

# Line Follower Robot Arduino (using robot to control Patient bed who was infected with Covid-19 Virus)

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**ABSTRACT**— In light of the spread of the Corona pandemic in the world very quickly and for the small number of medical cadres in hospitals and the growing number of terrifying cases and to reduce the contact between the medical cadres and those infected with the Corona virus, therefore we had to manufacture a robot on the form of a special bed to transport the patient this robot does not feel tired and not affected by emotions. This robot is not exposed to the disease. The task of this robot is to transfer the patient from the ambulance to the stone room through the Arduino program and walk along the lines installed on the hospital floor. In this process, we will not need human intervention and at the same time we protect the lives of medical personnel from the risk of injury. With this virus

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and the user or the beneficiary of this process can read it very clearly through the sensor site or it is sent electronically through the network. Today, all known sensors convert the measurement of environmental and physical factors into electrical ones. Of course, mechanically, the robot consists of two rear wheels rotated by a process that runs on a continuous current, but the front wheel is free movement and depends in its movement and push it on the strength of the two rear wheels. Also, it contains an Arduino board and a sensor that senses the line on the floor and many continuous attempts are made on the robot to achieve the highest ratio on following the line on the ground from the starting point (A) to the access point(B).

## I. INTRODUCTION

In the role of scientific development taking place today in this world, robots have become one of the basic requirements for use in various fields of industry, but that the use of the robot was not limited to industry alone, but also entered in the field of restaurants, laboratories, hospitals, educational fields, etc. because the robot works with very high accuracy and reduces human interference and human errors in a way Large and of course in the recent period witnessed great competition between companies and restaurants to distinguish diversity and development in order to attract consumers, whether in terms of providing service or quality. Using the security can reduce the operating costs that the project owner incurs. And that is by creating a robot that makes two or three people to the fullest and with very high precision. These robots cannot be tired or exhausted, nor are they affected by human emotions. The work of these robots is through a sensor that follows a line drawn on the ground of the place. This line can be straight or oblique. This robot can perform its tasks in the most difficult and worst conditions without feeling any fatigue. These are usually two-wheeled robots, a sensor, and an left sensor. The sensor (ground sensor) is a device that explores and obeys some types of orders from the environment around it. These orders can be like (temperature, humidity or other environmental factors) and the output is by means of a signal that is sent to the screen

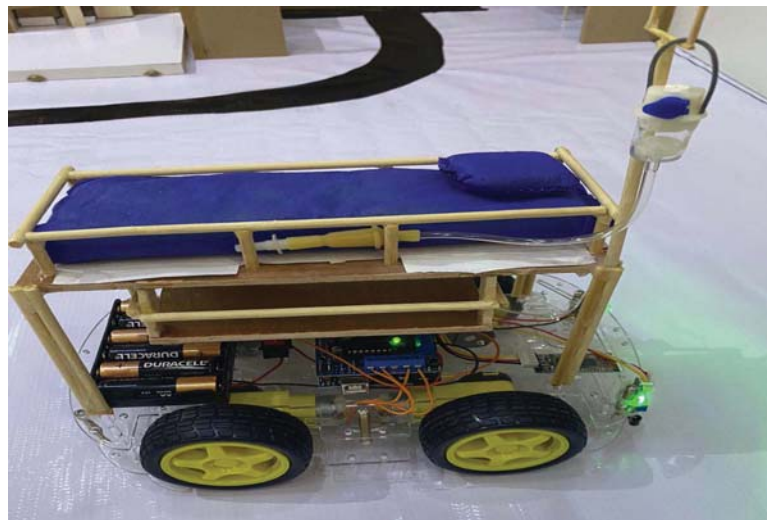


Figure (1) illustrates robot to control Patient bed who was infected with Covid-19 Virus

## II. METHODOLOGY

In this chapter we will talk about two main parts. The first part talks about the parts of the robot it. As for the second part, it talks about the Arduino program.

## 1-Introductory overview of robot parts:.

### A- Arduino uno board:.

This piece is the mind that manages this robot by giving it movement orders forward or backward or pausing and transferring to self-driving by tracking the path and the robot can be programmed easily by downloading the code to the Arduino board and downloading the code to it from the personal computer through a program Arduino.

