



JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

MULTI PURPOSE ROBOT CAR SYSTEM USING IOT

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Acknowledgement- We sincerely acknowledge the support and facilities provided by the **Project Lab** and the **Embedded System and Application Lab (Microchip)**, department of ECE, PESCE, Mandya for carrying out our project work related to this publication.

ABSTRACT- By fusing cutting-edge robotics with Internet of Things (IoT) technology, the "Multi-Purpose Robot Car System Using IoT" offers a novel way to improve healthcare delivery. Wireless charging, voice and remote control, line-following, obstacle detection, smoke detection, and alcohol monitoring are just a few of the activities that this system is made to automate. Additionally, it has real-time accident detection and alarm systems that guarantee prompt emergency responses. Through the use of sensors, microcontrollers, and Internet of Things platforms, the system seeks to lessen the strain of medical personnel, freeing them up to concentrate on important medical duties while the robot takes care of everyday activities. This research demonstrates how robots and the Internet of Things may revolutionize healthcare settings by enhancing patient safety and productivity. The system's capacity to do a variety of tasks on its own makes it a vital instrument in a variety of settings where automation may improve operational efficacy, safety, and productivity.

KEY WORDS- IOT(internet of things), wireless charging, embedded systems, emergency alert system, obstacle detection, gps and gsm modules.

INTRODUCTION- The use of robots in healthcare has become a game-changer in recent years as a way to meet the growing

demands for efficiency, safety, and individualized care in caring settings. The "Multi purpose robot car system using IOT" offers a novel approach to patient care and environmental monitoring by being able to carry out a number of activities remotely and autonomously. Automation has emerged as a critical component of contemporary care systems, helping to alleviate the strain on medical personnel and improve patient well-being as the world's population ages and the need for healthcare assistance increases. The advanced robotic care system proposed in this research may perform a variety of tasks that enhance patient safety, aid, and monitoring. Wireless charging, voice control, remote control, line-following capabilities, obstacle detection, smoke detection, and alcohol sensor monitoring are just a few of the essential characteristics that the robot incorporates. It also has an IoT-based smart accident detection system, which guarantees that any accidents or emergencies are reported in real time. The creation of such systems aims to increase

overall operational efficiency in healthcare settings in addition to enhancing caregiving services, and multi-tasking duties, freeing up healthcare workers to concentrate on vital medical procedures that call for human involvement. Furthermore, seamless connectivity is made possible by the incorporation of cutting-edge technology like the Internet of Things (IoT) into healthcare robots. This permits real-time data exchange and communication between the robot, medical personnel, and family members. By giving continuous information on patient status, ambient variables, and possible threats, this connectedness improves decision-making processes.

LITERATURE SURVEY- [1]. AUTOMATIC
ACCIDENT DETECTION AND AMBULANCE

RESCUE SYSTEM:

Dr. Ms. V.G. Nasre, 2 Ashwini Sonbaone, 3 Ashwini Lade, 4 Kadambari Yengade, 5Swati Golait ,Volume 11,Journal of Emerging Technologies and Innovative Research (JETIR). 2024

[2]. ACCIDENT DETECTION AND ALERT SYSTEM USING ARDUINO.

Dr. R.Prasanthi, M.U. Nitish Babu, B. Jaswanth, G.Sumith Chandra,Volume 05, International Research Journal of Modernization in Engineering Technology and Science. 2023

DETECTION SYSTEM BY USING GSM AND GPS.

GOWSHIKA, MADHU MITHA, JAYASHREE, S. MUTHARASU, Volume 06, International Research Journal of Engineering and Technology (IRJET) 2019

A.Ranga Rao , P. Anjaiah , D. Ramesh, Volume 12, Megha Institute of Engineering and Technology for Women, Edulabad, Ghatkesar, Medchal Dist- 501301 ,2021

[5]. ACCIDENT DETECTION AND REPORTING SYSTEM USING GPS, GPRS AND GSM TECHNOLOGY (@2012 IEEE):**[6]. REAL TIME DETECTION AND REPORTING OF VEHICLE COLLISION (@2017 IEEE):**

PROBLEM FORMATION—By offering a robotic system that can carry out a wide range of duties on its own, the "Multi-Purpose Robot Car System Using IoT" aims to address these problems. This contains features including line-following, obstacle detection, smoke detection, alcohol monitoring, wireless charging, voice and remote control, and real-time accident detection and reporting. The system's integration of IoT technology allows for real-time communication and ongoing monitoring of emergency situations, guaranteeing a quicker and more effective response. This project aims to improve vehicle performance, increase safety, and facilitate efficient transportation by combining robots, automation, and IoT technologies. In order to improve vehicle performance and road safety, this technology seeks to lessen the strain for drivers, streamline operational duties, and offer a safer, more responsive driving experience.

