ANDROID CONTROLLED PICK AND PLACE ROBOT SYSTEM

Nikhil Barve[1],Machindra Waghmode[2],swapnil Banswal[3],Kishor Jadhav[4] ,Ramashwar Wadekar[5] ,Prof M.S.Walunjkar[6]

UG Student, Mechanical Engineering, SYCET, Maharashtra,India
UG Student, Mechanical Engineering, SYCET, Maharashtra,India
UG Student, Mechanical Engineering, SYCET, Maharashtra,India
UG Student, Mechanical Engineering, SYCET, Maharashtra,India
UG Student, Mechanical Engineering, SYCET, Maharashtra,India
Assistant Professor M.S. Walunjkar, Mechanical Engineering, SYCET, Maharashtra,India

ABSTRACT

The concept of pick and place based on automation speeds up the process of picking parts up and placing them in new locations, increasing production rates. With many end-of-arm-tooling options available, pick and place robots can be customized to fit specific production requirements. Moving large, small, heavy, or hard-to-handle products can be an easy task to automate in the factory line. Consistency is also a benefit of using a pick and place system. The robots can be easily programmed and tooled to provide multiple applications if required. An increase in output with a pick and place robot system offer long-term savings to companies. With the advancements in technology and affordability of robots, more pick and place robotic cells are being installed for automation applications.

Keyword : - *Automation, production rate.*

1. INTRODUCTION

1.1 Introduction:

A robot can be defined as a programmable, self-controlled device consisting of electronic, electrical, or mechanical units. More generally, it is a machine that functions in place of a living agent. Robots are especially desirable for certain work functions because, unlike humans, they never get tired; they can work in physical conditions that are uncomfortable or even dangerous. They can operate in airless conditions; they do not get bored by repetition and they cannot be distracted from the task at hand. The robot is powerful, reliable and can be use in hot temperature area where a human after working for so long can become sick and exhausted. This Robotic system is feasible by small and local industries having small scale production. The system is a reliable, can reduce the cost of production, and reduce the manpower and human workload. Common industrial robots are generally heavy rigid devices limited to manufacturing. They operate in precisely structured environments and perform single highly repetitive tasks under preprogrammed control.

1.2 Consideration While Designing a Robot:

1. A robot should not injure a human being or, through inaction, allow a human to be harmed.
2. A robot must obey orders given by humans except when that conflicts with the First Law.
3. A robot must protect its own existence unless that conflicts with the First or Second law.

These are very general laws and apply even to other machines and appliances. They are always taken care of in any

robot design.

1.3 Need of project:

The use of robotics in food industry is becoming more popular in recent years. The trend seems to continue as long as the robotics technology meets diverse and challenging needs of the food producers. Rapid developments in digital computers and control systems technologies have significant impact in robotics like any other engineering fields. By utilizing new hardware and software tools, design of these complex systems that need strong integration of distinct disciplines is no longer difficult compared to the past. pick and place operation can be performed efficiently with the help of a robot.

2. WORKING

1. Initially assume rest position of entire system.
2. At this stage, Bluetooth is switched on mobile phone and paired to Bluetooth module HC05.
3. The Bluetooth module HC05 connections are given to the ARDUINO UNO microcontroller.
4. Since the Bluetooth module HC05 works on 5v AND 12v is required for further processing, motor driver circuit IC L298 is used.
5. The microcontroller connections are given to the motor driver circuit IC L298.
6. The output from motor driver circuit is given to the boe motor (6v).
7. The boe motor then rotates the side gear shaft which then rotates the worm gear. the worm gear then rotates the spur gear which then rotates the gripper of the robot.
8. General DC motor used to give rotation to the wheels which has operating voltage of 12v.

3. PROJECT DIAGRAM

3.1 Block Diagram:
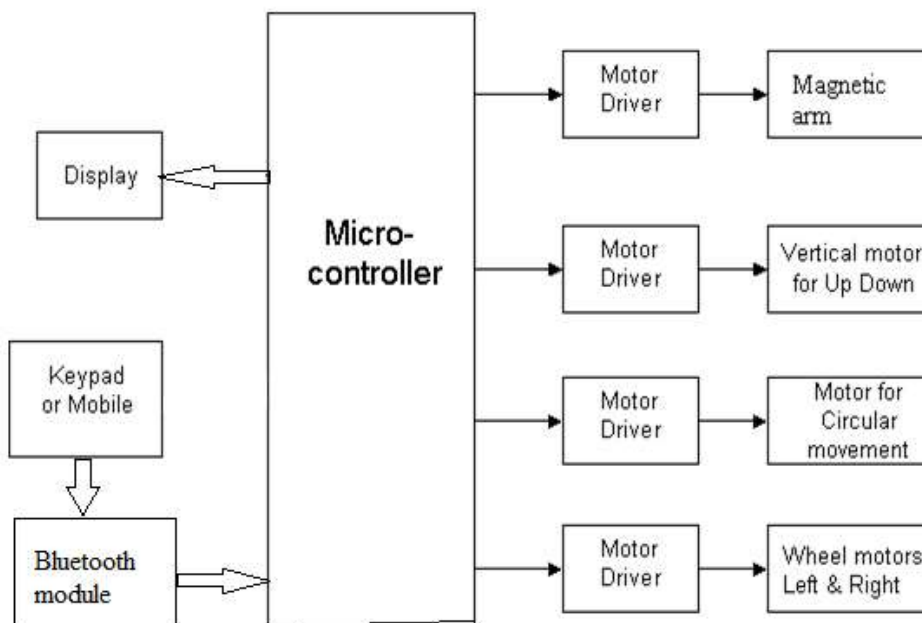
3.2 Actual Diagram :

4. RESULT AND DISCUSSION

[A] Degree of Freedom*:*

The point at which the robot manipulator rotates is called joint or axis. The number of joints in an industrial robot determines its Degree of freedom of motion. Our robot has one movement of axis so it posses" one degree of movement" , which means it has only one movement that is Rotational.

[B] Work Space*:*

The reach of the robot is defined as the workspace or work envelop of the system. All programmed points within the reach of robot are part of the workspace. The workspace shape of the Project robot is perpendicular as it can rotate in 90 degree angle.

[C] Robot Motion*:*

The robot has two basic movements:

1. The base travel movement.
2. The arm rotational movement.

[D] End- Effecter*:*

The end-Effecter is the hand connected to the robot arm. It is different from the human hand. The end- Effecter gives the robotic system the flexibility necessary for the operation of the robot. The end- Effecter of the project is a magnetic gripper and is driven by 12V DC source.

[E] Pay Load*:*

Payload is the load capacity of the robot. The project robot has a low payload of 200g.

[F] Accuracy*:*

The accuracy of a robot describes how closely a robot can position its manipulator. The accuracy rate of the project is 70% due to mechanical gears.

[G] Dimensions of tray:

The dimensions of tray are 8*9.8*3.5cm.

5. ADVANTAGES AND DISADVANTAGES

5.1 Advantages :

The most apparent reasons that are associated in installing of robotic systems in food industry are:

- Saving of manpower.
- Improved quality & efficiency.
- Ability to work in any hostile environment.
- Increased consistency & flexibility.
- Increased yields and reduced wastage.

5.2 Disadvantages :

- Limited weight carrying capacity.
- It cannot be used for multitasking.
- It has limited speed.

6. CONCLUSIONS

The robot has two movements such as base travel movement as well as arm rotational movement with the help of which it performs pick and place operation. The robot can rotate in 90 degree angle. The end- Effecter of the project is a magnetic gripper and is driven by 12V DC source. In this way we performed pick and place operation successfully for tray of biscuits.

7. REFERENCES

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