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Pick and Place Robotic Arm Using Android Device

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Abstract: *The project is meant to developed a opt for pick and place robotic vehicle with a soft catching gripper. For example it'll safely hand a bomb very painstakingly to avoid its explosion whereas catching. The robotic vehicle is golem application controlled for remote operation. All the transmitting end using golem application device, commands are sent to the receiver to manage the movement of the golem either to maneuver forward, backward and left or right etc. At the receiving end four motors are interfaced to the microcontroller where two are for the body movement. The golem application device transmitter acts as a far flung management that has the advantages of adequate vary, while the receiver end Bluetooth device is fed to the microcontroller to drive DC motors via motor driver IC for necessary work. Remote operation is achieved by Associate in Nursing sensible phone or Tablet etc., with golem OS; upon a GUI(Graphical User Interface)based bit screen operation. The main advantage of this golem is its soft catching arm that is designed to avoid additional pressure on the suspected object for safety reasons. any the project are going to be augmented by interfacing it with a wireless camera so as that the person dominant it'll browse operation of the arm and gripper remotely.*

KEYWORDS : Pick & Place Robot, Soft Catching Arm, Atmega 328, DC Motor, Android Bluetooth Control, Android Smart phone.

1. INTRODUCTION

Robot is associate integral half in automating the versatile producing system that's greatly in demand lately. Robots are currently quite a machine, as robots became the answer of the longer term as price labor wages and customers' demand. Robots is classified into completely different classes counting on their operate and therefore the market wants they're designed for. Here it's determining 2 major categories of robots, industrial robots and repair robots. in line with the Robotic Industries Association, associate industrial golem is associate mechanically controlled, reprogrammable, useful manipulator programmable in 3 or a lot of axes which can be either mounted in site or mobile to be used in industrial automation applications.

Research and development of future robots is movingly at a awfully speedy face owing to the perpetually up and upgrading of the standard standards of product. Golem and automation is used so as to exchange human to perform those tasks that are routine dangerous, uninteresting and in a very dangerous space. Now a day's within the world of

advanced technology, automation greatly will increase production capability; improve product quality and lower cost. Robots are indispensable in several producing interties. Robots are designed and programmed to be job specific

2. BLOCK DIAGRAM

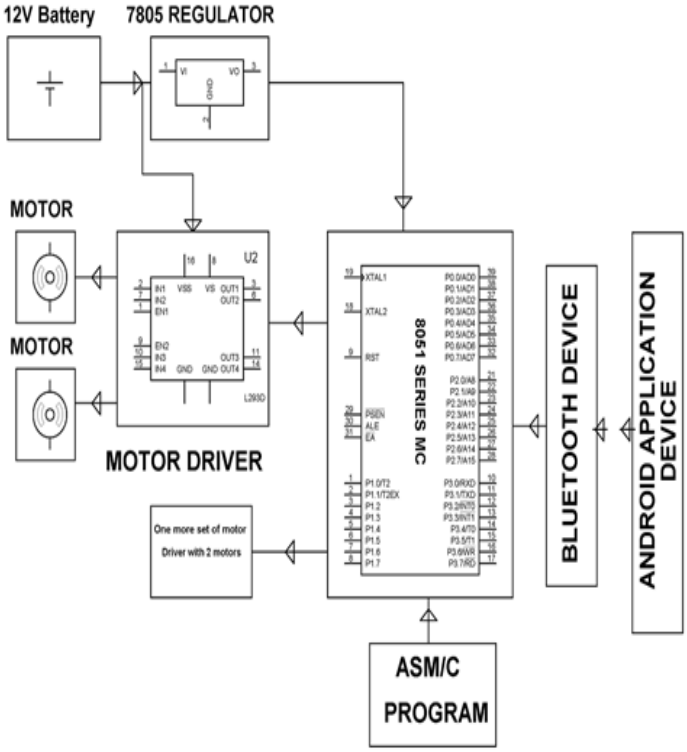

Fig.1: Block Diagram

3. LITERATURE SURVEY

3.1 Working of pick & place

The basic operate of decide and place automaton is completed by its joints. Joints square measure analogous to human be part of its and square measure wont to join the 2 consecutive rigid bodies within the automaton. they will be articulation trochee idea or linear joint. to feature a joint to any link f a automaton, it's ought to understand the degrees of freedom and degrees of movement for that part. Degrees of freedom implement the linear and motion movement of the body and degrees of movement imply the no. of axis the body will move.

