ISSN: 2454-9940

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

E-Mail :
editor.ijasem@gmail.com
editor@ijasem.org

www.ijasem.org

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

MEDICINE DELIVERY ROBOT USING IOT

DR S PRADEEP[1], M. LAASYA REDDY[2], M. HARIKA[3], KUSHNUMA[4], V. AARTHI[5]

ABSTRACT: In view of the safety and medical concerns of patients and the persons delivering medicines on a timelyfashion, robotic delivery of medicines in wards of hospitals using artificial intelligence techniques is investigated in this work. The robot traverses the wards where the medicine needs to be delivered using intelligence-based algorithm based on sensors and indicator marked in the wards, in the best possible shortest path and exits the ward. The program would ensurethat the robot does not collide with other robots and humans in the path and also would search for the indicator where the medicine would have to be delivered on a timely fashion. This way, we would ensure that contagious diseases are not transferred when medicine delivery is done and also compared to the same with laborious process being done manually. This proposed method functionality and algorithm is tested on a prototype arena and was proven to be successful using a firebird robot in the laboratory for the algorithm. The proposed method saves time and also human resources and is easy to operate with external monitoring from the hospital reception.

Keywords – Medicine delivery, IoT, Healthcare, RFID, Data

INTRODUCTION

Autonomous driving systems will become the state of the art technology in the future in house hospital medicine delivery. The Robotic Medicine Delivery systems (RMDS) are similar to autonomous driving systems that would be normally seen to be implemented at the basement of shopping malls, tech parks, apartments and other commercial buildings. The major parameters are operational speed, accuracy, safety, reliability, cost-effectiveness, convenience, space; efficiency and eco-friendliness play a key role in these kinds of systems. Hindrance in the delivery of medicine to some patients is an operation which is challenging. In these operations, the research has been considerably low due to the lack of trained experts for the RMDS to do its job efficiently. The most important parameter that would decide the logistics would be the gross time taken by a vehicle to enter and deliver medicine. If this time is kept as low as possible, then entire logic involved in the delivery of the medicine and health issues in diseases like COVID-19 (Corona Virus Disease) would be minimized. Nayak et al. [1] have discussed the robotic valet parking system with four parking slots and have shown how a robotic valet would park the vehicle efficiently. Though the technology developed is interesting, it might not be a very cost-effective method that can be used. But, the theme developed can be used for hospital systems. Conner et al. [2] explained simulating the valet parking without actual the valet based on a synthesis algorithm that generates

PROFESSOR& HOD[1], DEPARTMENT OF IOT, MALLA REDDY ENGINEERING COLLEGE FOR WOMEN, HYDERABAD
UGSCHOLAR[2,3,4&5], DEPARTMENT OF IOT, MALLA REDDY ENGINEERING COLLEGE FOR WOMEN, HYDERABAD

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

automaton that governs the execution of the local policies; however, the continuous evolution of the system induced by the local policies governs the state transitions within the automaton, the approach mainly being verified using a simulation environment. Min et al. [3] had carried out the autonomous driving and parking experiments in the real test area on autonomous vehicle valet parking service where they have remodelled steer, brake, accelerator and shift of the electric vehicle using three motors for steer, brake and accelerator and a lower controller which is an interesting theme for the control of autonomous vehicles. Stanek et al. [4] discussed the advanced driver assistance systems which become more sophisticated with increased functionalities as it becomes more important to acquire accurate geometric knowledge of the environment that the vehicle is driving in. Thus perception will increasingly move to a 3D world. Current state-of-the-art imaging lies to deliver high resolution point cloud data which provide dense 3D images of the environment. Object detection and tracking algorithms can process the 3D point cloud to accurately describe the location and movement of objects in the environment. Though in the literature there has been a considerable amount of work, there is not much work found where the theme of autonomous vehicles is taken to hospitals for medicine delivery through the RMDS to minimize the time delivery of medicine. The prototype of robot was a firebird [5] used for testing the execution of the plan. Keeping this in view, the functionality of RMDS is a challenging task for an autonomous system if an arena of a hospital ward is considered. Although similar work has been developed for tuberculosis patients[6]. The manuals of e-Yantra have been used for setup of the test bed as indicated in [7].[8,9] have discussed how to use IOT and Artificial Intelligence techniques in the scenario of COVID-19. Marat et al [10] investigates the control algorithms under the influence of varying dynamic parameters. Emily[11] illustrated about tele-robotics in stroke care, although a direct integration of these concepts is not seen to the work, this paper is being cited that a leaflet from tele-robotics can be taken and used for improving the aspects of mobility. Margaret et al[12] reviews applications of robotics in nursing and implications in nurse education. Wireless sensor networks usage and performance improvements with integration in robotic environments are said by Hailong[13]. Piver[14] described how robot technology is used in Gynecology and an important take away point from this is the usage of robot assisted devices in surgeries as well. Russell[15] discussed about the common safety and regulatory compliance issues associated with robot architectures. The application of the studies on autonomous mobile robots to minimize delivery time is an important issue in view of persistent delays that exist with the system and speed of operation. The method proposed can be extended to tuberculosis patient wards and other dangerous diseases which require isolation and proper care of patients without physical contact. The contactless delivery system through RMDS is a strategic method for better delivery of medicines in a timely fashion which is in the development stage. The development of this kind of system will not help hospitals, but the technology can be leveraged to other areas of research like parking, missions in outer space where physical contact needs to be avoided.

