SMART ROBOT FOR INFECTIOUS DISEASE

N. Prasad [1], Anfal. G.R [2], Dhamin Raani. R[3], Gowri. M[4].

Prasad, Electrical and Electronics Engineering, Nandha College of Technology, Tamil Nadu, India

Dhamini Raani, Electronics and Communication Engineering, Nandha College of Technology, Tamil Nadu, India

Gowri, Electronics and Communication Engineering, Nandha College of Technology, Tamil Nadu, India

Anfal, Electronics and Communication Engineering, Nandha College of Technology, Tamil Nadu, India

ABSTRACT

A unique syndrome virus is Infectious Disease. Close contacts of those who are infected propagate the virus. This is the primary cause of the virus's pandemic. For doctors, dealing with patients is the most difficult task. Affected individuals require timely care and adequate drug ingestion. As a result of the repercussions, it spreads among the affected persons. So, instead of nurses, this proposed technology acts as a robot to solve the difficulties. Robots are specially constructed devices that do devoted and repetitive tasks at fast speeds, with high precision, and for long periods of time. Advanced programming, manipulators, and sensors, among other things, are used to control these actions. Black line follower robots with sensors are one of the most basic robots for following black lines on white backgrounds or vice versa. It has great promise for providing medication, food, and clothing. It is crucial in determining the amount of medications to administer to the patient. It is more beneficial to frontline practitioners in terms of protecting them against the minute corona virus. Pandemic conditions have a significant impact on global economic output. The proposed nursing robot will contribute to the reduction of social transmission. It also reduces the number of severe cases and the degree of illness localization. Medical cadres hospitals and the increasing number of scary cases necessitated the creation of a robot to reduce interaction between medical cadres and patients infected with the virus.

Index term —Microcontroller,   Medical personnel, Line follower robot, sensor

INTRODUTION

The In every way, the pandemic sickness has impacted the world and the lives of millions.It completely altered the world. Pandemic sickness is easily transmitted from one person to another, and the majority of individuals die as a result. It altered how people interacted with one another and how they communicated with one another. In the event of an outbreak, the WHO (World Health Organization) strives to develop a vaccine as well as provide guidelines and rules to follow in order to lower the chance of contracting the virus. However, it is also humanity's responsibility to assist stop the outbreak and figure out how to contain the pandemic, particularly in hospitals. The virus reduction is a crucial task. In everyday life, humans encounter numerous problems. The virus is spread through direct contact with an infected person's respiratory droplets. Individuals can potentially become infected by touching virus-infested surfaces and touching their faces (e.g., eyes, nose, mouth). The virus can live on surfaces for several hours before being killed by basic disinfectants.

Hundreds of thousands of people have died as a result of the pandemic. Pandemic disease vaccines are both safe and effective. Vaccines train our immune systems to battle pandemic disease-causing viruses. It has become the most significant global health catastrophe since the epidemic era. The pandemic outbreak has proven to be a global tragedy unlike any other. The virus has affected billions of people around the world in a variety of ways, including physically, psychologically, and socially. The pandemic sickness has been declared by the World Health Organization (WHO). To stop the virus from spreading further, a global concerted effort is required. A pandemic is described as "an epidemic that spreads across a large geographic area and affects an unusually large proportion of the population." The world's most recent pandemic was the 2009 H1N1 flu pandemic. Some people who become infected will not display any symptoms. Those who do experience symptoms may have a mild to moderate condition that is self-limiting. People of all ages are infected by the virus that causes.

Robots were crucial in preventing the virus from spreading in hospitals. Robots, on the other hand, will prevent illness from spreading from one person to another, not just in the case of the COVID-19 epidemic, but also in the case of future unforeseen viral infections that could spread over the world. Since the start of the COVID-19 outbreak in Qatar, 13000 nurses have treated tens of thousands of patients. These nurses had to deal with a lot of stress and problems in order to give all of their attention to patients with COVID-19 and other illnesses. With such a large number of nurses on the job, it only makes sense to build a robot that can help the nurses with some of their responsibilities. Designing a robot that can work in hospitals from afar and deliver products to patients while sanitising surfaces and detecting temperatures is a highly effective way to avoid corona virus outbreaks while also saving time for healthcare professionals. The goal of completing the project is to assist the people of Qatar and the rest of the globe by reducing corona virus transmission. We were also drawn to this endeavour by a desire to aid others. A service robot is an autonomous robot that assists humans by doing repetitive and potentially risky jobs. In the health industry, using a service robot can aid with chores like bringing food, water, and medication, as well as reducing the danger of infecting healthcare employees. These robots are not affected by human emotions and cannot be tired or exhausted. For infected patients, the robot works around the clock. A robot should never make a mistake. Food and pharmaceutical delivery to pandemic disease positive hospital patients has remained a concern. It can be minimised by using a robot. This could lower the risk of infection among hospital employees.

