

SUMMARY

This work is aimed to design a low-cost, 3D printable parallel robot gripper for ABB IRB 1600 robot, that is easy to manufacture and adaptive. All of the functional requirements were met for the design, however due to logistic and some other restriction, partially caused by worldwide pandemic, a working real-life model or prototype could not be made.

The gripper can be improved further in terms of cost, reliability, sensing capability, and ease of manufacturing and assembly.

The simplest improvement for the gripper can be utilizing a servomotor with higher torque or improving gear ratio to achieve more force on the fingers, thus more payload capacity. However, this may also require changing the material used for gripper arms to light metals, such as aluminum, instead of 3D printing filament.

Reliability and resilience to environmental factors can also be improvement. The design of the gripper is not suitable in industrial use where particles larger than a millimeter may cause damage to gears and servomotor. Opening of the gripper can be refined in order to prevent this.

Sensory capabilities of the gripper are designed for "grab" and "release" functions only and the works that require precise handling delicate objects cannot be performed. In order to sense grip force, precise jaw opening width and position additional sensors may be added. At the least, utilizing pressure sensor on the fingers will make the gripper much more suitable for delicate tasks.

The control code of the Arduino can also be improved to utilize more I/O capabilities. In current state the gripper does not use digital outputs and analog input. Analog input could be used to get precise angle value from the robot controller, then with PWM signal from Arduino, the servo could stall at any given angle.