IJIRIS: International Journal of Innovative Research in Information Security
Volume 11, Issue 12, December 2025
E-ISSN: 2349-7017
P-ISSN: 2349-7009
https://www.ijiris.com/archives
https://doi.org/10.26562/ijiris.2025.v1112.07

IoT Based Virtual Doctor Robot

Bhavana R, Chandhana VS, Jithendra N, Basavaraj Korivad
Department of Artificial Intelligence and Machine Learning
Sri Sairam College of Engineering, Bengaluru, India
sce22am055@sairamtap.edu.in, sce22am067@sairamtap.edu.in
sce22am062@sairamtap.edu.in, sce22am0@51sairamtap.edu.in
Archana Devi M
Department of ComputerScience
P.S.V.College of Engineering and Technology
deviarchu92@gmail.com

Publication History
Manuscript Reference No: IJIRIS/RS/Vol.11/Issue12/DCISI0086
Research Article Open Access| Double-Blind Peer-Reviewed| Article ID: IJIRIS/RS/Vol.11/Issue12/DCIS10086 Received: 28, October 2025, Revised: 05, November 2025, Accepted: 12, November 2025, Published Online: 21, November 2025.
https://www.ijiris.com/volumes/Vol11/iss-12/07.DCIS10086.pdf
Citation:Bhavana,Chandhana,Jithendra,Basavaraj,Archana(2025),IoT Based Virtual Doctor Robot, IJIRIS: International Journal of Innovative Research in Information Security, Volume 11, Issue 11 of 2025 pages 869-874
Doi:> https://doi.org/10.26562/ijiris.2025.v1112.07
BibTeX Key: Bhavana@IoT
IJIRIS papers should be cited as IJIRIS (International Journal of Innovative Research in Information Security, AM Publications, India 2025, ISSN 2349-7017, https://doi.org/10.26562/ijiris.2025.v1112.07 The journal's official abbreviation is IJIRIS. Orcid: https://orcid.org/0009-0004-9398-7488

Abstract: This project presents a virtual robot controlled by a doctor from a remote location via Wi-Fi, designed to enhance patient care in rural or inaccessible regions. The robot is equipped with various sensors and modules that enable patients to perform basic hygiene and health parameter checks autonomously. With features like movement control, touchless hand sanitization, and vital parameter sensing (SpO, pulse, and body temperature), the robot provides comprehensive care. A real-time video conferencing setup allows doctors to interact with patient's face-to-face, facilitating diagnosis and consultation. The robot's data is transmitted to a centralized server, enabling doctors to access patient information remotely and make informed decisions. This innovative solution improves access to healthcare, enhances patient care, and increases efficiency by reducing the need for hospital visits. By leveraging technology and remote connectivity, this project addresses the challenges of healthcare delivery in rural and underserved areas. The system has the potential to revolutionize remote patient monitoring and interaction, expanding access to quality healthcare services and improving patient outcomes. With its advanced features and remote capabilities, this virtual robot is poised to make a significant impact in the healthcare industry. By providing patients with access to quality care from the comfort of their own homes, this project can help reduce healthcare disparities and improve health outcomes for vulnerable populations. Overall, this project demonstrates the potential of technology to transform healthcare delivery and improve patient care.
Keywords: Health care, Remote, Robot, Patient, Monitoring

INTRODUCTION:

Advancements in telemedicine have bridged distances between doctors and patients. However, physical assessments and hygiene procedures are often compromised. This robot is designed to assist in these aspects by delivering a mobile platform capable of remote operation, health diagnostics, and hygiene management. Controlled by a doctor, this robot enhances patient safety and healthcare accessibility. In recent years, healthcare systems around the world have witnessed a growing demand for remote patient monitoring and virtual consultations, especially in the wake of global challengessuchastheCOVID-19Pandemic.This shift has highlighted the critical need for innovative solutions that allow doctors to assess, interact with, and support patients from a distance, particularly in Rural, remote, or under- resourced areas where access to healthcare facilities is limited. While telemedicine has made significant strides by enabling video consultations and electronic health records, one of its fundamental limitations remains the inability to perform real-time physical assessments and provide basic clinical interventions without the physical presence of a healthcare provider. Patients in remote regions still struggle to receive routine check-up's or timely preliminary diagnostics, and there is an increased risk of disease transmission in face-to- face settings, especially for vulnerable populations. To bridge this gap, this project proposes the development of a virtual health care robot a mobile, sensor-equipped platform that can be controlled remotely by a doctor via a Wi- Fi enabled interface. This robot is not just a mode of transportation; it is an intelligent healthcare assistant capable of carrying out several essential functions that simulate in-clinic interaction. Once the robot is navigated near a patient, it initiates a touch less hand sanitization process using an infrared (IR) sensor and sanitizer pump. Following this, a drying system using a Peltier plate and DC fan ensures hygienic preparation before vital sign measurements.