SYSTEM ARCHITECTURE

Our proposed smart nursing robot is an Assistive Bots, which is based on the 'Line Following Robot' concept. One of the most crucial features of robotics is line following. The Line Follower robot is capable of detecting and following a line drawn on the floor. The robot that follows a line The path is usually set and can be visible, such as a black line on a white surface with a high contrasted colour, or invisible, such as a magnetic-filed. With its Infrared Ray (IR) sensors positioned beneath the robot, this type of robot should undoubtedly detect the line. Following that, data is sent to the CPU via specialised transition buses. As a result, the CPU will determine the appropriate commends and then transmit them to the driver, allowing the line robot to follow the path. The line location is captured using sensors positioned on the robot's front end. The robot employs various sensors to recognise the line, which helps it to stay on track. Its movement is accurate and versatile thanks to the array of sensors. To regulate the movement of the wheels, the robot is powered by DC gear motors. The Arduino is used to run and apply algorithms that control the motors' speed and steer the robot smoothly along the line. The robot's impediment is detected using an object sensor. There are six total types of movement of robat.Left motor is stopped and right motor moves in forward direction for left movement of robot.

- For sharp left movement, the left and right motors are moved in reverse and forward directions, respectively.

- For sharp right movement, the left/right motors are moved in a forward/reverse motion.

Table no: 1 Motor Rotation

S.N	ROBOT MOVEMENT	MOTOR ROTATION	
		LEFT	RIGHT
1	Left	STOP	ON(Forward)
2	Straight	ON(Forward)	ON(Forward)
3	Sharp Left	ON(Reverse)	ON(Forward)
4	Right	ON(Forward)	STOP
5	Sharp Right	ON(Forward)	ON(Reverse)
6	Reverse	ON(Reverse)	ON(Reverse)

HARDWARE DESIGN:

