

Solar Powered Automatic Pick and Place System

Dhere Tejas Santosh, Lohakare Ashish Vinod, Godse Pratik Dattatray,

Borkar Rutik Sanjay, Prof. Kulkarni B. L

Amrutvahi Polytechnic, Sangamner, Maharashtra, India

Abstract: *Concept of object pick-and-place and Line follower robot which will be functioned following a particular line may help an industry to attenuate the labor cost or may be alternatives of the labors. Nowadays the industries are following the concept of automation and for this purpose robots are the best alternatives. Single type of robot is most commonly used in industry is a robotic manipulator or simply a mechanical arm. It is an open or closed kinematic mechanism chain of rigid links interconnected by movables joints. We have pile up a mechanical arm with a line follower robot which will be able to pick an object from a certain place then carry it to the defined place by following a predefined line. A robotic system that is capable of both picking up and releasing micro-objects with high accuracy, high precision, reliability and speed.*

Pick and place capabilities are commonly used in manufacturing plans. In today's advanced technology man power are critical constrains for completion of task in large scales. The automation is playing vital 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. These moves of objects on a specified path to pick the components from one location and place them on desired locations. Basically, the object carrying robot is a microcontroller-based mechatronic system that finds out the object from the particular place, picks the object from location and places at a specific destination. A robotic arm is a robot manipulator configuration, usually using a sequence of function by the controlled program, with resembling functions to a human arm. The robot arms can be self- explanatory or operated manually and can be used to perform different tasks with great accuracy.

Keywords: Solar

I. INTRODUCTION

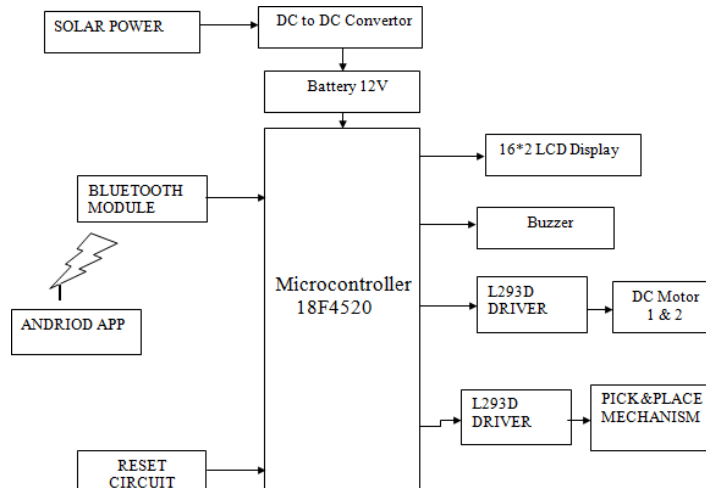
Concept of object pick-and-place and Line follower robot which will be functioned following a particular line may help an industry to attenuate the labour cost or may be alternatives of the labours. Nowadays the industries are following the concept of automation and for this purpose robots are thebest alternatives. Single type of robot is most commonly used in industry is a robotic manipulator orsimply a mechanical arm. It is an open or closed kinematic mechanism chain of rigid links interconnected by movables joints. We have pile up a mechanical arm with a line follower robot which will be able to pick an object from a certain place then carry it to the defined place by following a predefined line. A robotic system that is capable of both picking up and releasing micro-objects with high accuracy, high precision, reliability and speed.

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II. LITERATURE SURVEY

The line follower and pick and place robot by Sri Jagath H R, published In IRJET , Feb 2020. This paper presents the development of an automatic pick and place robot arm controlled using Arduino NANO. The pick and place robots are popular in industries, where repetitive tasks are present. Line follower robot is known as a learning tool for Automation. It is machine that follows a line either a black line on white surface or vice-versa. Android controlled pick and place arm with line follower automation [2] by Iwin Htay, Nyan Phyo Aung, Mo Myint Wai published in (IJTSRD) international journal of trend in scientific research and development (IJTSRD), ISSN : 2456 -6470 , volume-3 , issue- 5, August 2019 . This paper presents the pick and place robot with line follower function for manufacturing application. Manufacturing automaton is widely used in small and medium plants, however, automaton cooperating with other devices is an important aspect for achieving the fully autonomous system. Automatic pick and place robotic arm vehicle [3] by Prof. Vijay Matta , Namita Mendole , Leena Lengule , Nidhi Hatwar, Pragati Manohare , Neha Meshram , Shipa Negdeote published in (IJARCCE) International journal of advanced research in computer and communication engineering. Vol.7, issue 2 , Feb 2018. Line follower robot [4] by Abhijit .G. Kalbande , Shraddha Koche . published in Journal for research , vol 4, Issue 1 , Marcp018. It is programmed to move automatically and in accordance with the plot line One of the most crucial features of robotics is line following. A Line Follower Robot is a self-contained robot that can follow a black or white line drawn on a surface of contrasting colour. It is programmed to move automatically and in accordance with the plot line. Design and implementation of a sensor guided pick and place robot [5] by S.H. Sushmitha and Uma Priyadarshini published in International journal of pure and applied mathematics vol 119, No.16 2018, 2939-2945. ISSN: 1314-3395. In this paper. A novel design for autonomous line follower robot [7] by Md. Majedur Rehman, Hossain Mi, Islam, Rahman MM May 2017 Journal of electrical engineering and technology (JEEET). The line following paper proposes a new model The Autonomous Line Follower Robot is a mobile machine that can recognise and follow a pre-drawn line that may be seen as a black line on a white surface with a high contrasting colour. Technical report of building a line follower robot [8] by Sayedehson Marjani Bajestani, Arsham Vosoughinia . IEEE 2017. The following robot is a temporary intelligent system with robot positions corrected feedbacks, aiming for the black or white line. The voltages of the circuits and the voltages of the sensors are the main sources of income for robots. The following robot is a temporary intelligent system with robot positions corrected feedbacks, aiming for the black or white line. The voltages of the circuits and the voltages of the sensors are the main sources of income for robots . Pick and place ABB working with a linear follower robot [9] by Nwokomah Wilson Gosim , Trig Faisal HMA A AL- Assad. Published in international symposium on robotics and intelligent sensors 2012 (IRIS 2012). The necessity for higher manufacturing output in industries prompted the development of this project proposal. Industrial robots are commonly utilised in small and medium workshops; nonetheless, the robot's ability to collaborate with other devices is critical to developing a fully autonomous system.