E-ISSN: 2349-7017
P-ISSN: 2349-7009
https://www.ijiris.com/archives
https://doi.org/10.26562/ijiris.2025.v1112.07

The robot includes a servo-actuated sensor box that houses a MAX30100 sensor for SpO and pulse readings, along with a DHT11 sensor to measure body temperature. These vitals are then transmitted securely to a central server, where the doctor can view them on a dashboard interface. Moreover, to enhance the personal aspect of healthcare, the system supports live video conferencing, enabling face-to-face communication between the doctor and patient despite geographical distances. By combining robotics, the Internet of Things (IoT), and real- time communication technologies, this virtual robot presents a transformative approach to remote healthcare delivery. It addresses both the medical and hygienic needs of patients in isolated environments, while empowering doctors to provide timely, data-driven consultations. The system aligns with the goals of modern tele health by reducing physical interaction risks, ensuring continuity of care, and expanding the reach of medical services.

PROBLEM STATEMENT:

Experts are often asked to appear at every hospital and crisis centre once in a great while. However, it is not feasible for every professional to be available at every location at the desired time. The challenge with video calling is that you have to be forced to use a computer or computer at a certain location. This limits the specialist's capacity to assess patients, go around emergency clinic rooms, or even be present in the activity theatre freely. The expert may make a lot of money with this mechanism: Specialists will be able to walk about the patient easily, be at any location at any time, and see clinical reports remotely through video chats. Specialists will also be able to roam around activity theatres.

EXISTING SYSTEM:

This idea might provide older citizens living in dependently with a robot-assisted intelligent emergency system. Through a robot-sensing element system, it serves as an innovative senior freelancing living emergency assistance platform. The robot assisted emergency system in brief Wearable sensors and emergency aid capabilities will be required. Motion sensors are often used to keep an eye on all of the senior citizen's activities. Emergency situations, such as falling to the ground, will be seen in advance. It will automatically certify that the incident is a falling accident rather than someone sitting on a sofa or sleeping on a bed since the acceleration rate of the person's postures exceeds a certain threshold, etc. We tend to successfully integrate the wearable device and mechanism together, resulting in a smooth hardware/software system integration. The wearable gadget is wirelessly (through Bluetooth or Wi-Fi) linked to the mechanism. When a wearable gadget triggers an alert, the mechanism may take a number of steps. For example, it may automatically choose a relative who will remotely tele-control the mechanism through video communication in order to investigate the situation and take appropriate action. In this instance, we will reduce the warning rate that restricts the efficacy of several remedies. In the event that a response is not obtained from the mechanism, the wearable gadget may also convey a warning to family members or physicians

SCOPE: This project's main objective is to effectively provide medical care to the underprivileged in mobile regions of the state. Reducing the amount of human effort required to treat patients is the main goal. People who reside in rural or mobile locations lack the option to seek medical attention from a city based healthcare provider

LITERATURE SURVEY

[1].Divya Ganesh “Auto Impilo: Smart Automated Health Machine using IoT to Improve Telemedicine and Telehealth”, 2021. The purpose of the paper, according to Divya Ganesh, [1] is to create an automated system that can quickly link to healthcare providers like hospitals or physicians in order to stop the spread of illness and lower the rising rates of death in rural regions.

[2]. During the COVID-19 Outbreak, "An IoT- Based Healthcare Platform for Patients in ICU Beds," Itamir De Morais Barroca Jr. IoT appears as a promising paradigm because it offers the scalability necessary for this objective, facilitating ongoing and accurate global health monitoring. Based on this backdrop, the authors' earlier studies suggested an IoT-based healthcare platform to provide remote monitoring for patients in a life-threatening condition.

