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CONTACTLESS DELIVERY ROBOT FOR MEDICAL APPLICATION

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Abstract - The field of automation is now expanding into the field of medicine and has roots in almost every service-oriented industry. . The robot is programmed to move the robotic arm to the right position, pick up the right amount of merchandise, and then put the product in the queue. It is controlled by an Arduino Uno. The Arduino is programmed to halt the robotic arm when the target weight is attained, and the load cell is used to measure the product's weight. The software used is Arduino IDE, and the robot is implemented on an ATmega328p. A visual system might be added to the robot to help it recognize the product and then direct the robotic arm to the right spot. The robotic arm spins 360 degrees.

Keywords: Autonomation, Line following Robot, Cam Module, Medicine delivery system, Weightliffting

I. INTRODUCTION

The COVID pandemic has increased the need for contactless interactions, which is where robotics and automation come in. Therefore, here we propose an autonomous delivery robotic system to increase e-commerce and food delivery without disease transmission due to human contact. To verify the functionality of the entire robot, an Arduino uno board was used when creating the robot. Four-wheel drive and RF remote control are used to control the robot remotely. The robot also has an upper section for storing merchandise that can only be opened by the intended recipient.This anti-theft system eliminates the possibility of theft. Besides the lack of goods/materials, the allocation and transportation of available resources is also a concern. When the robot works in line inspection mode, the robot only needs a remote control device to turn it on or off.
a self-driving delivery system that can move small items over short distances but isn't yet capable of moving goods throughout entire cities Even though large international corporations like Amazon and DHL have long used autonomous robots to handle packages in their warehouses, the use of such robots for delivery is not a new development, it seemed quite advantageous to propose something of this nature, particularly in the eyes of such firms and corporations.

A Background:

Due to the robot's ability to deliver items to locations on the same level, a simple delivery robot system was developed to make daily tasks simpler. This project differs from the line-following robots that were used in the past in that it can be called using a smart phone from any room and may be instructed to deliver items and convey messages. The line, which is only 1.5 cm away from the robot's torso, is traced using seven infrared sensors. In this project, the robot can visit four predetermined rooms in addition to a base camp. Other characteristics of the robot include an alert system that may let people know when it has reached its destination, an obstacle sensor to prevent theft, and an emergency system that activates when the delivery box is opened. The HC05 module was utilised to control a Bluetooth robot while on the go. Robotic delivery that is autonomous and theft-proof is the project's main goal.

B. Problem statement:

The challenge of manually moving goods from one location to another must be solved. It speeds up workdays and improves productivity. An autonomous robot is designed to stop at specific locations and to recognise when mobility is required. In order to limit the delivery robot's response time to times when it detects a certain material in the trash can, an ultrasonic sensor is attached to the robot.

C. Specific Objectives:

The project will be divided into the following specific objectives that willaid in achieving the main objective.

- Design and assemble a power supply unit.
- Design and assemble an appropriate robot gear system.

II. Literature Survey

There are numerous varieties of robots with diverse features thanks to the quick advancement of technology. In a hospital in the United States, the Automatic Delivery Robots are being utilised to transport medications, juice, water bottles, etc. The room mapping on the robot's controller, the maximum weight it is capable of carrying, the robot summon method, and item delivery are the main areas of this study. The study's ultimate objective is to create a robot that can deliver items between floors of a building a robot-specific alert system that can signal when it has arrived at the desired location, A message-writing LCD and keyboard, an obstacle-avoidance sensor, and an emergency system that activates if the robot deviates from the path are all included. This study focuses on robot mapping systems that use line mapping, special remote systems that use radio frequency, message delivery systems that use LCDs, and emergency systems that employ remote controls and video cameras. [1]

The robot moves quickly across the places where the medication needs to be supplied thanks to an intelligence-based system built on sensors and indicators designated in the wards. The methodology and functionality of the proposed technique were tested on a prototype arena in the lab using a Firebird V robot, and they were found to be successful. We could prevent the transmission of infectious diseases through the challenging procedure of manually distributing medications by doing this. The suggested method's functionality and algorithm were successfully tested using a firebird V robot in the lab as the test subject. The suggested method may be seen externally by the hospital reception, is easy to use, and saves both time and human resources. We added an RFID tag to make it easier to find the right drug and prevent people from following the wrong path or choosing the wrong thing. [2]

In this study, we employ robotics technology to identify a replacement for human labour in hospitals for routine tasks like reminding patients to take their medications or eat their meals at the appropriate times and delivering tablets per a doctor's prescription It uses an IR sensor to trace the trip and an RFID reader to find each room. The robot can freely move in all four directions since a DC motor is utilised to power its movement. The Obstacle IR sensors can quickly identify any obstacles that may be present in the line

Follower idea is used to move to the next room. With the use of IoT technology, our suggested solution integrates sensors to raise the standard of patient care in the hospital. Without human interaction, we can use this compassionate robot to remind patients about their medications in the hospital. They used the ATmega 2560 microcontroller in this design, but we'll use the ATmega328p. [3]

Consumers are avoiding direct human contact due to the mandatory house lockout measures and are doing more of their online shopping for necessities like food and groceries. With the help of the Global Positioning System, the design and development of a prototype autonomous mobile robot at an affordable price has been shown (GPS). By using a password-protected container to carry the delivery package, the robot provides a safe and human-contact-free delivery. The products may be delivered without being touched, damaged, or stolen because the password protection is so accurate. During the recent coronavirus pandemic, where unprotected human contact is deemed dangerous and outdoor movements are banned, this robot can be quite helpful in delivering food, groceries, and everyday essentials to our preferred destination. They use robots for outside deliveries, but we only delivered to specific areas, i.e. medical. [4]

