

To: Dr. Dean

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We have decided to use the contour tracking using RGB color values for our tracking algorithm. We are currently in the control algorithm development stage of our project and we are also working on hardware integration for the robot. We have the control algorithm we want to use in place, however, we are still tweaking the code to get it running properly.

Last week, after our phase one presentation, we tested the whole system with the cart on the track. We were able to run the system fine in manual mode, however, when we switched to automatic mode, the cart would just sit there. One of the problems is that we can not see what the camera is seeing while we have the cart running, so we are not sure if the problem is the controls or tracking algorithm. On Friday, we ran our tracking and control algorithm in the cart, but with the cart not on the track. We used a monitor to see what the camera was tracking, and an o-scope and watch window to see the “motor” values. We held a pink shirt up for the camera to track, and as we moved the shirt from the left side of the camera to the right, the “motor” values ranged from 0-255, which is what is desired. We could also see the wheel spinning at the corresponding speeds. This was all good, however, there was a large delay of about 30 seconds when switching from manual to autonomous mode before it would start tracking. We have done a few things to help this delay. We were using a USB camera plugged into the pi before and we have now changed the code to work with the picamera, which has dedicated memory. We also changed the code to where we are processing each frame that the camera sees and if we don’t need to do any processing (manual mode), the frames will be discarded. This frees up the memory buffer on the pi. After getting the robot to run in the senior design room, we moved it out to the hallway to hook it up to the tracks to test it. Again, manual mode worked fine, however, the autonomous mode did not work completely. It seemed to work a slightly for a second but was not consistent. This could be from a number of things. The hallway is dark, so the pink shirt appears as a darker color in the hallway, and the color could be out of our RGB range. We will need to possibly use a flashlight to fix this or adjust the color range. Another issue is that we don’t know the correlation between the 0-255 value and the cart speed. And again, its tough to tell what the problem is because we can’t monitor the tracking camera while the cart is moving. Currently,

we are working on getting the system to work exactly how we want it, while not on the tracks or attached to the pulley system. Once we get this working, then we will mess with the “motor value” range to fix the speed issue.

We feel like we made good progress last week when we got the tracking/control algorithms working with the cart not on the track. An issue we ran into was that we can not see what the camera is tracking while the cart is moving. We may be able to overcome this by using the wireless video transmitter that is already in the cart. We will need to purchase a yellow video to hdmi adapter in order to do this.