

PICK AND DROP ROBOT

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Abstract— The industry is moving from current state of automation to robotization to increase productivity and to deliver uniform quality. The industrial robots of today may not look the least bit like a human being although all the research is directed to provide more and more anthropomorphic and human like features and super-human capabilities in these. One type of robot commonly used in industry is a robotic manipulator or simply a robotic arm. It is an open or closed kinematic chain of rigid links interconnected by movable joints. In some configurations, links can be considered to correspond to human anatomy as waist, upper arm and forearm with joint at shoulder and elbow. At the end of arm a wrist joint connects end effectors which may be a tool and its fixture or a gripper or any other device to work. Here how a pick and place robot can be designed for a workstation where loading and packing of lead batteries is been presented. All the various problems and obstructions for the loading process has been deeply analyzed and been taken into consideration while designing the pick and place pick and place robot.

Index Terms— Object Detection, Object Recognition, Bluetooth device, Android Device, DC Motor, Gripper Module.

I. INTRODUCTION

In this highly developing society, time and man power are critical constrains for completion of task in large scales. The automation is playing important role to save human efforts in most of the regular and frequently carried works. One of the major and most commonly performed works is picking and placing of jobs from source to destination. The pick and place mechanical arm is a human controlled based

Manuscript received April 23rd, 2019.

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system that detects the object, picks that object from source location and places at desired location. For detection of object, human detect presence of object and move machine accordingly.

II. PROJECT OVERVIEW

The aim of this project is design an autonomous robot with complete system allow the robot wander about its environment and to interact with certain object that its encounter. In order to achieve the aim of this project, several objectives are needed to be complete. In this scenario, the industry having a problem by human life in some hazardous duty service. Robot can work in environments so hazardous that an unprotected human would quickly die.

III. SCOPE OF PROJECT

Industrial automation, equipment and goods carrier, tour guide in museum, deliver the mail in office building, delivers medication in the hospital, can be used in place of crane in various lifting and carriage application.

IV. EMBEDDED SYSTEMS

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

V. BLOCK DIAGRAM

A robot can be controlled using Bluetooth module HC-05 and ATMEGA 328 microcontroller with android Smartphone device. The controlling devices of the whole system are a microcontroller. Bluetooth module, DC motors are interfaced to the microcontroller. The data receive by the Bluetooth module from android smart phone is fed input to the controller. The controller acts accordingly on the DC motor of the robot.

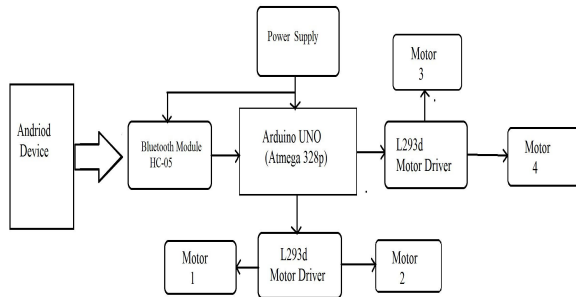


Fig. 1. Block Diagram Of Pick And Drop

The robot can move to move in all the four directions using the android phone. The direction of the robot is indicators using LED indicators of the Robot system. In achieving the task the controller is loaded with program written using Embedded C Languages. Android smart phone controller Bluetooth.

VI. ARDUINO BOARD

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control both physically and digitally. Its products are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone.

1. MICROCONTROLLER

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

2. PIN CONFIGURATION OF ATMEGA 328P

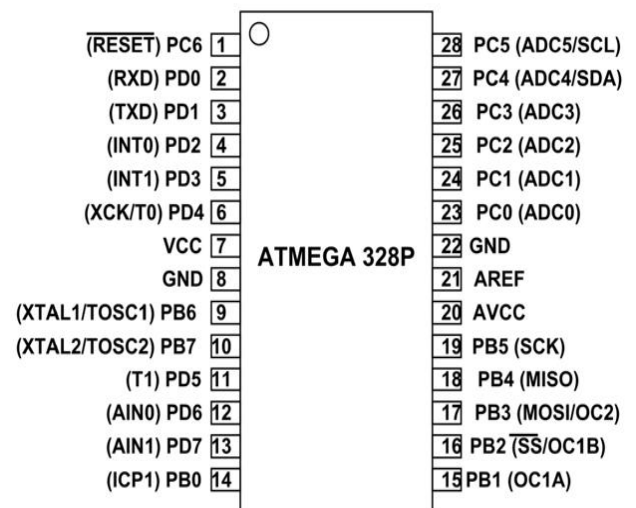


Fig. 2. Pin Configuration of ATMEGA 328P

3. FEATURES OF ATMEGA 328P

- High Performance, Low Power Atmel AVR 8-Bit Microcontroller Family
- Advanced RISC Architecture
- 131 Powerful Instructions
- Most Single Clock Cycle Execution
- 32 x 8 General Purpose Working Registers
- Fully Static Operation
- Up to 20 MIPS Throughput at 20MHz
- On-chip 2-cycle Multiplier
- High Endurance Non-volatile Memory Segments
- Data Retention: 20 years at 85C/100 years at 25C(1)
- True Read-While-Write Operation
- Programming Lock for Software Security
- 32 Programmable I/O Lines

4. MOTOR DRIVER

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors. The most commonly used motor driver ICs are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.

5. BLUETOOTH MODULE

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data

Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband.

It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.

