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A Multitasking Robot Team for Hospital Application in Pandemic Situation

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***Abstract*— In this fast world, more and more researches are diverted forwards automation and robotics. Robots can be considered as the important helping hand in daily work. In so many application robots are playing a vital role on terms of reliability and precision. Therefore, in past decade in every industry robots are employed for the given application. By making little modification the same robot can be employed for different application. Therefore in this paper a derived topology is proposed to have important application in hospital during pandemic situation. In this paper a multitasking robot is presented which employ line following algorithm, UV light radiation and many which may combine and called as a team which can help the frontline warriors like doctors, nurses and all in the pandemic situation without getting affected and make the area sanitized and well equipped.**

***Keywords*— Robotics, Line following robot, U.V. light radiations, Pandemic effect**

I. INTRODUCTION

The covid-19 pandemic is a worldwide pandemic of corona virus diseases. Symptoms of the covid- 19 are highly wearing, ranging from none to life-threatening illness. The virus spread mainly throughthe air when people are near each other. It spread from an infected person as they breathe, cough, sneeze or speak and enters other person via their mouth, nose or eyes. Recommended preventive measure includes social distancing, wearing marks in public, covering mouth when sneezing or coughing, use of sanitizer are taken. Several vaccines are developed and have been tested. The people w ho is being tested covid-19 positive has to be hospitalized for the cure. Doctor nurses and many people working in healthcare sector are at high risk to this highly infectious disease. They have to face many on usual challenges in the fight against corona virus. In spite of wearing PPE and having another safety precaution there is always a higher risk of getting infected by the viruses.

There are many technology's develop in term of robotics which is very much helpful in hospital application in any way. So many difficult surgeries can be possible with the help of robot and very precisely they are providing the report. Now in this pandemic situation the robot can be very helpful because right now in this situation the chances of getting infected are greater. In this case is a doctor who cure the patient will only get infected then this will be more dangerous situation. So in this type of situation we can take the help of robotic technology for multiple purposes. Multitasking robot take the data from the patient and sent to the doctor and the prescription is given by the doctor according to the data and then the robot get to its work according to the given data. So by this we can overcome the chances of getting infected which will be a great achievement in the warriors this robotic application will be a great life saving device in Pandemic situation. So for the frontline worriers this robotic application will be a great life saving device.

II. LITERATURE SURVEY

The recent trends in the robotics evaluated in different-different way. For the hospital there are many numerous approaches are available already exist. The independent complex path tracking based on the NAO robot hardware platform and an image transforming technology approaches [1] where The camera captures an image and extracts a path through a series of image processes, such as threshold, filtering, and edge detection. The path identification algorithms and its edge array were used to calculate these relative parameters that drive the anthropomorphic robot for complex route walking for autonomous tracking. Implemented on the hexapod robot Weaver, which is 33 cm tall and 82 cm wide.

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Particularly, the slope-matching method is proposed to enable it to track in accordance with the established rules when meeting the cross routes. These methods separately calculate the slope from the intersection to paths in all directions, and then, the matching rate can be obtained by a predefined matching formula in terms of choosing the best path forward. The experimental results show that the robot imposed a strong anti-interference ability to filter out the noise and have accurate complex route tracking, which is significant for the anthropomorphic robot visual guide.

These experimental tests show that using image processing can effectively extract edge information of the path recognition algorithm, distinguish the various paths, and accurately calculate the control parameters, so that the robot can follow the path of stable walking. But the camera jitter has certain interference on the track, which needs to be improved in later studies. The aim of this paper is to study a visual route guide system for a anthropomorphic robot.

A hexapod robot approaches [3] as the name suggests it has six number of leg which offers high stability and flexibility. Robot can easily run and passes from small amount of area. The direction of the robot can be easily changed at instant time. This type of robot is easily capable for the climbing stairs. Disadvantages of the hex port robot is that it need to charge it require more space the and the moving of this report is very slow. The path planning is based on the trajectory optimization algorithm CHOMP that creates smooth trajectories while avoiding obstacles. The proposed method has been tested in simulation and walking normally.

We demonstrate navigating fewer than 25 cm overhanging obstacles, through 70 cm wide gaps and over 22 cm high obstacles in both artificial testing spaces and realistic environments, including subterranean mining tunnel.