The goal of this initiative is to lower the risk of pandemic sickness. Pandemic infections can cause unpredictability. We use robots to reduce virus. We can reduce intimate contact with infected patients by utilising a robot. Nourishment, medicine, food, and other essentials are delivered to patients with infectious diseases. Robots are quite helpful. The Arduino microcontroller is in charge of the robot's movement.
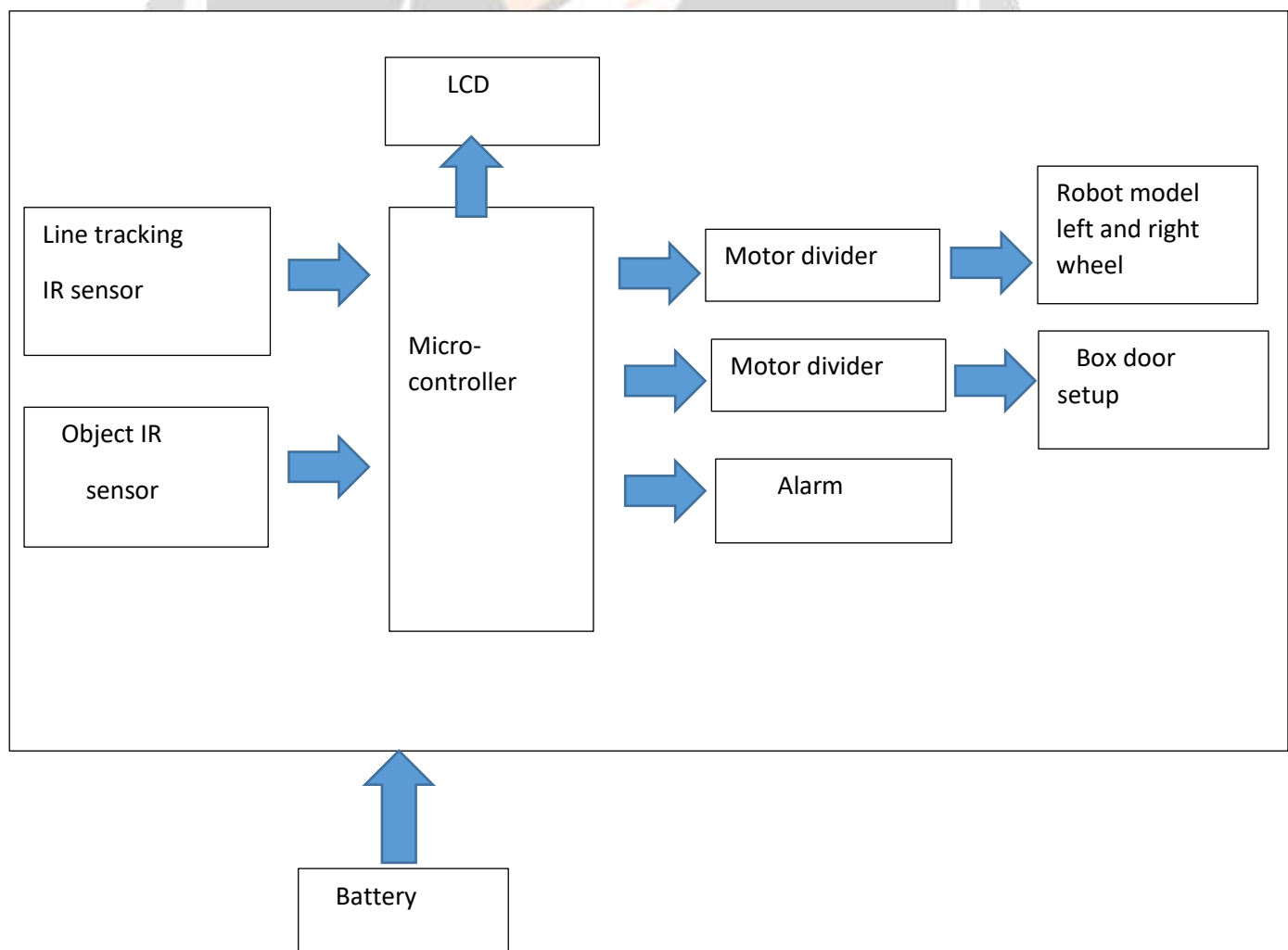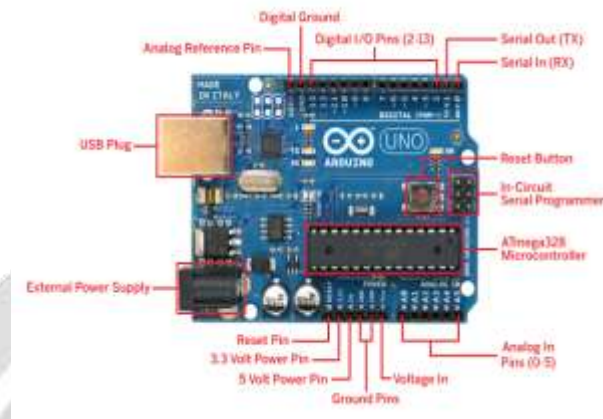
Fig 1: Block diagram

1. Arduino microcontroller:

 The Arduino software can be used to programme the Arduino. It has a simple programming language of its own.

Fig 2: Arduino microcontroller

2. Sensor:

 Each sensor has a distinct role, and the sensors are utilised to transmit specific values to the system's brain, which it uses to make decisions. Sensors are divided into two groups:

- Line detector sensor
- Object sensor

2. a. Line detector sensor:

- One of the most crucial features of robotics is line following. The Line Follower robot is capable of detecting and following a line drawn on the floor. The two infrared sensors are situated on the robot's front, with the diodes towards Earth.
- When a robot is placed on a fixed path, it detects the line and follows it. The outputs of the two sensors determine the robot's mobility direction. The robot travels forward when the two sensors are on the same path.
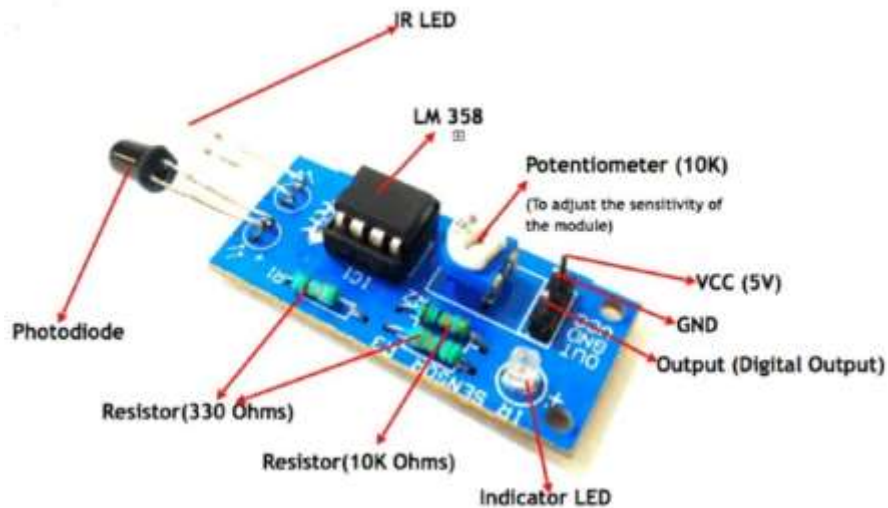
Fig 3: Line detector sensor