OBJECTIVES-

- To develop a wireless charging station in an identified area
- To develop a voice and remote control model via Bluetooth
- To develop a model to detect the obstacles, alcohol, smoke and fire using relevant sensors
- To develop a real time model for the accident detection and to alert the person using IOT technology

METHODOLOGY—The Multi-Purpose Robot Car System Using IoT employs an organized technique that combines software and hardware elements to guarantee effective operation. An Arduino microcontroller serves as the system's primary processing unit and manages a number of sensors and connectivity components. The project integrates a number of sensor-based features, such as the use of infrared and ultrasonic sensors for obstacle detection, the MQ-3 sensor for alcohol and smoke detection, and the DHT-11 sensor for temperature and humidity monitoring. The system also has

real-time accident detection and alerting capabilities via GPS and GSM modules, guaranteeing timely alerts in the event of an emergency. The system provides voice command operation through a smartphone app, remote control via Bluetooth (HC-05 module), and autonomous lane-following via infrared sensors for navigation and control. Sensor startup and safety checks are the first steps in the workflow, which is based on an organized flowchart. After choosing a navigation mode—either manual Bluetooth control or autonomous lane-following—the system keeps an eye out for obstructions.

BLOCK DIAGRAM-

It consist of multiple sensors like ir sensor, ultrasonic sensor, hc-05 sensor, mq-3 sensor, dht-11 sensor and gsm and gps module with micro controller Arduino.

FLOW CHART-

The flowchart in represents the workflow of a Multi Purpose Robot Car System using IOT, describing how the system operates under different conditions. Below is an explanation of the flowchart:

1. Start Multi-Task Robotic Car System: The process begins with initializing the robotic car system.

2. Alcohol, Smoke, Fire Detection, and Temperature Sensor Check: The system performs safety checks using

sensors to detect: Alcohol, Smoke, Fire, Temperature abnormalities.

If the sensors fail these checks, the system triggers necessary actions, such as an alert or stopping the system.

If the sensors pass, the system continues and confirms that "System is Okay."

3. Lane Following or Bluetooth Control Selection:The system allows for two modes of operation:

Lane Following: The robotic car follows lanes autonomously.

Bluetooth Control: The user manually operates the car through Bluetooth, with options for:

Manual Control: Directly controlling the car via Bluetooth.

Voice Control: Operating the car using voice commands via Bluetooth.

4. Obstacle Detection:If an obstacle is detected, the system stops the car.If no obstacle is detected, the car continues moving.

5. Battery Check:If the battery is low, the car automatically switches to wireless charging mode to replenish the battery.If the battery is sufficient, the car continues driving.

6. End Multi Purpose Robot Car System using IOT:Once the tasks are completed, the system terminates.

RESULT-The Multi-Purpose Robot Car System Using IoT was successfully developed and tested, demonstrating efficient real-time monitoring, autonomous navigation, and remote control capabilities. The system effectively performed its primary functions, including obstacle detection and avoidance using IR and ultrasonic sensors, alcohol and smoke detection via the MQ-3 sensor, and temperature and humidity monitoring through the DHT-11 sensor. The lane-following navigation system accurately followed a predefined path, while the Bluetooth (HC-05) module enabled seamless remote and voice control. Additionally, the IoT-based accident detection system efficiently transmitted real-time emergency alerts using GSM and GPS modules, ensuring prompt responses in critical situations. The implementation of wireless charging allowed the system to operate continuously without manual intervention, further enhancing its usability. The results indicate that the robotic system is highly efficient in performing multiple tasks with minimal human intervention. The integration of IoT technology ensured that real-time alerts and notifications were sent without delay, making the system highly effective for emergency response applications. The use of multiple sensors significantly improved its ability to detect hazards, navigate autonomously, and monitor environmental conditions. However, certain limitations were observed during testing. The Bluetooth connectivity range was restricted to approximately 10 meters, limiting remote control functionality over longer distances.

CONCLUSION-The "Multi-Purpose Robot Car System Using IoT" was effectively created and put into use to carry out a number of clever activities that improve convenience, automation, and safety. The robot incorporates a number of technologies, including speech recognition, Bluetooth connectivity, obstacle detection, environmental monitoring, and real-time alarm systems based on the Internet of Things. One of the main characteristics of the system is that it can be operated with both voice commands and a Bluetooth remote control, which gives it versatility and accessibility for a range of users. By employing ultrasonic and infrared sensors to identify and avoid obstacles along a predetermined course, the robot may also function independently. Using MQ-series gas sensors, the system also effectively detects alcohol, smoke, and fire and sends out notifications to stop dangerous circumstances. The accident detection and alarm system is one of the project's main features. The robot can detect possible

collisions and provide emergency messages with position coordinates to pre-specified contacts by utilizing accelerometer, GPS, and GSM modules, guaranteeing prompt aid.

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