



**UNIVERSITI TEKNOLOGI MARA**

**MEC299**

**SMART AUTOMATED LAMP GRIP**

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## **ABSTRACT**

A lamp gripper is one gadget that is becoming more common in this day. The purpose of the lamp gripper is to reduce time to change the light bulbs and to help ease the burden for light changing. The issues are people this day still used to change light bulbs the old-fashioned way, by using a ladder and their hands. Although the Internet of Things (IoT) technology is well-known, but there is many more product that not have IoT system to improve the product. The objective of the project is to fabricate a gripper that is capable of grasping the objects of different shape bulbs using Internet of Thinking (IoT). As a result, this research presented a fully automated smart automatic lamp grip system that equipped with the sensors that will light up when the gripper's grip the light bulbs. Specific tools and equipment are required to assure the success of this Final Year Project. A gripper and an Arduino uno board are required for this project. The Arduino IDE software is used to program the code. This project also necessitates the grabbing test to ensure that the gripper is completely at ease with the light bulbs. Aside from that, this project requires the use of SOLIDWORKS software to design a gripper with a sensor and an actual dimension to ensure that the end product has no wrong miscalculations. Simply put, in order to benefit people and achieve the aims, this initiative must be a success.

## **TABLE OF CONTENTS**

<b>1.0</b>	<b>Introduction</b>	<b>6</b>
1.1	Background of Study	
1.2	Problem Statement	
1.3	Objectives	
1.4	Scope of Work	
1.5	Significant Study	
<b>2.0</b>	<b>Literature Review</b>	<b>7</b>
2.1	Project review	
2.2	Review of Gripper	
2.3	Review of Internet of Thinking(IoT)	
2.4	Review of Sensors	
<b>3.0</b>	<b>Methodology</b>	<b>9</b>
3.1	Flowchart	
3.2	Preliminary Results	
3.3	Gantt Chart	
<b>4.0</b>	<b>References (IEEE/APA format)</b>	<b>10</b>

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background Of Study

A mechanical gripper is an end effector that grasps an object with mechanical fingers actuated by a mechanism. The fingers are the ones that make direct touch with the thing. The fingers are either attached to the mechanism or constitute a vital component of it. The gripper mechanism's job is to convert some type of power input into finger grabbing motion against the component [1]. The robot's power source, which can be mechanical, pneumatic, hydraulic, or electrical. The mechanism must be able to open and shut the finger, as well as exert enough force against the part when closed, to keep it securely in place. Human hands are the organs of human manipulation; in comparison, a robot's prehension tools are frequently referred to as "grippers." As the last link in the kinematic chain, it's often the sole part in direct touch with the workpiece.

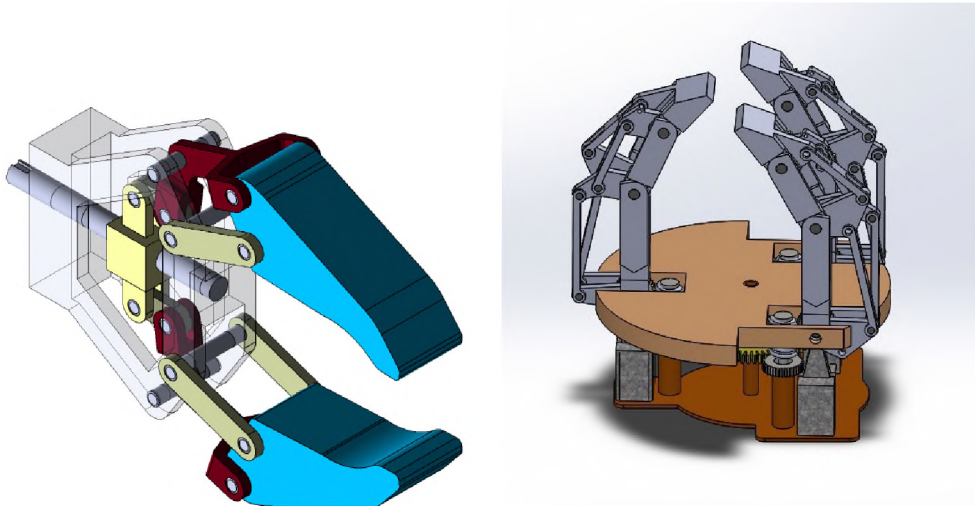


Figure 1: Gripper mechanism [1]

In a static gripping system, fragile and soft objects such as bulbs, are often damaged due to excessive gripping force or large deformation. Low damage gripping to these objects is a challenge [2]. When holding fragile things like bulbs and eggs, the rigid grippers' gripping force is tightly controlled [3]. On the other hand, the gripping power and the fingertip displacement deep into the object surface must be precisely regulated. As a result, the rigid gripper's control approach should be more difficult. To overcome the following issues, a

growing number of researchers are focusing on soft grippers, which offer promising benefits such as excellent flexibility [6].

Internet of Things (IoT) is a network in which all physical objects are connected to the internet through network devices or routers and exchange data. IoT allows objects to be controlled remotely across existing network infrastructure. IoT is a very good and intelligent technique which reduces human effort as well as easy access to physical devices. This technique also has autonomous control feature by which any device can control without any human interaction [7]. IoT aims at extending internet connectivity beyond computers and smartphones to other devices people use at home or for business. The technology allows devices to get controlled across network infrastructure remotely. IoT technology differs depending on the ecosystem or architecture. The core operating premise, though, remains the same. To interact securely with an IoT platform, the working procedure begins with the object or device, such as digital watches, smartphones, electrical appliances, and more. The platform then collects data from a variety of devices and analyses it. It now uses applications to deliver all valuable data to linked devices [8].

The Arduino Uno is a component of the Internet of Things (IoT) system. Arduino is an open source programmable circuit board that may be used in a number of basic and complicated makerspace projects. This board has a microcontroller that may be designed to detect and control items in the real world. The Arduino can interact with a wide range of outputs, including LEDs, motors, and displays, by responding to sensors and inputs. Arduino has been a popular choice for makers and makerspaces wishing to construct interactive hardware projects due to its versatility and inexpensive cost [11]. The Arduino project started in 2005 as a tool for college students at the Interaction Design Institute Ivrea in Ivrea, Italy, with the goal of providing a low-cost and straightforward means for novices and professionals to create devices that interact with their surroundings using sensors and actuators [9]. The Arduino Uno is a microcontroller board that uses the ATmega328 processor. It has 14 digital input or output pins, six of which can be used as PWM outputs, a 16 MHz oscillator, a USB connection, an influence connector, an ICSP header, and a push button. It also has a 16 MHz oscillator, a USB connection, an influence jack, an ICSP header, and a push button. It comes with everything you'll need to get started with the microcontroller. Then all it takes is a USB cord to attach it to a computer or an AC-to-DC adapter or battery to get it started. Because it controls everything that runs the computer, the Arduino Uno is essentially a computer's brain [10].