AutoDrive Hallway Usability Test

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Goal: To test and discover any usability bottlenecks, including physical and interactive constraints, lack of supporting materials and other necessary preconditions that enable the use of our prototype when deployed in a casual, wifi-enabled, occupied hallway environment.

Requirements: We would require a 50 square foot space, 100 white printing papers and the car prototype with an ethernet cable connected to a personal computer.

Procedure: First, lay out two pieces of printing paper on the free space side by side. These two pieces of paper will be a single unit to construct the track. Compose the track by creating multiple components and overlay one over the other. The sharpness of the turn in the track can adjusted through manipulating the direction in which one building component overlapped on the other.

Establish the connection between a personal computer and the raspberry pi on the prototype through an ethernet cable. Turn on the raspberry pi and remote login into the pi through its static internal IP address 192.168.2.2.

Place the prototype at the beginning of the track and adjust the camera on the car so it points directly down at the surface of the track through the car's midpoint. Run the Python script to initiate the autonomous maneuver of the car on the track.

Findings:
There are a few more environmental preconditions we discover that will affect the performance of our vehicle:

1. The track should be placed on a hard surface and avoid rug or or carpet
2. Ensure that there is enough lighting in the space to produce better image quality
3. Ensure that the track is not overcast by a shadow of other objects
4. Ensure that the flooring has a significant color contrast with the track itself so it's easier to differential what in the track and what is not
5. Place the track away from wall as the prototype can misinterpret the white wall as part of the track.
6. Setting the track up in the hallway is not preferable - the size of the track will hinder the flow of people in the building and should be used in a isolated room.

As the prototype drives itself through the track, its cable connection with a personal computer will become a hindrance. Certainty we could connect to the raspberry pi through a wireless connection, but this will introduce more points of failures in the setup:

1. Cannot reliably confirm which wireless network the pi has connected in a headless setup without additional monitor, mouse and keyboard controlling the pi
2. Once the pi are connected a wireless network, we need to search for the pi's internal IP address in the same wireless network.
3. Wireless connection is a lot slower than ethernet connect (although this will not affect the car's maneuverability as all the calculation is done within the raspberry pi)

To these points, we decide to stay with a ethernet cable connection and severe the connection after we initiate the Python script on the raspberry pi of the car.