[3]. “An IoT-based system for automated health monitoring and surveillance in post pandemic life is called COVIDSAFE Invoking”-Seyed Shahim Vedaei The Internet of Things(IoT) may assist in providing a remote diagnosis before reaching hospitals for more effective treatment in a smart health care system. Develop an Internet of Things (IoT) e-health system based on Wireless Sensor Networks to continually monitor patients' state of health for diabetic patients. Blood glucose data may be transferred through wearable sensors to physicians or cellp hones (WSN).

[4]. Kashif Hameed, "An Intelligent IoT Based Healthcare System Using Fuzzy Neural Networks," The term "remote delivery of healthcare services" refers to telemedicine. Telemedicine provides a lot of advantages, but it also has some drawbacks. Both providers and payers as well as regulators are aware that there are certain murky regions that are difficult to monitor. Over the next ten years, the sector will expand rapidly, but it will also provide both practical and technical hurdles.

[5]. “Remote Health Monitoring System for Patients and Elderly People Using Internet of Things," Mohd. Hamim IoT integration with health wearables may eliminate the need for patients to visit hospitals for basic health concerns. Additionally, patients' medical costs are much lower as a result of this. Additionally, by tracking a patient's health statistics over time through an application, physicians may prescribe appropriate drugs. To comprehend how the employed sensors operate, a thorough study of the data was collected with regard to fluctuations in physical and environmental activity

PROPOSED METHODOLOGY:

This project main objective is to effectively provide medical care to the underprivileged in mobile regions of the state. The main goal is to useless staff to care for the patients. People who reside in rural or mobile locations lack the option to get medical care from a doctor who practices in a city.

A recorded voice and a show advise the patient to sit in front of the specialists and to disclose the nature of their sickness during a recorded consultation.

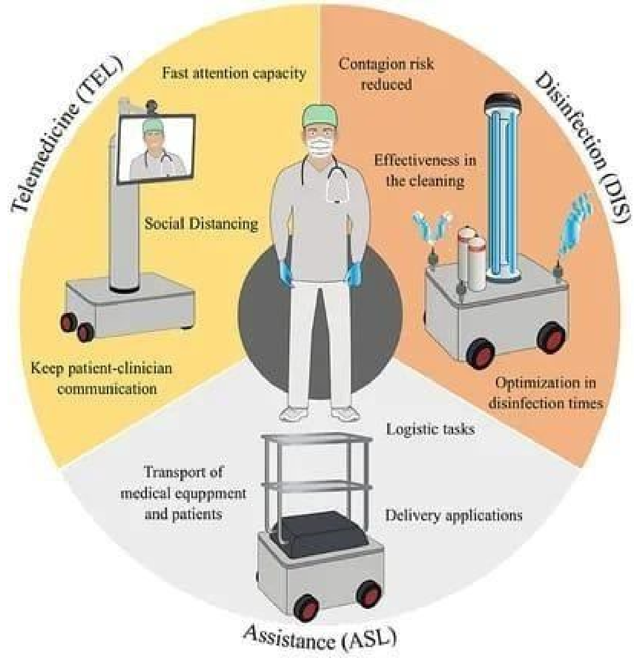


Fig1. How to reduce contact

PROPOSED SYSTEM:

Sometimes, doctors are obliged to work at every hospital and urgent care facility simultaneously. However, it is impossible for every doctor to be available at all times or in all locations. With video business, it's necessary to do video calls from a laptop or laptop computer on a table. This restricts the doctor's ability to observe the patient, walk about the operating area, or maybe travel among the hospital rooms on a PRN basis. To assist in resolving this problem, we have created a virtual doctor automaton that enables a physician to virtually roam around in a distant country and evensit down with patients there as needed. For physicians, this automaton has a new of advantages, including:

- The ability to be anywhere, at any time;
- The ability to easily move among patients and operating rooms;
- The capacity to see medical reports remotely through video chats;
- The ability to walk about in many rooms at once.

For simple navigation, the system uses a robotic car with four wheel drive. The automaton also comes with a mounting for a tablet or smartphone and a controller box for electrical devices. Livevideo calls are carried via a mobile device or a tablet. The doctor will control the automaton using a panel that is mostly based on IOT. The automaton controller receives the management directives supplied online. The automata controller uses a wireless fidelity network to function. The orders were given in real time, and the automata motors we returned on to carry out the requested movement commands. Additionally, the foundation serves other purposes in addition to being able to detect when a battery needs to be charged.

