

Bluetooth Control Pick and Place Robot using Arduino

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Abstract—In latest years, industries and everyday routine activities have become more attracted to and implemented through robotic automation. Pick and place robots are a form of technology used in the manufacturing industry to perform pick and place tasks. The system is constructed in such a way that it reduces human error and intervention, resulting in more exact work. There are many domains in which human interference is problematic, yet the process in question must be operated and controlled, which leads to the application of robots. This paper discusses how to design a pick-and-place robot with Robot-Arduino and TCS3200 colour sensor utilizing Robot-Arduino for any pick-and-place functions.

Keywords—Arduino UNO, Pick and Place Robot, TCS3200 colour sensor.

I. INTRODUCTION

People have been attempting to replace human workers with robots for many years. Robotic machines are faster and more effective than humans. Robotics is described as the study, design, and application of robot systems in production. Robots are typically used to undertake tasks that are dangerous, repetitive, and unpleasant. Material movement, assembly, arc welding, resistance welding, machine tool load and unload tasks, painting, spraying, and other functions are included. Many aspects of robots are modelled after natural phenomena. The manipulator, which serves as the robot's arm, is designed like a human arm. The robot will perform pick-and-place tasks. It can also operate independently. The technological advances in electronic industry robot systems have accelerated. The service robot with machine vision capacity is one such application that has recently been developed. Time and manpower are critical constraints for completing large-scale tasks in this rapidly developing society.

Because of the requirement for better efficiency and consistently good in end goods, today's industry is increasingly resorting to computer-based automation. The inflexibility and high expense of hard-automation systems, which were previously used for automated manufacturing operations, has sparked widespread

Interest the use of gentle systems. Mechanical arm capable of performing a large range of manufacturing tasks in a flexible and cost-effective manner. The design of a robotic arm capable of sorting things is described in this paper. The

categorization approach was based on the object's physical property, colour, in relation to white light. Color sensor, power unit, actuators (DC servo motors), end-effectors (imp active gripper), and At mega microcontroller were all included in this robot (to control DC servo motors and sensor). The function of colour identification was done by an integrated colour sensor. The arm (developed) reads the angles of the joints and moves the actuators to pick reach a desired object. The robotic arm sorted objects based on the colour codes given by the end-effectors' colour sensors.

II. LITERATURE REVIEW

John Iovino[1], Various topics of robot design are discussed in this paper. It covers a range of issues such as arm design, control techniques, and vehicle design. The functioning and control of robots is discussed in this publication.

AkraticKaushik, AasthaSharma [2],Sensors provide a means of acquiring information about industrial activities and processes, as discussed in this paper. Sensors are frequently employed to convert a physical stimulus into an electronic signal that the manufacturing system can analyse and utilise to make decisions about the processes being executed.

S. Senthilkumar1, L. Ramachandran ,R. S. Aarthi [3],This paper proposes a system that uses an IR sensor in the designed pick and place robot to alert the user if an object is available in front of the vehicle.

III. STATEMENT OF THE PROBLEM

The designed pick and place robot will be used to help with, moving heavy goods, sorting of the objects and other tasks. The heavy goods movement is usually done by hand, if task is performed for a long time, the operator may sustain injuries.

By deploying the operator will no longer be required for this robot to bend and lift heavy objects, reducing injuries and enhancing job productivity. Every now and then, an operator will make a minor or major error. In the industrial environment, any form of error is unacceptable. Every blunder is costly in terms of time, money, and materials.

IV. OBJECTIVE

Pick and place robots allow businesses to deploy automated systems to lift and place goods from one location to

another. Simple tasks like lifting or moving objects do not require a lot of thought. As a result, utilizing workers for these tasks may be inefficient, as the workforce may be utilized efficiently for tasks requiring higher mental talents. Pick and place robots handle these repetitive chores. To lift things from a moving conveyor belt, these robots are frequently equipped with sensing and vision systems.

V. METHODOLOGY

In this project following components such as Arduino UNO voltage regulator ,four DC motor with driver IC ,Bluetooth module(HC-05) are required. The voltage regulator ,driver IC and the Bluetooth device are interfaced to the microcontroller .When the command to the microcontroller is given by the user then the command is checked in the pre stored data if the data is same the robot can perform the operation to move to the right ,left, arm down ,arm up , forward direction ,backward direction to pick any object and placing the object.

In the fig 1 and 2 four motors are used, two motors are used for the movement of the vehicle designed one for the movement of the gripper another arm for the arm movement. The mechanical push button type switches limit the maximum upward and downward arm movement, as well as the shutting and opening of the jaw. Driver IC (L293D) is used to ensure that motors work properly. A single L293D may control two DC motors at the same time.

It is based on the H-bridge concept. The voltage regulator ensures that the gadget operates at a constant voltage. To communicate commands to the controller, the Bluetooth control app is needed. Blue control is a basic Universal Remote Control for Bluetooth capable serial devices attached to a controller, such as Bluetooth modules.

