**EX6 - Modelling and Simulation for precision pick and place operation on vaccine-box by SCARA robot**

Problem Statement

Since Mr Vinod, Managing Director Vaccinator Pvt Ltd is happy your previous development, he now have more request. Particularly, he is not yet convince that for palletisation operation of vaccine box you would be able to use a robot to pick and place. Hence, he has requires you to complete following task and demonstrate result.
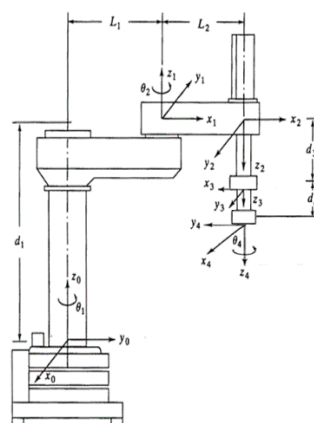
Task 1 Setting Scene - Pick and Place
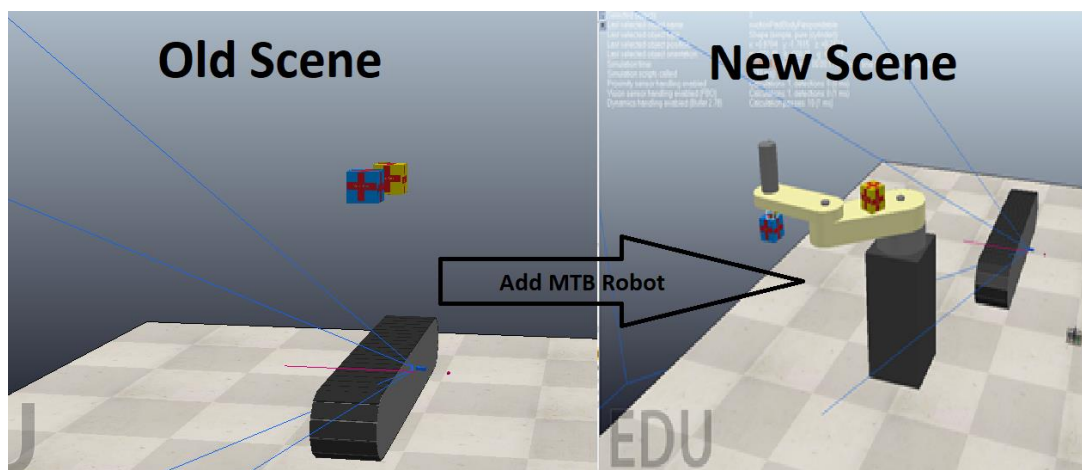
Task Aim: You should be able to control over SCARA Robot for pick and place operation

What to do: Add MTB (SCARA) robot in exp5 scene and control the robot for pick and place operation

Deliverable: Demonstrate control by giving joint angle or link length input

Task 2: Mathematical Model of frame data (DH transform)

Aim: You should be able mathematical model robot manipulator

What to do:

- Get robot frames for joint and link from the developed scene
- Draw the frame problem. Example above.

- Find DH Parameter and formulate DH table
- Calculate Forward Kinematics from joints angle and links length of your preference using model equation

Deliverable: Demonstrate mathematical model for forward kinematics matches simulation. That is on given joint angles and link length output position of the end effector should match in both the models.

Task 3: Precision Planning and Control
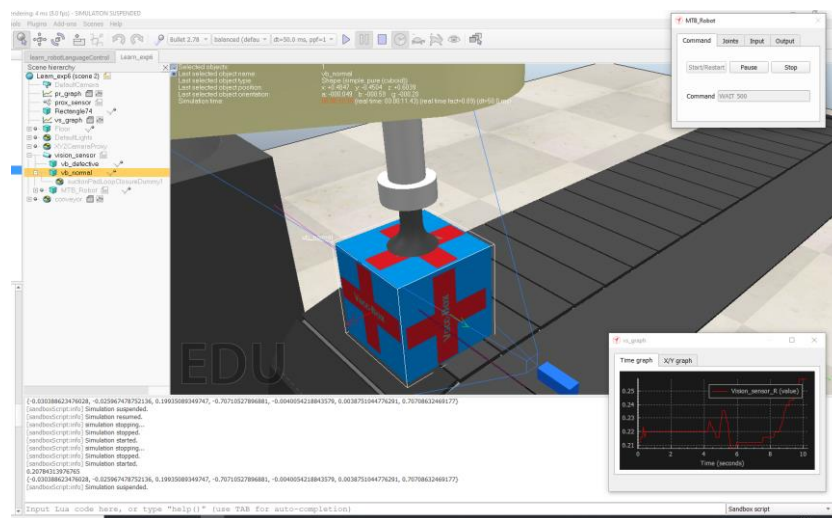
Aim: You should be able to precisely planning and control robot manipulator pose

What to do:

- Using the DH find inverse kinematics for a known position of vaccine box. That is find out mathematically what should be robot parameters to which it reaches vaccine box location on detection for precision picking operation.

Deliverable: Demonstrate use of inverse kinematics to precision planning and control of robot manipulator to pick the vaccine box exactly from the centre of cross on top as shown in picture.

Note:

For mathematical part you are free the chose any tool to calculate. Recommend toolset is MATLAB. Addition resource will be available in the link below.

https://github.com/DeepMechatronics/MEC309P---Robotics-and-Automation/tree/master/Exp6