6. GRIPPER MODULE

The gripper module is state of the art robotic arm which can be used in various 'pick and place' kind of robots. It works on DC Motor (9 to 12V DC).Change in rotation direction of the DC Motor, generates Jaw Open and Close Action.

7. DC MOTOR

"Gear motor" refers to a combination of a motor plus a reduction gear train. These are often conveniently packaged together in one unit. The gear reduction (gear train) reduces the speed of the motor, with a corresponding increase in torque. Gear ratios range from just a few (e.g. 3) to huge (e.g. 500).

A small ratio can be accomplished with a single gear pair, while a large ratio requires a series of gear reduction steps and thus more gears. There are a lot of different kinds of gear reduction. In the case of a small transmission ratio N , the unit may be back drivable, meaning you can turn the output shaft, perhaps by hand, at angular velocity w and cause the motor to rotate at angular velocity w .

8. POWER SUPPLY

The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in walkie-talkies, clocks and smoke detectors. Most ninevolt alkaline batteries are constructed of six individual 1.5 V LR61 cells enclosed in a wrapper. These cells are slightly smaller than LR8D425 AAAA cells and can be used in their place for some devices, even though they are 3.5 mm shorter. Carbon-zinc types are made with six flat cells in a stack, enclosed in a moisture-resistant wrapper to prevent drying. Primary lithium types are made with three cells in series.

VII. ADVANTAGES

- Increased efficiency Industrial robots are able to complete certain tasks faster and better than people.
- Higher quality Due to their high accuracy levels, robots can also be used to produce higher quality products.
- Improved working environment Industrial robots are often used for performing tasks which are deemed as dangerous for humans, as well as being

able to perform highly laborious and repetitive tasks.

- Increased profitability By increasing the efficiency of your production process, reducing the resource and time needed to complete it, and also achieving higher quality products, industrial robots can thus be used to achieve higher profitability levels overall, with lower cost per product.
- Longer working hours Typically people have to have breaks, get distracted and after time attention drops and pace slows. With a robot it can work 24/7, and keeps running at 100 Percentage.

VIII. APPLICATIONS

- Military Application and Hostage Rescue.
- In Domestic Use: This project can be used at homes for many purposes like picking up and placing some objects from one to other.
- In Spying Operations: This robot can help in spying operations. The object recognition and android control makes it Hi-Fi.
- For Handicapped People: This project can help the handicapped people especially those who had lost their feet unfortunately.
- Robo Races: The tilt control of robots can be used in robo races which will be revolutionary.
- Delta-style robots that operate from overhead with three or four long, thin arms that meet at the effector head.
- SCARA (selective compliant articulated robot arm) models, which are fixed-base robots with three vertical-axis (horizontal-motion) rotary arms.
- Multi-axis articulated robots, which can have up to six axes, with joints that can rotate in any direction.
- Pick-and-place applications are fertile ground for robotic equipment. As technology and other developments make such equipment increasingly viable, end users who pick the right machines will find themselves in a good place.

IX. SAFETY REQUIREMENTS

- The Robot should not be programmed such that it should damage the Battery while holding it in its gripper.
- Correct holding position should be set as if it not set then while movement of the Robot it may drop the Lead Batteries which can arise a Hazardous situation in the industry.
- The Robot should be interfaced properly with the sensors been placed near the Belt conveyor so as to know when the belt conveyor is to be stopped or to be started to move the batteries ahead.
- Load carrying capacity should be maintained as it should be always more than the default load which is to be shifted.

X. WORKING MODEL



Fig. 3. Working Model Of Pick And Drop Robot

[7] Womack K., D Jones and D. Roos, The Machine that Changed the World, MIT Press, 1996.

[8] Aniket R. Yeole , Sapana M. Bramhankar , Monali D. Wani , Mukesh P. Mahajan , Smart Phone Controlled Robot Using ATMEGA328 Microcontroller, IJIRC Vol. 3, Issue 1, January 2015, pp. 352-356.

[9] Muhammad Gulfam and Mirza Waleed Iftikhar Baig , WG11 Android based Surveillance Robot Control IJMSE, Vol. 3, March 2015, pp. 17-22.

XI. FUTURE SCOPE

Robotic industry is poised to grow with declining costs and increasing requirements for automation. Even the testing and debugging times to solve system problems are highly reduced.

With the introduction of PC platforms, maintenance of robotic systems on the factory floor has become an easy and simple task.

Smarter versions of pick and place robot are used to deliver mails within office building and deliver medications in a hospital.

This technology has been suggested for running buses and other mass transit systems and may end up as a part of autonomous cars navigating the freeway.

XII. CONCLUSION

The extensive study of PICK AND DROP robots and their applications results in simple design and high productivity with a better working environment. The solution for improvement of machining techniques lies in the improvement of industrial robots. With this we conclude that FUTURE LIES HERE-ROBOTICS.

REFERENCES

[1] GOLDMAN S, and K. PREISS, Century Manufacturing enterprise strategy- An Industry Led View, volume 1 Lehigh University, 1991.

[2] GOLDMAN S, Agile Manufacturing- A new production paradigm for Lehigh University, 1993[3]

[3] (Shimon Y. (editor) (1999). Handbook of Industrial Robotics.

[4] Abo-Hammour Z.S., Mirza N.M., Mirza S.A. Arif M.(2002) Cartesian Path Generation of Robot Manipulators.

[5] School Net Robotics (2001). Future Projects.. School Net Robotics (2001). Future Projects.

[6] Anderson D, Agile Product development for Mass Customization, Irwin, 1997.