III. BLOCK DAIGRAM



IV. TEST METHOD

Check that component agree with the part list (value and power of resistors, value and voltage rating of capacitor, etc.) if in any doubt double check the polarized components (diodes, capacitor, rectifiers etc.)

If there is a significant time elapse between circuits, take trouble to read the article; the information is often given in a very condensed form. try to get most important point out of the description of the operation of the circuit, Even if you don't understand exactly what is supposed to happen.

- If there is any doubt that some component may not may be equivalent, check that they are compatible.
- Only use good quality IC socket.
- Check the continuity of the tracks on the PCB (and through plated holes with the double sided boards) with a resistance meter or continuity tester

Make sure that all drilling, filling and other 'heavy' work is done mounting any component.

- If possible keep any heat sinks well isolated from other components.
- Make wiring diagram if the layout involves lots of wires spread out any all direction.
- Check that the connectors used compatible and that they are mounted the right way round.
- Do not reuse wire unless it is of good quality. Cut off the ends and strip it a new.

PIC18F4520 Microcontroller



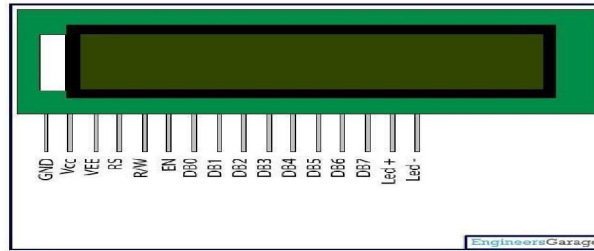
PIC18F4520 is a low-cost, low-power, high-speed 8-bit, fully-static Microcontroller unit that has 40 pins out of which 36 pins can be used as I/O pins. It has Power-on-Reset (POR) as well as the Extended Watchdog Timer (WDT) circuitry, which can be programmed for 4ms to 131s. It is an 8-bit enhanced flash PIC microcontroller that comes with non-volatile memory technology and is based on RISC architecture. Many electronic applications use this controller and cover wide areas ranging from home appliances, industrial automation, security system and end-user products. This microcontroller has made a renowned place in the market and becomes a major concern for university students for designing their projects, setting them free from the use of a plethora of components for a specific purpose, as this controller comes with inbuilt peripheral with the ability to perform multiple functions on a single chip.

PIEZOELECTRIC BUZZER



This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and required interval. This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and required interval.

16*2 LCD DISPLAY



LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments). Animations and so on.

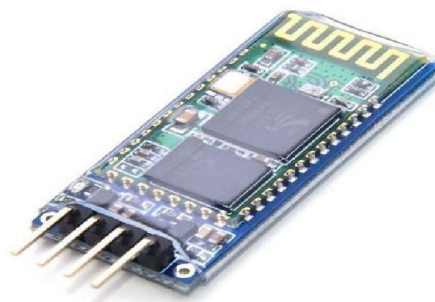
A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

Motor Driver L293D



L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively. Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state. They are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as their high-current/high-voltage loads in positive-supply applications.

Bluetooth Module HC-05



The IOT enabled projects require two way communication between the microcontroller and various sensors. There are various methods you can do that, Wired Communication, Wi-Fi, Bluetooth are some among them. The **HC-05 Bluetooth Module** adds wireless communication to your project to communicate via Bluetooth to any Bluetooth enabled Laptop or Mobile Device. The module communicates at 9600 baud rate via USART protocol. It can be used in applications like communication between two microcontrollers, data logging, wireless robots, wireless sensors data acquisition and home automation.

30 RPM DC GEAR MOTOR

DC Motor – 30RPM – 12Volts geared motors are generally a simple DC motor with a gearbox attached to it. This can be used in all-terrain robots and variety of robotic applications. These motors have a 3 mm threaded drill hole in the middle of the shaft thus making it simple to connect it to the wheels or any other mechanical assembly.