2. b. Object sensor:

Avoiding Obstacles A robot is an intelligent device that can detect and avoid obstacles in its path by moving itself in a different direction. Avoiding Obstacles A robot is an intelligent device that can detect and avoid obstacles in its path by moving itself in a different direction. This design enables the robot to travel in an unfamiliar environment while avoiding collisions, which is a must for any robot. If the robot encounters an obstruction, it adjusts direction and continues on its way. Robot that avoids obstacles using an Arduino

Fig 4: Object sensor

3. Motor driver:

- ➢ A motor driver is used to drive a motor forward and backward. Robots make use of motor drivers. A motor driver is a device that allows a motor to move in response to commands. A system with a motor is known as a motor drive. A system with multiple operating speeds is referred to as an adjustable speed motor drive. Robots make use of motor drivers. A motor driver is a device that allows a motor to move in response to commands. A motor driver is used to drive a motor forward and backward.

- ➢ A motor driver is unquestionably something that causes the motor to move in response to commands or high and low inputs.

Fig 5: Motor driver

CONCLUSION:

The line robot's design and construction were planned. The Arduino microcontroller is used in this design. Using simple DC motors and three wheels, the robot moves left, right, and forward on the black line of the white surface. The motor driver circuit regulates the speed of the motors. The robot's movements are controlled by the Arduino microcontroller's sensing signal from IR sensors. Three infrared sensors detect the colour. At the same time, the Robot follows a certain line course. This line follower robot with several modes compatibility performs admirably as intended.

REFFERENCE

[1] aga dayini yapathi1, Bhargavi endlimarri, Karishma Sk3, Kavya Ch4," Smart edicine Box using AR 7 icro controller", International Research Journal of Engineering and Technology(IRJET), Volume: 03 Issue: 05 I ay-2016.

[2] Alaiad A, Zhou. The determinants of home healthcare robot's adoption: an empirical investigation. Int J ed Inform.2014.

[3] Anderson D. .S. atent o. 7,938,413. Washington, DC: .S.atent and Trademark Office;2011.

[4]   Bateni H, aki BE. Assistive devices for balance and mobility: benefits, demands, and adverse consequences. Arch hys ed Rehabil.2005

[5]   Beer J, Takayama . obile remote presence systems for older adults: acceptance, benefits, andconcerns. In: roceedings of the6th international conference on human-robot interaction. AC ;2011.

[6]   Bouzembrak, Kliche, Gavai, A., & arvin, H. J. . (2019). Internet of Things in food safety: iterature review and a bibliometric analysis. Trends in Food Science & 570 Technology, 94, 54-64. https://doi.org/10.1016/j.tifs.2019.11.002

[7]   Chou HK, an SH, in IC, Tsai T, Chen CC, Woung C. A pilot study of the telecare medical support system as an intervention in dementia care: the views and experiences of primary caregivers. J urs Res.2012.

[8]   eIrajS Amirifg K.Venkatachalama, A.Devipriyab, J. anirajc, A.Ambikapathy , .Sivaramd "A novel method of motor imagery classification using EEG signal" Elsiever, Artificial Intelligence in medicine. 103, 01787. https://doi.org/10.1016/j.artmed.2019.101787

[9]   Heerink , Krase B, Evers V, Wielinga B. Assessing acceptance of assistive social agent technology by older adults: The Almere model. Int J Soc Robot.2010.

[10]   Raga avima1, r. G. SubhramanyaSarma, "An iot based intelligent medicine box", IJCS C, Vol. 4, Issue. 10, October 2015, pg.186 -191.

[11]   Suprem, A., ahalik, & Kim, K. (2013). A review on application of technology systems, standards and interfaces for agriculture and food sector. Computer Standards & Interfaces, 35 (4), 355-364. https://doi.org/10.1016/j.csi.2012.09.002

[12]   Viral Shah, Jigar Shah, ilesh Singhal, Harsh Shah & rof.   rashant

apdhyay, "Smart edicine Box", Imperial Journal of Interdisciplinary Research (IJIR), Vol-2, Issue-5,2016.