Gripper / Suction Pump based Pick and Place using myCobot 280 M5

Jay Menon[1]
[1]School of Manufacturing Systems and Networks, Arizona State University, Arizona, USA

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ABSTRACT

In this experiment, a MyCobot robotic arm is used to perform controlled pick-and-place tasks. The emphasis is on integrating a gripper to improve manipulation capabilities. Using commands like get_coords and send_coords, the experiment implements precise joint and coordinate movements using the pymycobot library. The experiment's goal is to precisely place a wooden block at a designated location after picking it up from a specified location by utilizing gripper functionalities like set_gripper_value. The sequence that is being demonstrated, which is led by a predetermined set of movements, provides an understanding of the capabilities of the MyCobot platform as well as the efficiency of the Python-based control that makes use of the pymycobot library.

1. OBJECTIVE

This experiment aims to show that MyCobot can be precisely controlled to perform pick-and-place tasks.

2. ROBOT SERIAL NO: ERMC2800120230201244

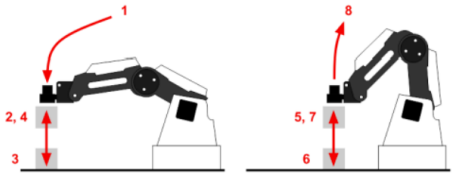
3. METHOD

This experiment makes use of the pymycobot library to operate the MyCobot robotic arm by performing a sequence of pick-and-place tasks. The first section imports the necessary libraries, which include standard libraries for general functionality and pymycobot for MyCobot interaction. After that, a MyCobot class instance is initialized, connecting to the physical MyCobot with the given port ("COM11") and baud rate (115200). The initialization process is completed after a short delay.

The script includes commands to operate the MyCobot's gripper. The gripper is opened and closed by the set_gripper_value() function. There is also suction pump approach. The pump is turned on by the pump_on() function, which sets certain bits (2 and 5) to operate; the pump is turned off by the pump_off() function, which stops those bits from working. These operations are essential to the pick-and-place process that the robotic arm performs.

To carry out specified tasks, the MyCobot is guided using particular joint coordinates. It first goes to the home position and then raises itself up above the pick point. At the designated pick point, the robot can then pick up an object thanks to the activation of the suction pump. Following the pick process, the suction pump is turned off.

1. Home
2. Above Pick
3. At Pick
4. Above Pick
5. Above Place
6. At Place
7. Above Place
8. Home



4. CHALLENGES FACED

The Gripper does not close perfectly at times. The suction pump heats up too fast.

5. MEDIA

The final video can be found here:
https://drive.google.com/drive/folders/1_Tbae17rhdCGB1iZtOzPc5wujOsIZ8lL?usp=sharing

6. CONCLUSION

Ultimately, this experiment shows that the MyCobot robotic arm can be effectively controlled for pick-and-place tasks. By using the pymycobot library, the script enables the grasping and releasing of objects by coordinating the precise movements and activation and deactivation of a suction pump / gripper.

REFERENCES

[1] MyCobot Labs, https://docs.google.com/document/d/1kWq4milBgbxbNO80HPnsYiMwxRQ8QIYt01OGePCYDU8/edit