LITERATURE SURVEY The synchronization between IoT and robotics, It talks about the technologies in IoT that would benefit the robotics domain. The advent of Cloud Robotics and its role in aiding robot functions like sensing, manipulation, and mobility.IoT-aided robotic applications are discussed in various domains like health-care, military, industrial plants and rescue operations. This concludes by considering the use case of an Intelligent Transportation System

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

endowed by an IoT-inspired architecture.The introduction of Robots and IoT made the industries and firms fully smart automated and digitalize [1]. In other perspective, robots were also serving medical sectors since many years successfully in heart surgeries, fighting cancer cells etc. and making the footprints for further research and developments. An attempt is made to highlight the methods and applications of Robots & IoT in large extent in medical and societal areas to safeguard from corona virus [2].The path to a mature development of IoTaided robotics applications requires several pivotal issues to be solved, design methodologies to be consolidated, and strong architectural choices to be discussed, In particular, the present contribution is four-folded. First, it provides a solid state of the art on the main topics related to IoTaided robotics services: communication networks, robotics applications in distributed and pervasive environments, semantic-oriented approaches to consensus, and network security [3]. In this paper, an idea to improve the current status of health care worldwide through automation and robotics has been propounded. Health Care & proper monitoring is the most integral part of medication as it is the recovery stage of the patient [4]. The comprehensive requirements for updating the healthcare system, this presents a novel system framework and designed a IoT robot which based on cloud technology and Internet of Things. The system based on multi-core embedded system,communication protocol, and cloud technology [5].The experimental results show that the well performance and feasibility of the system.The study in recent advancements in technology and the availability of the Internet make it possible to connect various devices that can communicate with each other and share data. It discusses a new semantic model for patients' e-Health. The model named as makes use of layers; the sensor layer, the network layer, the Internet layer and the services layer. All layers cooperate with each other effectively and efficiently to provide a platform for accessing patients' health data using smart phones [6]. The paper presents [7], finding the path using line following method which identifies the track with the help of two infrared proximity sensor and using cards identifies the room number of the patient. It can also monitor the pressure and temperature levels of the patient and record it in the hospital patient database by incorporating a pressure and temperature sensor in it which is an added advantage in this model. This shows that it provide stable and reliable system and keeps the manufacturing cost low.The performance analysis of scheduling multiple robots for hospital logistics. A fleet of autonomous mobile robots are used in the hospital for the delivery service [8]. To increase the efficiency of using multiple robots, an appropriate task allocation algorithm is required. The indoor service robot which has the capabilities to follow human commands and handle emergency is designed and implemented. A location algorithm of the robot based on the wireless sensor network is proposed. Stability of the proposed home monitoring system in longtime monitoring tasks is tested [9]. Automatically classifying affective and informative. Various websites today provide medical information and this information can either be affective or informative, contains information which are facts and information which are opinions from a fellow patient, doctor or nurse who try to analyze the given query and give an opinion [10].

EXISTING SYSTEM:

In the existing system of the smart medicine remainder box, it will blink led, based on the medicine number along with a buzzer. In this also they have used the Arduino and an RTC module to get the current time and an LCD display and push buttons to set and observe the time. When it’s time to take medicine, the buzzer will

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

alarm along with the led blink. The main drawback in this is if the person is far away from the system, he won't get to know that it is medicine taking time.

DRAWBACKS:

- If the person is far away from the system, he won't get to know that it is medicine taking time which might affect the person's health.

PROPOSED SYSTEM:

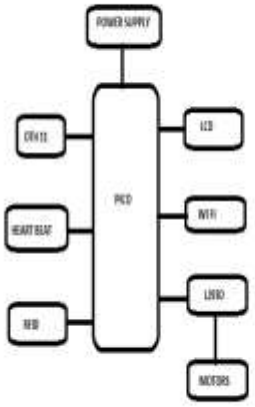
Our project MedRobo is an alternate solution to the difficulties faced by the hospital staff in treating the coronavirus positive patients, who raised this problem. It delivers the medicine to the patient and checks the important parameters of the patient such as temperature, heart rate without the involvement of humans or by avoiding the direct contact of hospital staff with the patients. By using the reference parameters which are given to the system, will compare with the measured parameters. Then the recorded parameters data will be sent to the doctors through the IOT platform. The movement and finding the path to patient location is done through a Bluetooth and with RFID tag. The medical staff will be aware whether the medicine is delivered or not.Also can reevaluate and view the datas of individual patients after a particular interval of time to make sure that all those patients suffering from coronavirus are feeling better and are in good condition.