The objective of this work was to create a fast and reliable planner which allows legged robots to navigate confined spaces. This was achieved by using a deformable bounding box as an abstraction of the robot model. Moreover, this abstraction greatly simplified planning complexity in open and confined spaces enabling us to solve challenging navigation problems efficiently.

Tracked robot has a continuous chain wheel which is used for running the robot on the surface approaches [4]. So it is able to climb the slope surface and also it can pass through the small pot-holes and bumper reason. It offers a great stability and super flexibility.

And also it provides great the robot. The speed of the robot is more the disadvantages of this robot is that the weight of the report is small it need to charge it required some more amount of space.

The relationship can be obtained between the speed of two tracks and steering movements by analysis of steering principle. And it can be conclude that slip and skid has effect on robot control. Then the steering movements along the line of its edge trimming were fulfilled through controlling two tracks speed in virtual prototyping, and the simulation experiments were done based on slip and skid.

III. Block Diagram

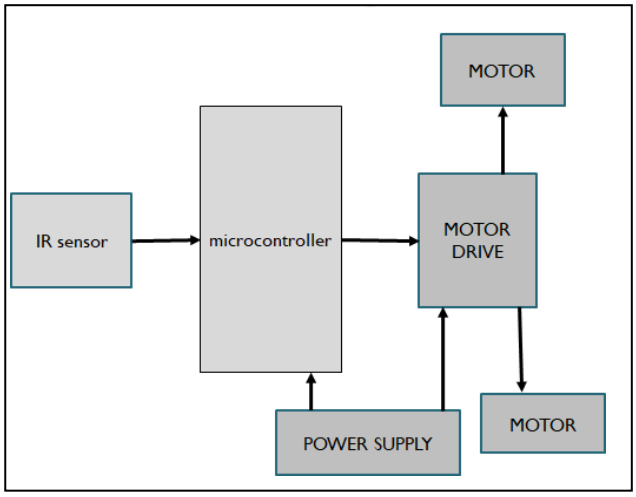

Fig- 1: Block Diagram of the Robot

Figure 1 depicts the Block diagram of the Robot prototype with minimal amount of auxiliaries which ensures the proper movement of the robot in the given working area.

The Robot consists of the following parts:

- IR Sensors (4 Nos.)
- Microcontroller (ATMEGA328)
- Battery
- Motor Driver Circuit
- Wi-Fi Module
- Gear Motors
- IC 7805

IV. Circuit Diagram

Unlike a block diagram or layout diagram, a circuit diagram shows the actual electrical connections.

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A drawing meant to depict the physical arrangement of the wires and the components they connect iscalled artwork or layout, physical design, or wiring diagram. The circuit diagram of "Multitasking Robot" Consist of 4 IR sensors, 2gear motor, motor drive, Wi-Fi module, Microcontroller, IC 7805. All the connections are shown in the diagram.

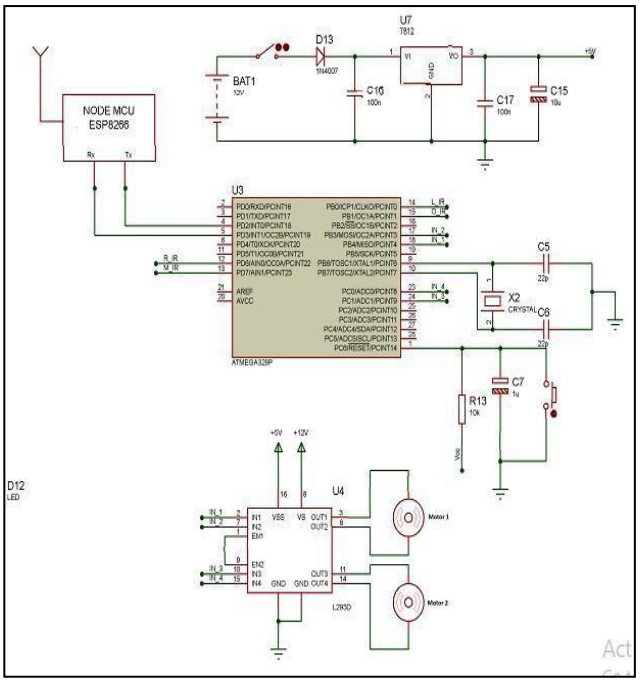

Fig-2: Circuit Diagram of the Robot

The figure shows the Circuit diagram in which all the elements of the robot can be fixed on one PCB and from that the performance of the robot can be ensured.