Fig: Front view

E-ISSN: 2349-7017
P-ISSN: 2349-7009
https://www.ijiris.com/archives
https://doi.org/10.26562/ijiris.2025.v1112.07

Fig:2 How to Contact Specialists with patient

Requirements

Software Requirements:

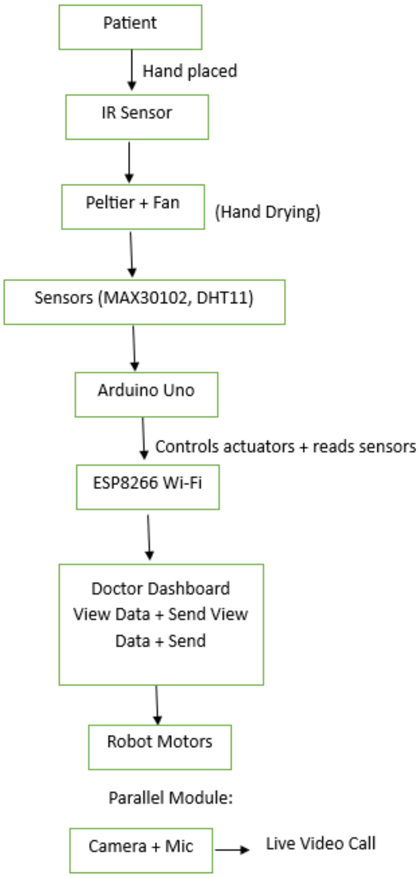
1. **Arduino IDE**: The Arduino Integrated Development Environment (IDE) is used for writing, compiling, and uploading programs to the Arduino Uno micro controller. Supports C and C++ programming languages, which are used to control sensors, motors, and actuators in the robot. Provides built-in libraries for handling hardware modules like IR sensors, motor drivers, and pulse oxi meters.
2. **Net Beans IDE:** Used for developing the Java-based dashboard and interface for doctors. Allows integration of patient data (SpO_2, pulse, temperature) into a graphical user interface (GUI).Provides debugging, code management, and GUI builder features, ensuring a smooth and user-friendly monitoring system.
3. **Programming Languages:** Used in Arduino for low-level control of hardware (sensors, motors, pumps, and relays).Ensures fast execution and real-time response. Java: Used in the development of the monitoring dashboard. Handles real-time communication between the cloud server and the doctor's interface**.** Enables integration with video conferencing and database systems.

Hardware Requirements:

1. **Arduino Uno:** A microcontroller board based on the ATmega328P. Acts as the **central processing unit** of the robot, controlling sensors, actuators, and data collection. Provides digital and analog input/output pins to connect with hardware modules.
2. **ESP8266 (Node MCU Wi-Fi Module):** Enable wireless communication between the robot and remote doctor. Transmits patient health data (SpO_2, temperature, pulse) to the cloud server. Allows the robot to be controlled viaWi-Fiusing a web or mobile dashboard.
3. **L298N Motor Driver:** Used to drive and control the four DC motors of the robot. Provides bi directional control (forward, reverse, left, right).Works as an interface between low- power Arduino signals and high-power motors.
4. **DC Motors with Wheels:** Provide mobility to the robot platform. Controlled by the motor driver for navigation toward the patient.
5. **MAX30102Pulse Oximeter Sensor:** Measures SpO_2 (oxygen saturation) and pulse rate. Uses infrared and red LEDs to detect blood oxygen levels non-invasively.
6. **DHT11TemperatureSensor:** Measures body temperature and humidity. Provides digital output that is read by the Arduino.
7. **Servo Motor (SG90):** Used to open and close the sensor protection box. Ensures that sensitive health sensors remain safe from dust and contamination.
8. **IR Sensor:** Detects the presence of a patient's hand. Triggers the sanitizer pump to dispense liquid automatically, ensuring contactless sanitization.
9. **Mini Submersible Pump:** Operates via a relay to dispense sanitizer solution. Provides touchless hand sanitization functionality.
10. **Relay Module:** Acts as a switch for high- current components like the pump and fan. Ensures safety by isolating high power devices from the low-power Arduino.
11. **Peltier Plate + DC Fan:** The Peltier plate generates warm air, while the DC fan circulates it. Used for **hand drying** after sanitization.
12. **Ultrasonic Sensor (HC-SR04)** Measures distance and detects obstacles in the robot's path. Ensures safe movement in patient environments.
13. **External Camera and Microphone:** Provide real-time video conferencing between patient and doctor. Allows doctors to visually examine the patient and interact in real-time.