- Though the person is far away from the system, it reminds through SMS is sent through GSM so that he can make time to reach and take pills.
- It has the provided with a voice circuit module, which speaks which medicine has to take at this time

APPLICATIONS

- It can be useful for anyone who forgets to take pills while working.
- It can be used for those who goes far away from home and forgets to take pills with them.
- It can be helpful as it has provided with a voice circuit module that speaks the medicine number when it is time to take that pill.

BLOCK DIAGRAM



DRIVER CIRCUIT (L293D) L293D IC generally comes as a standard 16-pin DIP (dualin line package). This motor driver IC can simultaneously control two small motors in either direction; forward and reverse with just 4 Microcontroller pins (if you do not use enable pins) It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor. In a single l293d chip there two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller.There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch

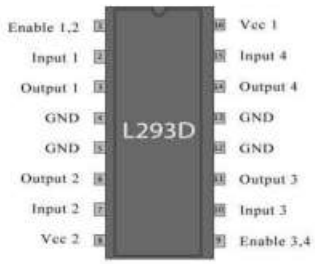


Fig: Driver CircuitL293D

TEMPERATURE SENSOR Temperature is the most-measured process variable in industrial automation.Most commonly, a temperature sensor is used to convert temperature value to an electrical value. Temperature Sensors are the key to read temperatures correctly and to control temperature in industrials applications. A large distinction can be made between temperature sensor types. Sensors differ a lot in properties such as contact-way, temperature range, calibrating method and sensing element. The temperature sensors contain a sensing element enclosed in housings of plastic or metal. With the help of conditioning circuits, the sensor will reflect the change of environmental temperature

Features: 1.Calibrated directly in Celsius (centigrade) 2. 0.50 C Ensured accuracy (at +250 C) 3. Suitable for remote applications 4. Operate from 4 to 30 V

SPO2 SENSOR Pulse oximeter is a simple, relatively cheap and noninvasive technique to monitor oxygenation. It monitors the percentage of haemoglobin that is oxygen-saturated. Oxygen saturation should always be above 95%, although in those with long-standing respiratory disease or antibiotic congenital heart disease, it may be lower, corresponding to disease severity. The Oxyhaemoglobin dissociation curve becomes sharply steep below about 90%, reflecting the more rapid desaturation that occurs with diminishing oxygen partial pressure PaO2 . On most machines the default low oxygen saturation alarm setting is 90%.Pulse oximeter does not provide information on the oxygen content of the blood or on ventilation. Thus care is needed in the presence of anaemia and in patients developing respiratory failure due to carbon dioxide retention

RFID READER AND TAG The reader, functions similarly to a bar-code scanner; however, while a bar-code scanner uses a laser beam to scan the bar-code, an RFID scanner uses electromagnetic waves. To transmit these waves, the scanner uses an antenna that transmits a signal, communicating with the tags antenna. The tags antenna receives data from the scanner and transmits its particular chip information to the scanner The data on the chip is usually stored in one of two types of memory. The most common is Read-Only Memory (ROM); as its name suggests, read-only memory cannot be altered once programmed onto the chip during the manufacturing process. The second type of memory is Read/Write Memory; though it is also programmed during the manufacturing process, it can later be altered by certain devices RFID tag is a small device which stores and sends data to RFID reader. They are categorized in two types – active tag and passive tag. Active tags are those which contain an internal battery and do not require power from the reader. Typically active tags have a longer distance range than passive tags. Passive tags are smaller and lighter in size than the active tags. They do not contain an internal battery and thus depend on RFID reader for operating power and certainly have a low range limited up to few meters

CONCLUSION IOT is a combination of various technologies that empower a diverse range of appliances, devices and objects to interact and communicate with each other using different networking technologies. The Internet of Things has made the lives of the human being straightforward and comfortable. It has

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

made the lives of the people very convenient.Whereas on the other hand with the increased use of the Internet of Things the treat for security and safety has also increase. So we should be careful while providing the details on the Internet platform. However, we can see a lot of necessary steps are being taken but still keeping your data safe with you is essential.So far, much of the information found on the Internet is supplied by human beings. In case of IOT smart objects provide the information. There exist a wide variety of applications based on IOT, including healthcare, which is the primary focus of this work. Healthcare systems makes use of interconnected smart devices to establish an IOT network for healthcare analysis, patient monitoring and automatically identifying situations where a physician involvement is needed.This research helps to reduce human to human contact in hospitals and thus prevents the doctors and medical staff from getting affected by Corona virus. The time of both patients and doctors is saved.

