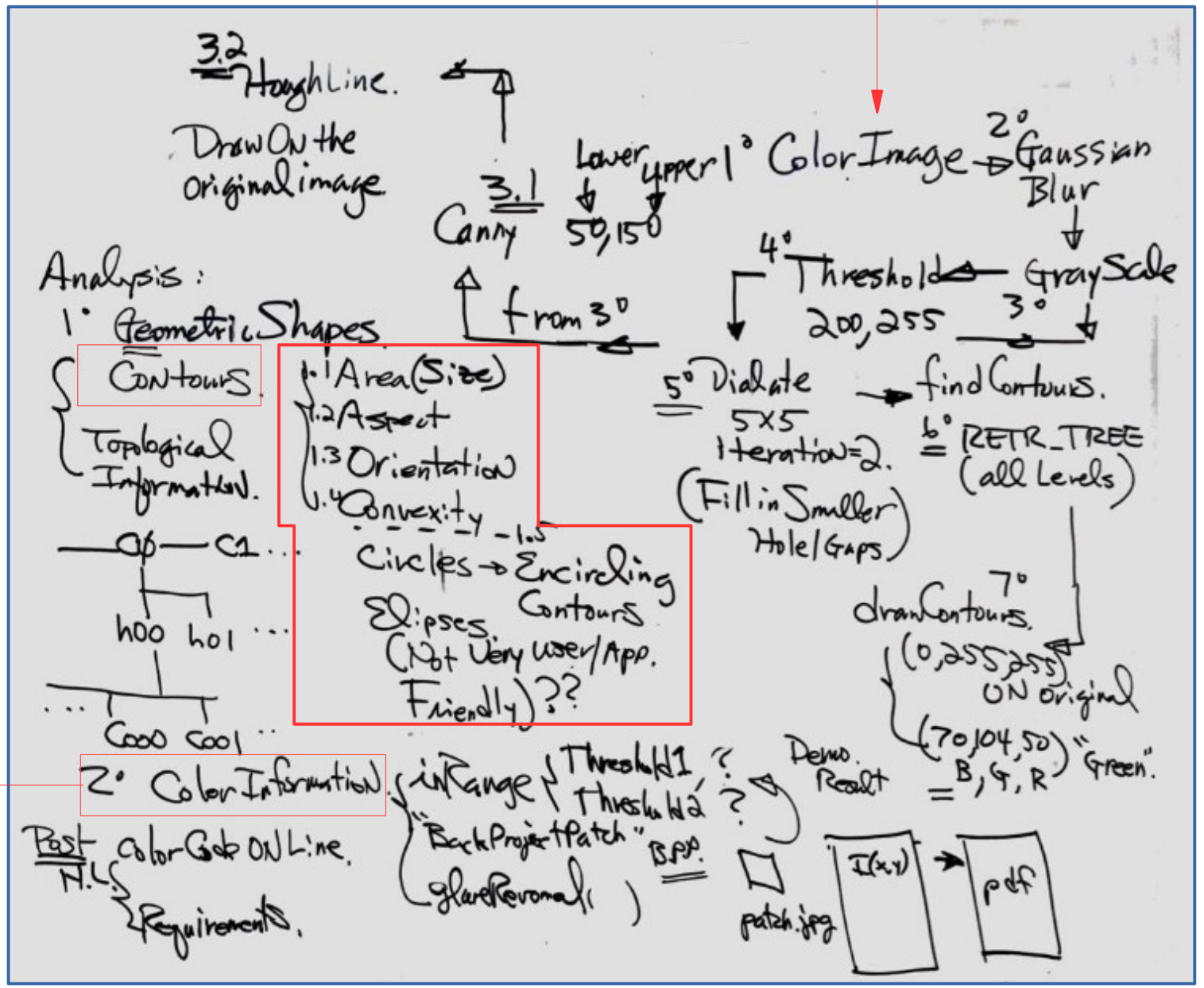
opencv hsv color picker

How to define the “lower” and “upper” range of a color?
http://answers.opencv.org/question/134248/how-to-define-the-lower-and-upper-range-of-a-color/




```
#-------------------------------------------------------*
# program: colorPicker.py;                              *
# reference code: see Harry Li's PPT for                *
#          original source;                             *
# date: April 28, 2018;  status: tested;                *
#-------------------------------------------------------*
import cv2
import numpy as np

image_hsv = None   # global
pixel = (20,60,80) # some default

# mouse callback function
def pick_color(event,x,y,flags,param):
    if event == cv2.EVENT_LBUTTONDOWN:
        pixel = image_hsv[y,x]
```

Reflection Removal Using Contours And Color



Harry Li, Ph.D.