Arduino Based Pickup and Drop Robot

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Abstract:

A robotic arm is designed using Arduino to pick and place the objects via user commands.

It will pick and place an object from source to destination safely. The soft catching gripper used in the arm will not apply any extra pressure on the objects. The robot is controlled using android based smartphones through Bluetooth. Based on the commands given by the user the robot moves accordingly.

At the receiver end there are four motors interfaced with the micro controller. Two for the vehicle movement and the remaining two are for arm and gripper movement. Blue control application is used for the controlling of robot

Keywords: Six Axis, Bluetooth Module, Micro-controller, Stepper Motor.

I.   INTRODUCTION

Robotics deals with the design of robots their manufacture and applications. Robotics gained more importance in the modern era since it require less cost to operate than a human Labour to do the same task, also once programmed robot will perform better than an experienced human labour. Now a days industry is turning towards computer based monitoring of tasks mainly due to the need for the increased productivity and delivery of the final products with maximum quality. Due to the inflexibility and generally high cost of hard computerization systems lead to the use of industrial robots. In this we are introducing a robotic arm which is capable of picking up and placing the objects. The soft catching gripper used here handle objects safely. An android based smart phone which has blue control application is used for the movement of robot. Thus based on the user commands the robot moves and pick and place the objects. The robotic arm used here is similar to a human arm which is programmed to perform the pick and place functions.

II.   WORKING

In our Pick and Drop Robot we will set a destination then we will pick our material from pick up station and drop to the drop station. When robot will get the rule the microcontroller gives signal to the LIDAR sensor , motor drivers incoders.
The microcontroller will process the data and gives signal to the LIDAR and motor driver and the motor starts rotating along with that the wheels also start rotating.
Then the robot will go to the pick up station then microcontroller will gives instructions to the pick up the material then microcontroller again gives instructions to motor driver to rotate the motor and robot goes towards the drop station
Then it will drop to the drop station

Fig.1 Basic Mechanism of a Robotic Arm
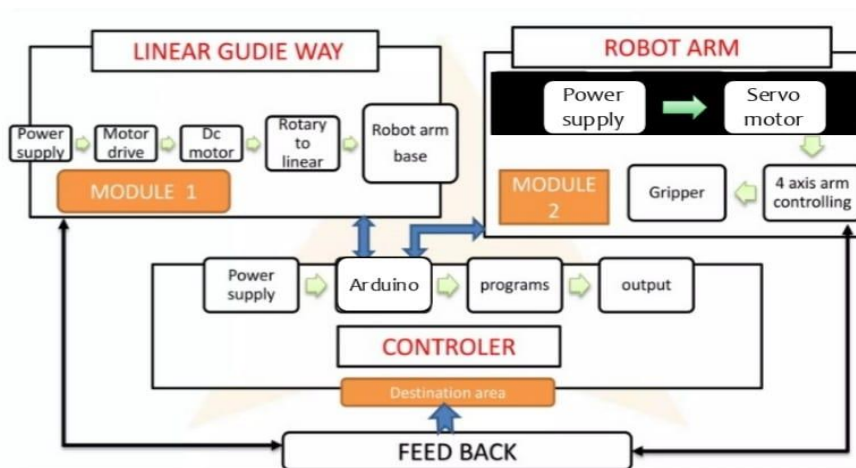
III.   BLOCK DIAGRAM

Fig.2 Block Diagram of Pick up and Drop Robot

IV. COMPONENT USED

1. Stepper Motor

A stepper motor is a brushless, synchronous electric motor that converts digital pulses into mechanical shaft rotation. Its normal shaft motion consists of discrete angular movements of essentially uniform magnitude when driven from sequentially switched DC power supply. The stepper motor is a digital input-output device. It is particularly well suited to the type of application where control signals appear as digital pulses rather than analog voltages. One digital pulse to a stepper motor drive or translator causes the motor to increment one precise angle of motion. As the digital pulses increase in frequency, the step movement changes into continuous rotation. Some industrial and scientific applications of stepper motors include robotics, machine tools, pick and place machines, automated wire cutting and wire bonding machines, and even precise fluid control devices.

2. HC05 Bluetooth Module

The HC-05 Bluetooth Module is a simple Bluetooth SPP (Serial Port Protocol) module that allows for the setup of a transparent wireless serial connection. Its communication is via serial communication which makes an easy way to interface with the controller or PC.

3. ArduinoMega 2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

4. PLA Filament

Polylactic Acid (PLA) filament is a recyclable, natural thermoplastic polyester that is derived from renewable resources such as corn starch or sugar cane. The filament is biodegradable under certain conditions with high heat capacity and high mechanical strength.

5. Servo Motor

A servomotor (or servo motor or simply servo) is a rotary or linear actuator that allows for precise control of angular or linear position, velocity, and acceleration in a mechanical system. It constitutes part of a servomechanism, and consists of a suitable motor coupled to a sensor for position feedback.

6. ADVANTAGES

- Improved Accuracy
- Increased Process Speed
- Flexibility to Accommodate Multiple Product Changes
- Improved Consistency
- Ergonomic Injury Reduction
- Cost Efficiency
- Minimal Floor Space Requirements
- Completely Customizable

7. CONCLUSION

The conclusion for pick and place robots, which play a crucial role in automating repetitive tasks. The proposed concept of pick and place robot using Arduino is implemented via RF play station. It is found that, the robot so implemented has the ability to locate itself to the location where the object to be lifted is available with the help of chassis and four dc motors. Further depending upon controlling action provided to servo motor it lifts the object and locates the same at required destination

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VI.   BIOGRAPHY

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