**Executing And Running the Robot Arm Package on The Simulator**

**(Full instructions)**

**Written by: Haneen Alhajji Ahmed**

**Supervised by: Smart Methods**

**Abstract**

**To simulate the robot arm motions and positions as it is in the reality. And to discover any physical or logical problems that may surface during the simulation. In this project we will use ROS packages with ROS melodic and Ubuntu 18.04.5. The robot arm package will use joint\_state\_publisher to test the arm motion with both Rvis simulation and gazebo simulation. In addition to run the Moveit package. Which is Used for kinematics, motion planning, trajectory processing and controlling the robot. You can run Moveit package with both Rvis simulation and gazebo simulation.**

**Instructions**

**download VirtualBox**

<https://www.virtualbox.org/wiki/Downloads>

**download Ubuntu 18.04 desktop image**

<https://releases.ubuntu.com/18.04/>

**create the virtual machine**

**https://help.ubuntu.com/community/Installation/SystemRequirements**

**https://ubuntu-mate.org/about/requirements/**

**Install ROS melodic**

[**http://wiki.ros.org/melodic/Installation/Ubuntu**](http://wiki.ros.org/melodic/Installation/Ubuntu) **(all instructions in this page)**

**Create a workspace by using catkin\_make**

$ source /opt/ros/noetic/setup.bash

$ mkdir -p ~/catkin\_ws/src

$ cd ~/catkin\_ws/

$ catkin\_make

$ echo "source ~/catkin\_ws/devel/setup.bash" >> ~/.bashrc

$ source ~/.bashrc

**Download arduino \_arm\_pkg from Smart Methods GitHub**

**https://github.com/smart-methods/arduino\_robot\_arm**

**Add the “arduino\_robot\_arm” package to “src” folder**

$ cd ~/catkin\_ws/src

$ sudo apt install git

$ git clone https://github.com/smart-methods/arduino\_robot\_arm

**Install all the dependencies**

$ cd ~/catkin\_ws

$ rosdep install --from-paths src --ignore-src -r -y

$ sudo apt-get install ros-melodic-moveit

$ sudo apt-get install ros-melodic-joint-state-publisher ros-melodic-j oint-state-publisher-gui

$ sudo apt-get install ros-melodic-gazebo-ros-control joint-state-publisher

$ sudo apt-get install ros-melodic-ros-controllers ros-melodic-ros-control

**Compile the package**

$ catkin\_make

**Download the Arduino IDE (Linux 64)**

[**https://www.arduino.cc/en/Main/Software**](https://www.arduino.cc/en/Main/Software)

**install rosserial**

#include <ros.h>

#include <std\_msgs/String.h>

sudo apt-get install ros-melodic-rosserial-arduino

sudo apt-get install ros-melodic-rosserial

cd <ws>/src

git clone https://github.com/ros-drivers/rosserial.git

cd <ws>

catkin\_make

catkin\_make install

**Install ros\_lib into the Arduino Environment**

**Replace <sketchbook> with the path to sketchbook or Arduino folder.**

cd <sketchbook>/libraries

rm -rf ros\_lib

rosrun rosserial\_arduino make\_libraries.py

**Note: After restarting your IDE, you should see ros\_lib listed under examples**

**Open Arduino IDE -> file -> examples -> ros\_lib**

**Controlling the motors in simulation**

$ roslaunch robot\_arm\_pkg check\_motors.launch

$ roslaunch robot\_arm\_pkg check\_motors\_gazebo.launch

$ rosrun robot\_arm\_pkg joint\_states\_to\_gazebo.py

**You may need to change the permission**

$ cd catkin/src/arduino\_robot\_arm/robot\_arm\_pkg/scripts

$ sudo chmod +x joint\_states\_to\_gazebo.py

**To open Moveit assistant**

$ roslaunch moveit\_setup\_assistant setup\_assistant.launch

**To open Moveit simulator**

$ roslaunch moveit\_pkg demo.launch

**To open Moveit on Gazebo**

$ roslaunch moveit\_pkg demo\_gazebo.launch