Session 3

Final Installation and Building a ROS package

## ROS Installation ROS: Robot Operating System

The Robot Operating System (ROS) is a set of software libraries and tools that help you build robot applications. From drivers to state-of-the-art algorithms, and with powerful developer tools, ROS has what you need for your next robotics project. And it's all open source.
There are many versions of ROS corresponding to ubuntu version.As we are using 18.04 we needed melodic version.
http://wiki.ros.org/melodic/Installation/Ubuntu
Try running roscore to check if ros if installed perfectly or not.

## Mavros

Follow page 1 and 2 of
https://ardupilot.org/dev/docs/ros-install.html
Now all installations are over.

**System of ROS.**

ROS can be visualized as a set of blocks called topics with all blocks connected to a leader block. There are two types of topics Publishers and Subscribers. Publisher publishes information encoded in various datatypes to the Leader from where Subscribers gets data. Nodes are the programs we write to establish this data transfer.
Eg: I can get data from a sensor(fingerprint sensor) to some publisher where I can manipulate this data and sent to subscriber which drives an actuator(motor).
The various commands and examples are given in this site.
http://wiki.ros.org/ROS/Tutorials
Do 1.1 All 20( You can go according to the sessions) . Things you have to keep in mind during the tutorial are given below.
For more information and understanding read
https://www.cse.sc.edu/~jokane/agitr/ ( Better read after this tutorial series gets over.So you can have a recap on what you have been learning)
Make sure you read atleast one of the above before the final task that comes with session 5..

## Tutorial Notes (http://wiki.ros.org/ROS/Tutorials)

**Making a ROS workspace**

We need a seperate space to work with ROS. Follow the steps in Creating a ROS workspace.

1. Use catkin build instead of catkin_make.
2. Instead of kinetic you should write melodic and the whole
   echo $ROS_PACKAGE_PATH
   /home/youruser/catkin_ws/src:/opt/ros/melodic/shares

**Making a Catkin Package**

Now we can have various packages inside our workspace for various purposes.For learning purpose make a package by following the steps given in the tutorial.

1. You need to write source devel/setup.zsh everytime you are going to execute a program.In order to avoid that you can write this on a document hidden in home. Press CTRL+H to reveal all hidden files in your home directory. There you will see a document named .Zshrc.Write the command anywhere in the doc and save.

**Building ROS package**

Follow the steps in ROS tutorial

1. Use catkin build instead of catkin_make.

Read and do all examples in
**Understanding ROS nodes and Understanding ROS topics**.
They are the **important** section in this tutorial.

Be sure you have a picture of what is happening in the ros network before proceeding to next session.