FUTURE WORK Future we can have an intelligent system which could perform problem solving tasks such as diagnosing the patient in the doctor's absence and if anything suspicious is detected it would provide required solution. The robot can be so designed that it can monitor as many patients admitted to the particular ward. The database of the hospital can be linked with robot to track and register the entry and exit of patients. Robotics, the medicinal robotics market is going to increase exponentially in the coming years. There is a steep rise in the production and development of mobile medicinal as well as service robots and one of the major reasons is the corona virus outbreak. Robots like can be supported with Artificial Intelligence and computer vision so that they can cater to the patients in a more sensitive way. Voice recognition system including text to speech and speech to text could be implemented and the ability to talk to patients, make phone calls to their knows over the internet could be made possible by making them smart by connecting it to the internet and cloud

REFERENCES

[1]. Ankur Roy Chowdhury, "IoT and Robotics: A Synergy" CC BY 4.0 Open Access rec: 31 Jan 2017, publ: 31 Jan 2017.

[2]. Rajesh. K, M. GopiKrishna, V.R.Rao, P.Pavani, C.Chandrasekhara "Smart Applications using Robotic a" nd Iot Technologies in Fighting against Pandemic Covid19 in Medical and Societal Sectors,International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN. 2278-3075, Volume-9 Issue 7, 2020.

[3]. Grieco, L.A, A. Rizzo, S. Colucci, S. Sicari, G. Piro, D. Di Paola and G. Boggia, "IoT-aided robotics applications: Technological implications, target domains and open issues," Computer Communications 54 , 32-47 Web, 2014.

[4]. Nimit Sheth, Chirag Sharma, Abhishek Sanil, Sahil Jethwa, "Robotic Assistance and Patient Monitoring in Hospitals using IoT" International Research Journal of Engineering and Technology (IRJET) Volume: 06 Issue:05,2019.

[5]. Huiru Cao, Xiaofeng Huang, Jianyi Zhuang, Jianqiang Xu, Zening Shao Nanfang, "CIoT-Robot: Cloud and IoT Assisted Indoor Robot for Medicine Delivery" Joint International Advanced Engineering and Technology Research 2018.

[6]. Diksha B. Wasankar, Dr. Vijay S.Gulhane, L. K. Gautam, "Application o f Internet of Things in the Field of Medical and Smart Health Care," International Journal of Innovative Research in Computer and Communication Engineering,An ISO 3297, 2007 Certified Organization.

[7]. Dr. K. Lakshmi Narayanan, Dr. N. Muthukumaran, Dr. G. Rajakumar, "Design and Fabrication of Medicine Delivery Robots for Hospitals."

ISSN2454-9940
www.ijsem.org
Vol 14, Issuse.4 Nov 2023

International Conference on Trends in Computing, Communication and Networking Technologies (ICRTCCNT'19), Kings Engineering College, October 18-19, 2019.

[8]. Seohyun Jeon Jaeyeon Lee, "Performance analysis of scheduling multiple robots for hospital logistics" in the proceedings of 14th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) 2017.

[9]. Yu C, Chen X, "Home monitoring system based on indoor service robot and wireless sensor network," Computers& Electrical Engineering, 39(4):1276- 1287. - 2013

[10]. Satheesh Kumar and S. Vijayan., " Computer Aided Content Analysis of Web Based Medical Queries: Classifying affective and Informative Post ", Journal o f Pure and Applied Microbiology, vol. 9, No. Special Issue, pp. 37-45, 2015.

[11]. Ankit R. Patel, Rajesh S. Patel, Navdeep M. Singh and Faruk S. Kazi, "Vitality of Robotics in Healthcare Industry - An Internet of Things (IoT) Perspective," Springer International Publishing AG 2017.

[12]. McNickle, M, "Medical Robots that could change Healthcare" In: IEEE International Conference Robotics and Automation (ICRA), Anchorage, 2010, 11 pp. p 300-307,2012.

[13]. Wall, J.,Chandra, V., Krummel, T., "Robotics in General Surgery, Medical Robotics. In Tech Publications,p 12. European Commission, Information Society, Brussels, 2008.

[14]. Torkestani S S, Julien-Vergonjanne A, Cances J, "Indoor optical wireless system dedicated to healthcare application in hospital" International Symposium on Communication Networks and Digital Signal Processing. IEEE, 2010.

[15]. E. Guizzo, E. Ackerman, "The rise of the robot worker," IEEE Spect. 49 (10), 2012.