E-ISSN: 2349-7017
P-ISSN: 2349-7009
https://www.ijiris.com/archives
https://doi.org/10.26562/ijiris.2025.v1112.07

Software–Hardware Interaction Flow



Patient Interaction: The patient places their hand near the IR sensor. IR sensor detects the hand→ activates relay + pump→sanitizer is dispensed. Next, the Peltier plate + DC fan dries the hand. Sensor Activation: A servomotor opens the sensor box. MAX30102 measures pulse rate and SpO□.DHT11 measures body temperature**.** Data Processing (ArduinoUno): Arduino collects signals from sensors. Converts analog data into digital values. Controls actuators (motors,pump, fan, relay). Wireless Transmission (ESP8266 Node MCU): Arduinos ends sensor data to ESP8266 via serial communication. ESP8266 uploads this data to a cloud server (Firebase / Thing Speak / Custom server). Doctor's Dashboard (Java Application): The doctor accesses the cloud database via Java- based dashboard built using Net Beans. Real- time display of SpO□, pulse rate, temperature is shown in a GUI. Mobility & Control: Doctor controls robot's movement via Wi-Fi commands. Commands sent→ESP8266receives→Arduino→L298N Motor Driver → DC Motors → Robot moves. Video Conferencing: An external camera + microphone connected to the robot allows live video streaming. Video conferencing software (Zoom/WebRTC/custom) provides real-time doctor–patient interaction.

FUTURE ENHANCEMENT:

Clinical robots simplify a process, expose integrated emergency clinic elements, and enable suppliers to target specific patients. Robots in the medical profession are changing how medical operations are carried out, facilitating the delivery and cleaning of supplies while giving providers more time to interact with patients. Market development for clinical mechanisms is anticipated to assemble between 2022 and 2028.

CONCLUSION:

The mechanism technology used in this project helps to ensure peoples' safety and security. This efficient process is crucial in providing older citizens with emergency assistance, not only for patients and physicians. It has a positive effect on society, thus the bio-medical and natural philosophy may have a big influence on the health industry. The lives of people are dynamic every day, and they depend on technical advancements to help them solve their difficulties. Artificial intelligence in healthcare enables high-quality, cost-effective patient care. Each patient, patient, and doctor are in a clinical atmosphere that is secure.

REFERENCES:

1. Divya Ganesh, Gayathri Seshadri, "Auto Impilo: Smart Automated Health Machine using IoT to Improve Telemedicine and Telehealth", IEEE, 2021.
2. Anita Chaudhari, Jeet Thakur and Pratiksha Mhatre, "Prototype for Quadruped Robot Using Iot to Deliver Medicines and Essentials to Covid-19 Patient", International Journal of Advanced Research in Engineering and Technology, 2021.

E-ISSN: 2349-7017
P-ISSN: 2349-7009
https://www.ijiris.com/archives
https://doi.org/10.26562/ijiris.2025.v1112.07

3. Divya Ganesh, Gayathri Seshadri, Sumathi Sokkanarayanan, "Automatic Health Machine for COVID-19 and Other Emergencies", 13th International conference on communication system and networks, 2021.
4. World Health Organization (WHO): The world health report 2016, Geneva, Switzerland,PP.8/9/2016.
5. WHO Report of the WHO- China joint Mission on coronavirus Disease 2019 (COVID19);WHO:Geneva,Switzerland,2020.
6. Liu, Y.; Gayle, A.A.; Wilder-Smith, A.; Rocko, J. The reproductive number of COVID19 is higher compared to SARS coronavirus.J. Travel Med.2020, 27, 1-4.
7. Jonathan Malkin,jeffBilmes Department of Electrical Engineering, The Voice Controlled Robot Arm Brandi House, bhouse, jsm,bilmes@ee.washington.CHI 2009, Boston, USA.
8. Khan, Z.H.; Khalid, A.; Iqbal, J. Towards real.
9. International Journal of Research in Engineering and Science (IJRES) ISSN (Online):2320-9364,ISSN(Print):2320-9356
10. www.ijres.orgVolume10 Issue4‖2022‖PP.24- 26 www.ijres.org24 |Page Internet of Things in Virtual Doctor Robot