Robotics Competition 2016

Testing Hardware

This file contains instructions for testing hardware and preparing video for submission.

- 1. First, make sure that all components(camera and wifi dongle) are connected to Raspberry Pi. Insert SD card containing OS image into Raspberry Pi. Follow the instruction given "creating_bootable_SD_card.pdf" to create bootable SD card
- 2. Setup SSH connection between Raspberry Pi and PC/Laptop; follow the instruction given in WIFI Network connection and SSH.pdf to setup SSH connection.
- 3. Go to **catkin_ws/src** folder in Raspberry Pi and type the following command in terminal to clone the packages from git:
 - a) git clone https://github.com/bosch-ros-pkg/usb_cam.git
 - b) git clone https://github.com/ros-perception/image_common.git

If above commands give any verification error, run the following command in terminal

export GIT SSL NO VERIFY=1

- 4. After successful cloning of package, build the package using "catkin make".
- 5. Navigate to usb_cam package to edit launch file:

roscd usb_cam/launch
gedit usb_cam-test.launch

Comment the image_raw node in launch file. After adding comment, launch file will be as:





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The comment node in usb_cam-test.launch actually launches a window on which camera output will be shown. In SSH, we don't have the permission to access any GUI of Raspberry Pi. So we have to setup a ROS connection between Raspberry Pi and PC/laptop to see camera image. We will launch usb_cam node in R_PI and access this node data on PC by converting it into the image.

Connection setup on ROS between Raspberry Pi and PC/Laptop:

Setup connection such that Raspberry Pi will be ROS master and PC/Laptop will be a client. Follow the ROS_interfacing_R-PI_PC.pdf to setup connection.

NOTE: In **ROS_interfacing_R-PI_PC.pdf**, master of ROS was PC and client was R-PI.

6. Camera test: After successful connection of master and client. Launch the "usb_camtest.launch" file in Raspberry Pi. Now check the topic published on ROS by typing following command in PC terminal:

rostopic list

The output of above command is shown in Figure 1.1. The following output shows that your PC/Laptop and R-PI are connected on ROS.

```
simmu@simmu:~/Documents/catkin_ws$ rostopic list
/rosout
/rosout_agg
/usb_cam/camera_info
/usb_cam/image_raw
```

Figure 1.1: Output of rostopic list

7. Type following command to check the output of camera.

rosrun image view image view image:=/usb cam/image raw

This command will open a new window and show the image captured by camera. Image output is shown in Figure 1.2.



Figure 1.2: Camera output





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NOTE: There might be lag in video, don't worry about it

Submission preparations:

• Record the video of PC showing output of camera connected to Raspbery Pi. Save the video as <Team_ID>_Hardware_Testing.mp4. Upload it in your YouTube account as unlisted video. Upload the YouTube link in Video Submission: Hardware Testing submission box in the Task 2 tab.

Further, instructions for uploading the video link are provided on portal.

