Pick And Place Object With Line Following Robot

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Abstract – *The world is adapting Robotics for their comfort as the technology is growing day by day . So, we have developed a product "Pick And Place Object With Robotic Arm" which is useful for industrial applications. The special feature we have highlighted in our project is that the arm is easily manipulated to pick and place the object & simultaneously it also avoid obstacle and follow the line which is predetermined by the person. The applied robot is fully based on the Arduino. The performance of robustness is improved at some extent. The robot is equipped with DC Motor and Sensor helps to follow the line.*

***Key Words*: Robotic arm Control, Robotics, Line Follower, Obstacle Avoidance**

1. INTRODUCTION

In the last 15 years the technology is upgraded as per the changes and need of human. Robotic Arm is one of that technology which helps humans in their Day To Day life. And for the industrial areas its very difficult to carry the large size of packages. So, we developed a system or product "Pick And Place Object With Robotic Arm". In this project the robot follows the line predetermined by the person. The should be white line or black line. Robot follows that particular path and picks up the object from that path. After that it will place the object to the particular location. At the same time the robot will avoid obstacle. This technology is useful in the industrial areas. To avoid highly repetitive and tiring task we have developed this system. This system will replaced by the all human efforts. Its bit difficult to carry the large packets the will help them with their task in less time. This robotic arm or the system is manual based system to use. Again is easy to understand. Robot which can detect and follow a line drawn on the floor. The path which is to be considered is indicated on a black surface with white line. This robot is based on the Arduino and DC Motors for the movement of the wheels. Basically, these Three are the different techniques

i. Robotic Arm ii. Line Following iii. Obstacle Avoidance. In our project we are combining the three technologies together and making the one single system which will work as the same. So, it is very easy to use the one system which is already having the three technology together instead of using the three different robot. This is how the technology is upgrading herself nowadays. We referred from the lots of papers and from google to improve the quality of our system and improve the robustness.

2. LITRATURE REVIEW

1. Paper Name: A line follower educational mobile robot performance robustness increase using a competition as benchmark.
Author: Vitor H. Pinto and paulo costa
Abstract: The Robotic Day line Follower Competition was held to check the robustness of line follower educational mobile robot which sets a Benchmark to test the proposed system. The robot works on Arduino, which is applied in the low-level control, while the high level control loop is carried out by an RPI running an object pascal application. The competition improved the performance of robustness in order to encourage to participate in upcoming events. It was prototyped with an RPI, taking advantage of its capabilities, allowing the use of higher performance sensors, when compared with the most common standard approaches based on a single 8 bit RISC micro-controller, having as disadvantage the inevitable robot size increase, which compromises in certain situations the robot maneu- verability and increases the power consumption. The robot works with the help of DC Motors, the chosen line follower sensor is the picamera and for the obstacle detection, a time-of-flight sensor was applied.

2. Paper Name: GUI based pick and place Robotic Arm for multipurpose Industrial Application.
Author: Shang-Prof.Dr. V.M Chaskar

Abstract: As the technology is growing and the world is changing humans are adapting robotics for their comfort in daily life. So we have developed a GUI based, trainable robotic arm

which is being automated for multipurpose industrial applications. The highlight of this model is the arm which is easily manipulated and has all in one solution for the certain range of pick and place application. The basic aim is to achieve the ability of commanding and controlling the arm through MATLAB Graphical User Interface (GUI) and to make the system more efficient. The designed system has been divided into 2 parts:(1) The AVR microcontroller used for programming the Central Controlling Station which has GUI access and the arm control, and (2) To programmed GUI makes the robot and user-friendly, allowing it to pick and place material over the conveyor assembly.

3. Paper Name: Design & fabrication of pick and place robotic arm
Author: Dr.T. Sunil Kumar, K. Sarath sd.Famil, A.V.S. Bhsgyesh & sk. Althaf
Abstract: This paper explains the design and fabrication of a pick and place robotic arm. The robotic arm is intended for educational purposes. In this project we are designing the robotic arm for improved accuracy by using servos to power the joints in the robotic arm. We are designing the robotic arm using CATIA software. To perform pick and place operation we have fabricated the robotic arm. Servos have been placed to produce power for each joint of the arm. Aluminum fabrication has been used for the components of theroboticarm. The torque exerting at each of the joints is going to calculate in this project and a servo with the required torque rating is being selected for each joint. C++ programming language has been used to control the movements of the servo.

4. Paper Name: Design & Performance Analysis of Line following Robot
Author: V. Saraswathi, K. Sneha, Ruby S, Shyam S.
Abstract: A lecture of robotics describes the techniques to analyze and to control the material supply in various sectors. In early days, the work of human beings was done manually. But now the technology has been developed. To reduce their work load, effort and grab some extra time various electrical and electronic applications were introduced to the world some of them are used in day-to-day life while some of them are not. Later the inventions developed and it gave birth to the evolution of robots and robotics. Application of Robot is essential in the modern world. Thus, the concept of this paper is to develop and design a

line following robot for various applications such as in railway stations, hotels, pharmaceutical industry etc.