One of the workable methods to increase logistical capacity is the autonomous mobile robot (AMR). In the industrial setting, AMRs are typically utilised to automatically convey goods between particular locations the autonomous mobile robot is one practical way to boost logistical capacity (AMR). AMRs are frequently used in the industrial sector to automatically transport goods between specific locations. Several AMRs working in the in-patient ward is used to simulate delivery. AMR operations in various settings are studied using simulation software created on the Unity platform. [5]

In the current situation, it is necessary to limit direct patient interaction in hospitals. Robots that dispense medications are becoming more common in an effort to protect doctors and other medical personnel from the Coronavirus. Using the principle of Radio-frequency identification (RFID), which automatically recognises, and tracks tags attached to the items, we may achieve the robot's locomotion process. Distribution over categorical classifications

Thinking application, all the measured parameters will be recorded in the cloud (IoT). Using the Node MCU, all of the data will be successfully uploaded to the cloud. Using the GSM Module, a message will be

sent to the doctors if the read values deviate from the threshold. The robot will follow a non-reflective line to the patient's room and utilise RFID cards to determine the patient's room number. [6]

The speed of the DC motor can be adjusted using a variety of methods. The goal of this work is to construct an algorithm using Simulink-MATLAB that will enable us to simulate a DC motor at the specified speed. Also, the technique is built in hardware to test the DC motor's actual response. Up to 4 DC motors or 2 DC motors with directional and speed controllers can be controlled by the L298N Module. [7]

This project involves creating a robot that follows lines. It is frequently employed to transport kids when shopping. As a new commercial, malls entertainment space is being suggested. The batteries can be charged using a solar panel's DC supply or an external source's AC power. It moves manually forward, backward, left, and right while in the Manual Mode, free from the black lined path, while in the Line-Following Mode it follows the path of the black line on a suitable surface.[8]

This is done in accordance with the forward and inverse kinematics of robot arm motion. The weight borne by the arm throughout its working duration must be calculated. The pneumatic arm is to be designed to select and position cylindrical objects such as steel bars. In industry, robots are used to do repetitive jobs, minimise human costs, and provide process quality control. The essential criteria of basic arms for pick and place operations are high speed and dependability, and the robot grasping element should be inexpensive and simple in design. The fundamental operation begins with simple tasks such as grabbing, lifting, moving, putting, and releasing in a single robotic arm system.[9]

Movable robots need a data source, a means of decoding that data, and a means of acting (including movement) in sorder to react to a changing environment. These emerging themes are being driven by artificial intelligence, autonomous driving, network communication, cooperative work, nanorobotics, amiable human-robot interfaces, secure human-robot

Ergonomics, sports, and the distribution of commodities. For the next few years, these trends will continue to develop. [10].

This is the topic of our paper: the significance of developing intelligent software that allows a camera to memorise the faces of a company's employees in order to note their entrance hours and follow their movements in a crowd. The paper will be broken into two sections: fellow: first A general overview of the video surveillance system. Second, we will discuss

How artificial intelligence is used to build facial recognition.

Finally, demonstrating the significance of facial recognition in video, fourth, a web application based on AI is shown in order to improve the security camera system. [11]

With the emergence of industry 4.0 in recent years, the robot industry is destined to become a significant area for research and development. It has numerous uses in our daily lives, including research on industrial tool machines and applications in the medical and catering industries, among others. AGVs can be combined to reduce the high repeated burden and replace the cost of human labour. In the field of robotics, indoor path planning is another crucial problem. Finding the optimal path as quickly as possible is where the difficulty lies. [12]

Robotic arms are now employed in a variety of industrial settings to reduce human error and improve the efficiency, productivity, and accuracy of processes. One of the most significant benefits of using robotic arms in industry is their ability to operate in hazardous environments where humans are at risk, such as high temperatures and pressures. A robotic arm is essentially a machine that closely resembles a human hand; it is made up of a number of connections attached either in series or parallel. It can be directed by programming it to carry out a certain action. [13]

The route of the line is predetermined, and it can either be seen as a black line on a white surface or as a highly contrasted colour. When an object enters the robot's path, an Infrared proximity sensor is employed to stop it. Comparator circuits are used to set a threshold value from which logic can be applied when a light is detected. The motor driver is used to manage the motor. When the circuit's dc motor receives low

current, the motor drive supplies a high current to meet its needs. High current values are required to run the motors. Two DC motors can be controlled

Simultaneously u sing the L293D IC. It has the ability to turn the engine both forward and backward. [14]

The delivery robot can navigate obstacles while going from a starting location in a crowded environment to a destination point. When something is placed inside the bin, it employs an ultrasonic sensor to detect it, and only then does the robot move from one position to another. Also, it can aid in reducing manpower, which will help with energy, time, and the issue of a person being available when needed. We can connect to the MKR1000 using the HC-05 module to locate certain destination points in a region. [15]

CONCLUSION

As a result, we have successfully analyzed a number of research papers written by various writers in order to better understand how our system was developed. Our objective are to create an autonomous delivery robot that could move materials to the location we needed. A prototype of our autonomous delivery robot, which will carry medicine.

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