Writeup

Search and Sample Return

1. Notebook Analysis

1.1 Describe in your writeup (and identify where in your code) how you modified or added functions to add obstacle and rock sample identification.

(1) In the color_thresh function, I added a parameter "target" to define the object to be indetified;

(2) To identify obstacles, threshold values are defined to be lower than values for terrain identification;

(3) For the rock sample identification, images are first transferred to HSV space, then the upper and lower bound are defined by testing sample images.

1.2 Describe in your writeup how you modified the process_image() to demonstrate your analysis and how you created a worldmap. Include your video output with your submission.

(1) Define source and destination points for perspective transform

(2) Apply perspective transform

(3) Apply color threshold to identify navigable terrain/obstacles/rock samples

(4) Convert thresholded image pixel values to rover-centric cords

(5) Convert rover-centric pixel values to world cords

(6) Update worldmap by increasing intensity at coordinates corresponding to terrain, obstacles and rock samples.

2. Autonomous Navigation and Mapping

2.1 perception_step() and decision_step() functions have been filled in and their functionality explained in the writeup.

(1) Define source and destination points for perspective transform

(2) Apply perspective transform

(3) Apply color threshold to identify navigable terrain/obstacles/rock samples

(4) Update Rover.vision_image (this will be displayed on left side of screen)

(5) Convert map image pixel values to rover-centric coords

(6) Convert rover-centric pixel values to world coordinates

(7) Update Rover worldmap (to be displayed on right side of screen)

(8) Convert rover-centric pixel positions to polar coordinates. Update Rover pixel distances and angles.

2.2 By running drive_rover.py and launching the simulator in autonomous mode, your rover does a reasonably good job at mapping the environment. (The rover must map at least 40% of the environment with 60% fidelity (accuracy) against the ground truth. You must also find (map) the location of at least one rock sample.)