30 RPM 12V DC geared motors widely use for robotics applications. Very easy to use and available in standard size. Also, you don't have to spend a lot of money to control motors with an Arduino or compatible board. The most popular L298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC or you can choose the most precise motor driver module from the wide range available in our Motor drivers category as per your specific requirements.

Nut and threads on the shaft to easily connect and internally threaded shaft for easily connecting it to the wheel. DC Geared motors with robust metal gearbox for heavy-duty applications, available in the wide RPM range and ideally suited for robotics and industrial applications. Very easy to use and available in standard size. Nut and threads on the shaft to easily connect and internally threaded shaft for easily connecting it to the wheel.

ROBOTIC ARM GRIPPER



V. WORKING & OPERATION

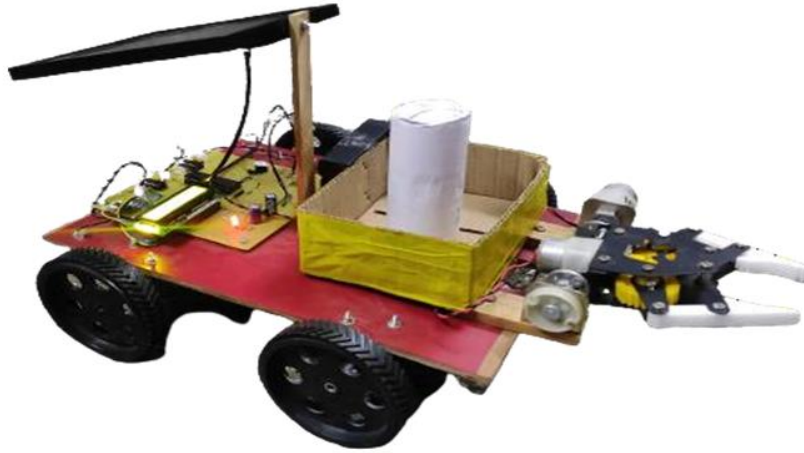
Initially, both motors are stopped and the robot is also at rest. To move the robot in any direction, we have to give commands from the smartphone through the Bluetooth-based Android application. To do this, we have to open (start) the Bluetooth Android application in the smartphone and then search for the HC05 Bluetooth module. Once the smartphone detects the HC05 module, it's required to pair the module with the application so that it can send commands from the smartphone via Bluetooth to the HC05 module (note: it's required to enter the passkey "1234" the first time to pair with the HC05 module). Now, we can send commands to the robot to move forward, reverse, left, or right via the smartphone through the application. When any of the above commands are sent (by sending direct character or pressing the button in the application), it's received by the HC05 module. The module further gives this command to Arduino, serially, through the Tx-Rx pins. Arduino receives this command and compares it with the set commands. If it finds a match, it will rotate the left and right motors accordingly to move the robot in any of the appropriate four directions. Once the robot starts its motion, it will continuously move until we send the command 'S' to stop.

At the same time, it sends signal to the servo motor to wake up and pick the object up by claw. Claw will be used to pick and place the objects from source to destination wirelessly using Bluetooth and also robot can be stopped in emergency of dropping the object carried by robot over the line of path.

VI. SOFTWARE SPECIFICATIONS

MPLABIDE8.91

VII. RESULT



VIII. SCOPE OF PROJECT

We have discussed solar powered automatic pick and place packaging system which could be able to pick and place an object in industrial area using advanced wireless technology. This system will have a proportionate increase in the level of getting maximum power that limits the sources of energy.

IX. ACKNOWLEDGMENT

“Perfect and precious guidance, hard work, dedication and full encouragement are needed to complete a project successfully in the life of every student illumination of project work is like engraving a diamond

We take this opportunity on the successful completion of our project so thank all the staff for their valuable guidance, for devoting their precious time, sharing their knowledge and their co-operation throughout all course of development our project and the academic year of education.

We a deep guidance to our project Prof. KULKARNI.B.L (Project Guide) whose valuable guidance, which has been a key factor in the successful completion of our project. Also we a deep guidance to our project Prof. Borhade G.L (project Co-ordinator) has been a key factor in the successful completion of our project A remarkable and unspeakable person in our life Prof Kulkarni B. L HOD E&TC Department) whom we have a gratitude and respected for developing entrepreneurship qualities and sharing his knowledge and lifetime experience to make our future glorious Also our special thanks to Prof. V. B. DHUMAL (Principal) & management staff whose assistance is also an important part in completion of our project Lastly we take opportunity to thank one and all who directly or indirectly have helped using the successful completion of our project.

X. CONCLUSION

Robot pick and place automation speeds up the process of picking parts up and placing them in new locations, while also increasing production rates. These pick and place robots are more accurate and do not fatigue while doing back-breaking or hard to maneuverer movements that may be difficult for humans. The consistency, quality and repeatability of a pick and place robot system is unmatched. These systems are also versatile and can be reprogrammed and tooled to provide multiple applications for consumers.

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