5. Paper Name: Design and implementation of line follower and obstacle detection robot
Author:Ahmed Bendimrad, Ayoub El Amrani, Bouchta El Amrani
Abstract: In this paper, we propose a method for a line follower robot based on the instantaneous computation of the radius of curvature of this line, Infrared line sensors have been used for that purpose. The number and layout of its sensors, as well as the adjustment or the positon of the sensors play great role in the response of robot towards the line with the desired accuracy and speed. The robot is equipped with an anti-collision system, using an ultrasonic sensor, which detects and avoid obstacles in several situations, especially at line crossovers, when other robots share a common complex line.

6. Paper Name: Robotic Arm Control based on Interent of Things
Author: Shuangquan FU, Pritesh Chandrashekhar Bhavskar
Abstract: A six degree of freedom robotic arm is the most widely used mechanical device in the field of robotics. This technology can work in the various complex situations/environment and has the accuracy and precision that the human arm cannot achieve. The computer controls the motion of robotic arm but in some of complex environments, it is not possible to control the arm. Real-time remote data transmission is acts as the key to achieve precise control of the robotic arm, and if the control terminal can be realized anytime and anywhere, the robotic arm can be controlled remotely. Internet of Things (IoT) and web applications can solve these problems of near real-time data transmission as well as multi-platform realization at the control end. In this paper we present a design and implementation of a web- based control of the robotic arm using on MQTT (Message Queuing Telemetry Transport) communication protocol and ESP8266 (a network data transmission module). Through these technologies are platform independent web-based control of robotic devices can be realized, for accurate and real-time manipulator from remote environments.

7. Paper Name: Technical report of building a line following Robot

Author: Seyed Eshan, Marjani Bajesathi Arshram Vosoughinia

Abstract: The following robot is a intelligent system as a kind of provisional one, which has robot positions accurate feedbacks, toward the black or white line. In general robots incomes are voltages of the circuits and sensors voltages variations. The robot processor which is a micro AVR chip has been set to read the incomes, compare them to the predetermined amounts and send command to the motors by the driver. The task of the robot is to move and change its position toward the line in the best way. The traits of this robot comparing to the last ones in this field includes: increasing man oeuvre power with sudden way point changes, excellent and accurate robot renovation and low price for production. This robot can be applicable to perform for carrying stuff of information's between two special points like to rooms in an office or in a hospital.

8. Paper Name: Obstacle Detection and Avoidance Robot

Author: R. Chinmayi, Yogesh kumar Jayam, Venkayesh Tunuguntla, Jaydeep Venkat Dammuru, Harshita Nadella, Sai sri Krishna Anudeep Dulla, Leela Sathya kartheele Raja, Jayacharan G Nair

Abstract: This is a cost effective obstacle avoidance circuit developed in Amrita University. This robot is driven with an Arduino board controlled by an ultrasonic sensor. The obstacles are being detected at a distance of 15 cm. when it senses the right path to move with the level of distance to the next obstacle. As the risk of accidents in day to day life is increasing to avoid this factor we have introduced this technology. The Bluetooth module communicates with the device using android apps acting as a interface between them. While driving the system with 76.93cm/s speed, an accuracy of obstacle detection of 92.5 percent is being achieved.

3. SYSTEM ARCHITECTURE

The project is combination of the Three technologies together 1. Line following robot 2. Robotic Arm and Obstacle Avoidance. With the help of line following the robot will detect the line and follow the line which is predetermined by the person. With the help of sensor it will detect the line. Implementation of DC Motor it can move all around on the surface.
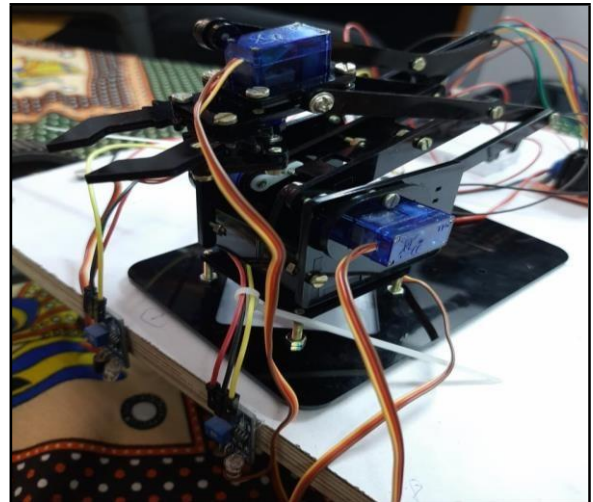

Figure 1 Robotic Arm

And the robotic arm will pick the objects from the p. ath and place it to the desired location if in between this process any obstacles occurred so the obstacle avoidance is one of the technologies which avoid the obstacle and go further. This will helpful in industrial areas to move heavy packages or stuff. Instead of using the Three different system we combined it together. It will save time and cost at the same time

4. ALGORITHM

1. Robot direction is determined by what the robot "detects"
2. If line is centered in front of the robot, go forward.
3. If the line is left of center, turn left.
4. If the line is right of center, turn right.
5. If its detects black line on both the sides (right & left) then it will stop.

5. CONCLUSION

In this paper, we have concluded the simplest & easy training methodology for multipurpose robotic arm. Combining the three technologies together are time saving for the industrial areas and others also. With the help of these technologies people find easy to delivered the packages and other stuff. Line follower will follow the line predetermined by the user and robotic arm will help us to pick and place the object and the obstacle will avoid any trouble is coming between this task. It will be very easy and helpful for everyone.

6. REFERENCES

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