### B- DK Electronics:.

This panel is the mechanical plate of the robot, and through this plate, the special phases are connected to move the wheels of the robot, and it can connect 4 stages on it easily, where two motors can be connect on the entrances (M1-M2) and connect other developers on the entrances (M3-M4) As for (M + -GND) These ports are responsible for the energy input, as this board and the Arduino board can be supplied through these ports and contain three transistors. Also, sensors are connected through this panel through the ports near the entrances (M3-M4).

### C- Bluetooth chip :.

It is a piece that connects the Arduino board and is responsible for the wireless side in terms of controlling the patient's bed through its Bluetooth connection. The program must be (Android) phone software, where it is less expensive than( IOS) phones.

### D- IR Sensors:.

The infrared sensor is the receiver sensor, when an order is issued, by pressing a specific direction button through the mobile control program, it will send signals to the encoded infrared sensor and the sensor will receive these signals and send them to Arduino. Very much affected by sunlight. When exposed to sunlight, the robot will operate continuously and non-stop.

## 2-Introduction to the Arduino language:.

It is a language through which you can speak with electronic devices or in a more correct statement through this language it is possible to give different and multiple orders to electronic devices such as movement in various directions or to measure climate conditions or control all home and institutional devices and of course all these orders or the Arduino language depends on the Arduino electronic board or It is also called the( Arduino board), and in general, programming languages such as the Arduino language or the language of (C Plus Plus) and others are considered a compromise in understanding between humans and machines.

## III. TEST AND RESULTS

After we talked in the previous chapter about the stages of manufacturing a robot and the elements involved in manufacturing it now we will talk in this chapter about three

important sections which are the process of downloading the code to the robot and the way to link the robot to the mobile and the process of walking the robot on the line automatically and manually through the mobile.

### 1- Connect the robot to the computer and how to download the code:.

We connect the robot to the computer with a USB cable, Of course, without operating the robot from the power switch installed in the robot, the computer works to supply the robot or the Arduino piece with power.

### 2-The first test:.

We printed the line with high specifications and a fixed width of (5.5) inches, and the result was that the robot tracked the path very accurately, as shown in Figure(1).



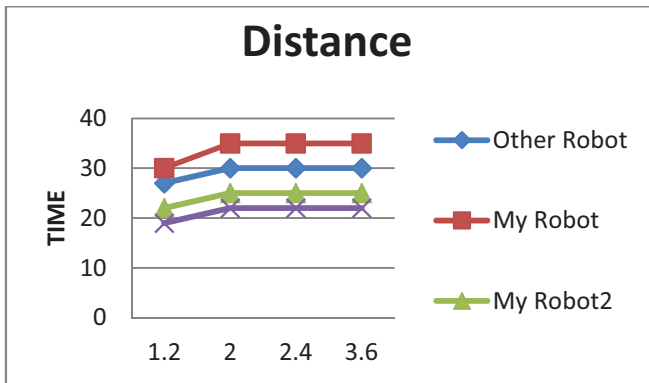
Figure( 2) shows the progression of a bed-shaped robot to transport Covid-19 patients on the printed line.

So, in straight lines, my robot proved faster to pass the distance from the other robot and with less time than the other robot, as shown in the above graph.

### 1- Case (1):. Curved path

TABLE I

Distance covered	My Robot(Time required)	Other Robot (Time required)
1.2 m	22 sec	19 sec
2.4 m	30 sec	27 sec



The diagram shows the action of the two robots in italics

#### IV. CONCLUSIONS AND RECOMMENDATIONS

when transporting a patient with corona virus (covid-19) from the ambulance to the patient's quarantine room. the robot will track the path drawn from the hospital entrance to the stone room and when it encounters any obstacle it does not stop because it is programmed to track this path and here was the problem and therefore we have solved this problem by programming the robot in a way that allows us to stop it from moving itself and convert the movement to manual movement when we see any obstacle in front of it, of course, it is possible in the future to develop from this project by adding a sensor to sensitize things to the robo bed for transporting patients, adding an oxygen meter scale and linking this scale to a mobile system, i.e. sending a message to the doctor informing him of the rate of oxygen every 24 hours.

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