It carries with it Associate in Nursing Atmega328 micro controller IC, Bluetooth Module, Four DC motors with driver IC and power provide .The decide and place robotic arm a robotic arm place on of moving vehicle, the vehicle is in a position to maneuver on any form of surfaces no matter it's swish rough. It uses 2 motors for the operation and a belt kind tier is hooked up to the vehicle, for the graceful operation. The decide and place automaton uses four motors for the operation of the system, 2 for the operation of the moving vehicle and 2 for the decide and place operation. The decide Associate in Nursing place arm consists of an arm assembly with a jaw, that is merely able to move in up and down direction. There square measure 2 motors, one for the up and down motion and alternative for jaw gap and shutting.

Table-1: Truth Table of Motor Driver

Pin			Description
E	A	B	
1	0	1	1 Motor runs clockwise
1	1	0	Motor runs anti-clockwise
1	0	0	Motors stops or decelerates
1	1	1	Motors stops or decelerates

4. HARDWARE IMPLEMENTATION

4.1 Microcontroller:

The hardware implementation of pick and place arm system consists of AVR micro controller, DC motor, Bluetooth, Motor Driver, Android application device and power supply.

The first demand for the planning of the automaton is that the micro controller. There are Arduino ATMEGA 328 has

been used. it's AN ASCII text file physics prototyping platform with fourteen digital I/O pins, half-dozen analog inputs, sixteen MC quartz oscillator, a USB affiliation, an influence jack, AN ICSP header and a button. The superior silicon chip 8-bit AVR RISC-based micro controller combines 32KB ISP non-volatile storage with read-while-write capabilities, 1KB EEPROM, 2KB SRAM, twenty three general purpose I/O lines, thirty two general purpose operating registers, 3 versatile timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI interface, 6-channel 10-bit A/D converter, programmable watchdog timer with internal generator, and 5 package selectable power saving modes. The device operates between one.8-5.5 volts.

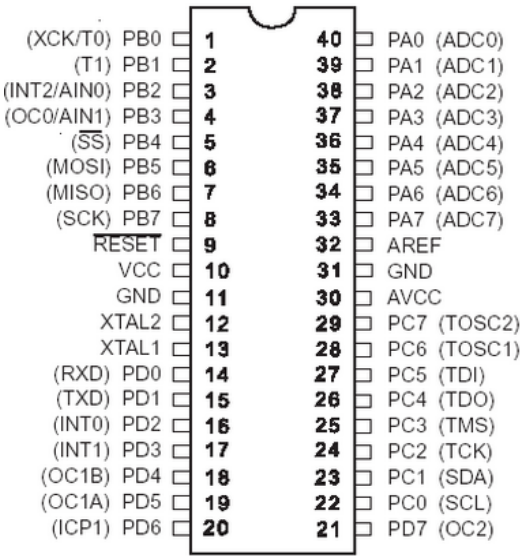

Fig. 2: Pin Diagram of ATmega328

4.2: DC Motor

There are four Stepper DC motor is employed to maneuver the arm, gripper and vehicle forward or backward. A stepper motor could be a brush less DC motor that divides a full rotation into variety of equal steps. The position of motor can be commanded to move and it holds one of these steps without any feedback sensor. It is an open-loop controller. When DC voltage is applied to their terminals, it rotates continuously. It converts a train of input pulses known as square wave pulses into a precisely defined increment in the shaft position. Each pulse moves the shaft through a fixed angle.

Fig. 3. DC Stepper Motor

4.3 Motor Driver:

Motor driver is employed to drive the motors. Motor driver is connected to the micro controller. Micro controller offers the five milliamp output that isn't ample enough to drive the DC motors that's why we tend to use motor driver. Fig five shows the diagram of motor driver.

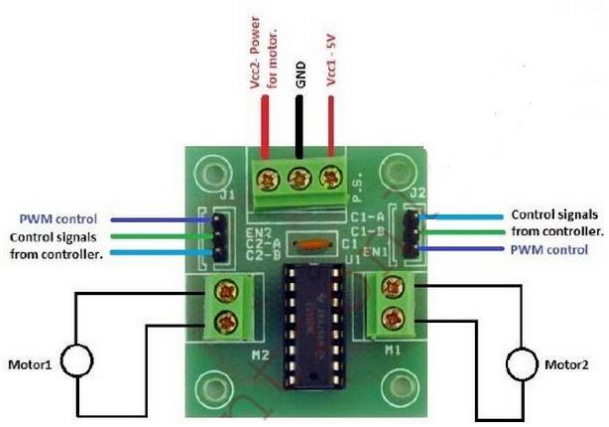

Fig. 4: Motor Driver

4.4 Bluetooth Module:

Bluetooth could be a packet-based multi-layer wireless protocol with Master-slave model. In Bluetooth, one Master might communicate up to seven slaves in a very „piconet". The interface Bluetooth module is absolutely qualified Bluetooth V2.0+EDR (Enhanced knowledge Rate) 3Mbps Modulation with completes a pair of.4GHz radio transceiver and base band. It uses CSR Blue core 04-External single chip

Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). it's a footprint as tiny as12.7mmx27mm. it's been 12V power provide is given to the system mistreatment the batteries. 7805 transformer is employed that regulates the voltage to 5V. F. humanoid Application Device

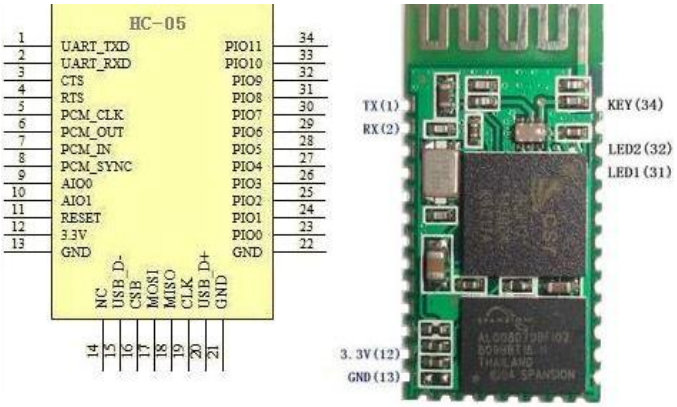

Fig. 5: Pin Diagram and Module of HC-05 Bluetooth

4.5 Power Supply :

It has been 12V power supply is given to the system using the batteries. 7805 voltage regulator is used which regulates the voltage to 5V.

Fig. 6:12V Battery

4.6 Android Application Device :

Android is an open-source operating system which means that any manufacturer can use it in their phones free of charge.

It was built to be truly open. For example, an application can call upon any of the phone's core functionality such as making calls, sending text messages, or using the camera.

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5. PICK AND PLACE ROBOTIC ARM

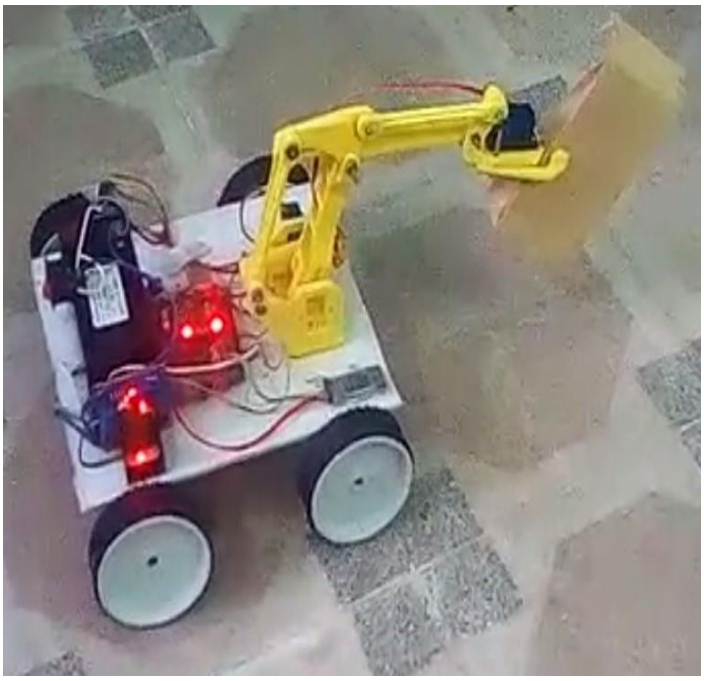

Fig.7: Pick and Place Robotic

6. CONCLUSION

An autonomous robot with adjustable gripper that perform pick and place operation has been successfully designed and developed. The robot has been able to pick the object and place it effectively. The robot is also able to perform lifting upward and downward smoothly. By using AVR microcontroller, the robot has performed the task perfectly according to the program that being made. Beside than that, the adjustable gripper with sensors is able to open its grip according to the size of the object. Due to this advantage, the robot can pick. This system can be used in various applications like in gripper, fabrication process, and

inspection, processing, spraying, stamping and welding for work piece.

7. FUTURE WORK

1. We can interface sensor to this robot so that it can monitor some parameters.
2. We can add wireless camera to this Robot.

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