Middlesex University Dubai

PDE4430

Installing ROS

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Programming for (Mobile) Robots

- A mobile robot that is going to achieve any real-world task will be a **complex machine**, with many processes running.

- **Low level control of motors** and **reading of sensors** is needed to enable the robot to move, work out what its state is, and information about the world around it.

Programming for (Mobile) Robots

- At a higher level our aim is to enable the **robot to have some autonomy** –
  - To **use the data** it has
  - To **draw conclusions** about the world
  - **Build a model** of it in order to **make decisions** about how to solve various problems
  - **And then act**

Programming for (Mobile) Robots

- There are **several programming frameworks** that can be used to work with robots.

- Many are proprietary, or built for specific robots –
  - **Labview**
  - **Matlab**
  - **Robot Studio** – ABB robot arms
  - **Choreographe** – Nao and Pepper

Programming for (Mobile) Robots

- We will be using **Robot Operating System (ROS)**

- The advantages of using ROS –
  - **Generic framework** – Enables it to be used with a wide range of robots
  - **Open source** – Look at the code of modules that already exist to see how they work – Fix or adapt them to our specific requirements.
  - **Industry standard** – Widely used in the robotics research to enable people to replicate and validate others work, and to build upon it.

Introduction

- Installing ROS is straightforward*
- The version we will use for the module is:
  - Ubuntu – **20.04 LTS Focal Fossa**
  - Robot Operating System (ROS) – **Noetic Ninjemys**

*Conditions apply

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Introduction

- Choice of version (of Linux and ROS) is **very important**.

- **Latest is recommended, but not always** – Important to check compatibility with robot, software, sensors, etc. – If new version is supported.

Introduction

- Also, **compatibility between robot and desktop** – Should run same version to be able to communicate with each other.

- Generally, a good idea to **check the Change List before** you upgrade and make sure there really is something you need. Otherwise, if it ain't broke...

Introduction

- Prerequisite: Laptop with Ubuntu 20.04 LTS Installed.
- If it's your first time using Linux, spend some time getting used to the environment, especially the Terminal.
- Go through some basic tutorials on Ubuntu:

  https://help.ubuntu.com/20.04/ubuntu-help/index.html

- Practice some basic Ubuntu commands…

  https://tutorials.ubuntu.com/tutorial/command-line-for-beginners

Installation

- To install ROS, follow instructions on:

http://wiki.ros.org/noetic/Installation/Ubuntu

- Don’t worry if you don’t understand what all the commands mean.
- Stuck? Google is your best friend. Today and forever.

- Also install an IDE: VS Code