The original color\_tresh function finds the points which RGB are above the given rgb\_thresh. [the local name thresh is changed back to above\_trash]

There was added two more thresh functions for obstacles with the name obstacle\_thresh, which finds the points with RGB below the given value. [the local name thresh is changed to below\_trash]

The 3rd thresh function is for the rocks. rock\_thresh. There is no rgb\_thresh parameter, the two threshold values are defined inside. . [the local name thresh is changed to between\_trash]

If you want, you can change the threshold values: (in line 42,43) in pairs

threshold\_low = (100, 100, 20) 30 or 10

threshold\_high = (255, 255, 30) 50 or 20

In the rover\_coords function the calculation of the rover-centric coordinates was changed (lines 62, 63)

original

x\_pixel = -(ypos - binary\_img.shape[0]).astype(np.float)

y\_pixel = -(xpos - binary\_img.shape[1]/2 ).astype(np.float)

changed to

x\_pixel = np.absolute(ypos - binary\_img.shape[0]).astype(np.float)

y\_pixel = -(xpos - binary\_img.shape[0]).astype(np.float)

In the rotate\_pix function the local variable yaw\_rad was renamed to yaw. This is optimized change, but if you want, you can use original function.

In the translate\_pix function [I have changed the addition to the original]

The perception\_step function is filled with the needed operations, similar what have I added ysternday.

step1 – no changes, the names are the same, what were used in the examples

step2 – -see above

step3 - for terrain, obstacle and rocks there are called different thresh functions, the used names are speaking names.

Step4 – see point 1

step5 – see point 3

step6 – see point 3. If you want, you can change the scale value in the line 161. (for example from 30 to 10 or 20).

step7: here you can change the angle values, make 2.0 higher, and 358 lower, but sum of them should be 360. In the lines 171 and 172 you can define different intervals.

step8: originally only the distance and angle were calculated for terrain. For detecting rocks, dist\_rocks and angles\_rocks were added here. And the Rover state variable were updated here. Not too much to change here.