The PCB houses the Microcontroller and the programming of the Microcontroller done of Keil platform. For the programming of the Robot one Algorithm is prepared to ensure the perfect operation of the Robot.

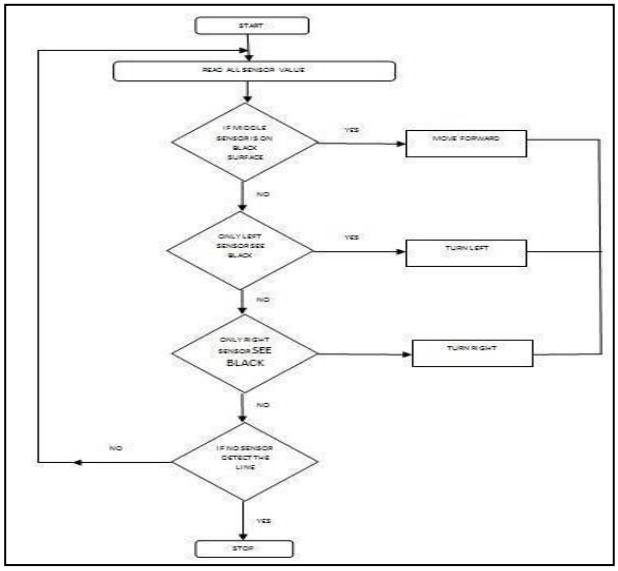

Fig-3: Algorithm of the Microcontroller

The Algorithm shown in the figure consists of the following steps:

1. Start the robot
2. Let the sensor L M R senses the line to follow the path.
3. Check whether the middle sensor is on black surface if Yes then move forward of Nothe go to step (4)
4. Check whether the left sensor is on black surface if yes then turn left and move forward if no then go to step (5)
5. Check whether the right sensor is on black surface if Yes then turn right and move forward if NO then go to step 6
6. If all sensor doesn't detect the line if YES then go to step 7 if NO then go to step 2
7. Stop

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V. HARDWARE MODEL

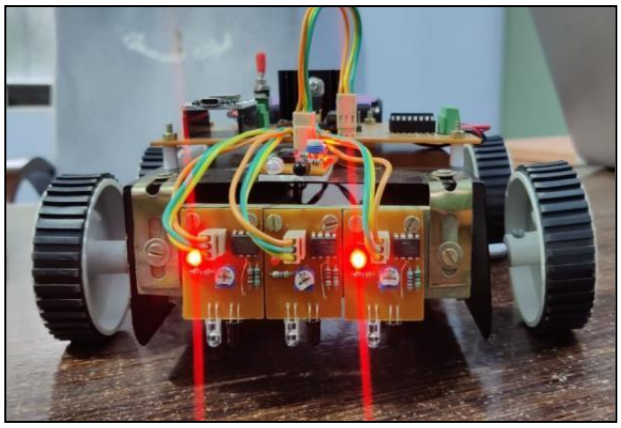

Fig-4: Hardware Prototype

The Robot uses the line following algorithm which will be used for providing the necessary essential to the patient. The necessary essential can be food, medicine etc. The robot can be play a major role of nurse and give the necessary and essential to the patient and resulting as a life saving device in hospital application.

The command is been given by the doctor with the help of application which is installed in the mobile and by this application the doctor can you command to robot from his office itself. The Robot is also capable of measuring the heart rate and oxygen level of the patient. The measured heart rate and oxygen level is directly shown to the doctor on his mobile phone and according to it a doctor gives the Command to the robot.

The doctor can give command to the robot from his given remote operating devices and then the performance of the robot can be verified. To confirm that we have developed the Wi-Fi connection and through mobile phone the command window is prepared which is the set of the command.

Once the proper connection with the phone is developed the given robot perform the given command over the working area.

VI. CONCLUSION

In This paper we have tried to show that the multitasking robot team can be very useful in a pandemic situation in the health centre. It can play an important role of nurse and provide the necessary essentials to the patients like food medicine etc. It can also measure the heart rate and oxygen level of the patient. It results as the life saving device for the frontline warrior in hospitals.

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