TCS3200 color sensor it can detect different colors. On a microscopic level, the square boxes inside the eye can be seen on the sensor, each square box can detect different light forms.

The circuit's brain is an Arduino Uno R3 board with an ATmega328 or ATmega328P microprocessor (MCU). It contains 14 digital I/O pins and six analogue input pins, as well as 32k flash memory, a 16MHz crystal oscillator, and USB connectivity.

RECEIVER

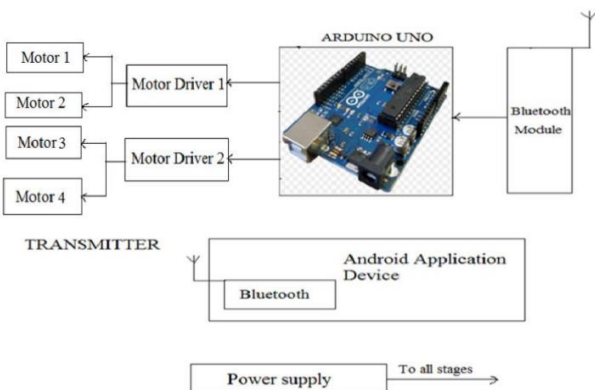


Fig 1: Main Block Diagram

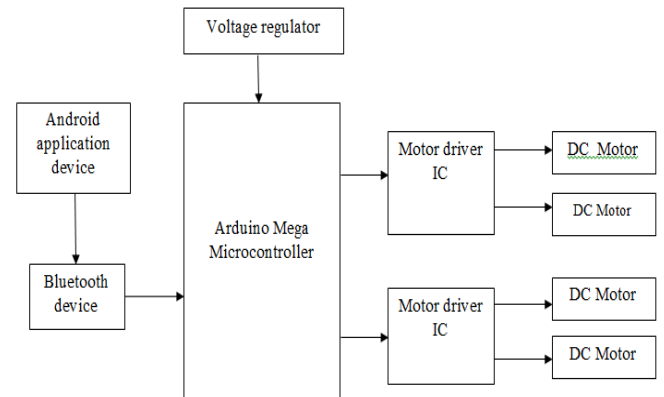


Fig 2: The receiver and transmitter block diagram

VI. SYSTEM DESCRIPTION

AURDUINO UNO: Arduino is an open-source prototyping tool that uses simple hardware and software. Here it gives input and output signals based on the sensors connected to it.

BLUETOOTH (HC-05): Bluetooth wireless technology is a short-range communications technology that aims to eliminate the need for wires to connect portable and/or fixed devices while ensuring high security. Bluetooth technology is known for its resilience, low power consumption, and inexpensive cost. The Bluetooth specification establishes a standardized structure for devices to connect and interact with one another.

COLOUR SENSOR: In this project, we'll use an Arduino UNO to connect with a TCS3200 color sensor. It can detect different colors. On a microscopic level, the square boxes inside the eye can be seen on the sensor, each square box can detect different light forms.

MOTOR DRIVER: this will convert the minimum current signals to higher current signals so that it can help the motor to work accordingly.

DC MOTOR: this will make the robot light and efficient. With this we can control speed with help of electronic devices.

The fig 3 and fig 4 shows the view of pick and place robot and actual set up of the project respectively.



Fig 3: View of Pick and Place Robot

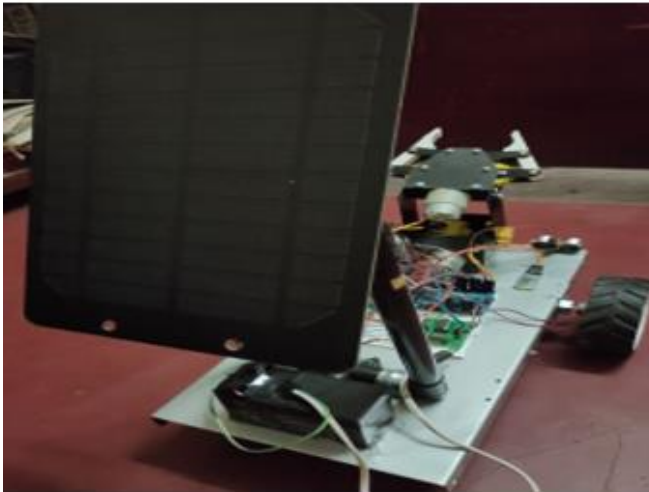


Fig 4: Actual Setup of the Pick and place ROBOT

VI. CONCLUSION

An Arduino-based robotic arm is used to pick and arrange goods more safely and without causing damage. A soft catching gripper on the robotic arms utilized here safely handles the thing. It can minimize time taken and human power. Dangerous works in factories can be safely handled. As we are using Bluetooth it makes the things effective in all dimensions.

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