International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

MEDICAL SURVEILLANCE ROBOT

V. ANANDA BABU[1]| SOURASISH TALUKDER[2]| KOLA VENKATA RAO[3]| KINCHA SHYAM KRISHNA[4]| GUGGILAM RAKESH[5]

[1]Associate Professor of Department of Mechanical Engineering, Nadimpalli Satyanarayana Raju Institute of Engineering andTechnology (Autonomous), Visakhapatnam – 531173.

[2-5]Students of Department of Mechanical Engineering, Nadimpalli Satyanarayana Raju Institute of Engineering and Technology (Autonomous), Visakhapatnam – 531173.

Abstract - *This project presents the design and fabrication of a Medical Surveillance Robot which aims at enhancing healthcare monitoring in clinical setting. The robot is equipped with various components and an imaging device to capture vital signs and ensuring seamless mobility in providing the patients with their required medicines and required meals and assisting the medical staff in various important roles and tasks. Through the integration of robotics and engineering, this project aims to revolutionize the response to situations like the covid pandemic minimizing human interference to infectious agents and maximizing operational efficiency and safety protocol.*

1.INTRODUCTION

The Robot named as Medical Surveillance Robot is designed in a way to control robot through instruction given by us and follow according via any Esp cam browser and also in a particular mobile application.

The connection between the mobile and the vehicle is facilitated with Wifi technology. The aim of the device is to perform required tasks by receiving the commands of the user. controlling can be done by any smart phone, tab, ios device or laptops etc on any internet enabled devices which we use in our day to day life. The commands from the mobile are transmitted through the internet from the input given by mobile device from any range the commands forward, backward, right, left and stop are used to control the device. After receiving the commands given by user the microcontroller then operates the motors to move using the motor driver. The movement of the robot is facilitated by two 100 RPM motors connected to the motor driver. Also there will be space available to store the things or objects and will be having a door like design controlled using servo motor.

1.1 OBJECTIVES OF STUDY

The main objectives of the project are comprehended as follows :-

The features described above suggest a versatile and efficient Medical Surveillance robot that could be useful in a variety of applications like food Deliver, Surveillance in hospital and navigating with computer vision with checking the ability with. Its ability to move around in an unknown environment and show its surroundings using a live camera feed is particularly valuable in Medical Surveillance and security contexts.

1.2 The capacity to store and deliver food to desired locations remotely could also be useful in a variety of settings, such as logistics or healthcare. Additionally, the robot's ability to operate without external control and in unknown environments makes it adaptable to a wide range of situations.

1.3 Overall, the described Medical Surveillance robot has the potential to be a valuable tool in a range of applications where remote Medical Surveillance, delivery food, check the body temperature or exploration is required

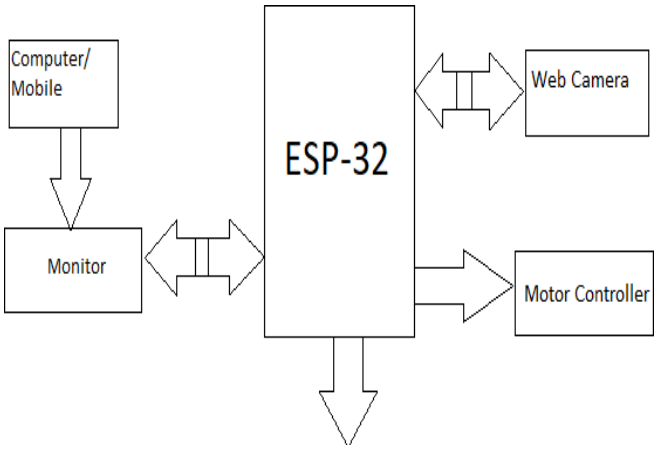
1.4 PROBLEM STATEMENT

The effective use of waste heat by the industrial sectors is severely hindered, which results in energy loss and negative environmental effects. The goal of this project is to create a thermoelectric heat exchanger that can absorb and transform waste heat from industry into useful energy by employing Peltier modules. The aim of this study is to tackle the demand for an affordable and expandable approach to improve energy efficiency and reduce environmental deterioration in industrial environments.

2. METHODOLOGY

1. This System of the security Medical Surveillance robot can be operated in two ways i.e. the robot can be used in automatic mode or it can also be controlled manually through the web. This facility helps the user to get a video feed at all times which can be seen live or through recording. Both the operations are implemented using separate circuits, the annual operation is done using a circuit that uses a raspberry pi as its core and the automatic operation is done by using Arduino as its core. But both modes cannot be used

simultaneously they have to be preset do working a particular operating mode. The circuits are constructed considering the drawback; each circuit has its own drawbacks if taken individually but if used together they eliminate most of the drawbacks



3.DESCRIPTION OF WORK INCLUDING DESIGN & IMPLEMENTATION

ESP32 is a series of low-cost, low-power system on a chip micro controllers with integrated Wi-Fi and dual-mode Bluetooth. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF ESP32 is created and developed by Espressif Systems, a Chinese company based in Shanghai, and is manufactured by TSMC using their 40 nm process.[2] It is a successor to the ESP8266 microcontroller balun, power amplifier, low-noise receive amplifier, filters, and power-management modules.

Bluetooth. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-

```
#define IN_2  D2 // L298N in2 motors
Right     GPIO13(D7)
#define IN_3  D3 // L298N in3 motors
Left      GPIO2(D4)
#define IN_4  D4 // L298N in4 motors
Left      GPIO0(D3)

#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>

String command;             //String to store
app command state.
int speedCar = 800;         // 400 - 1023.
int speed_Coeff = 3;
const char* ssid = "ISOLATION ROBOT";

ESP8266WebServer server(80);

int motor=D0;
void setup() {

 pinMode(IN_1, OUTPUT);
 pinMode(IN_2, OUTPUT);
 pinMode(IN_3, OUTPUT);
 pinMode(IN_4, OUTPUT);
  Serial.begin(115200);

 // Connecting WiFi

  WiFi.mode(WIFI_AP);
  WiFi.softAP(ssid);

  IPAddress myIP = WiFi.softAPIP();
  Serial.print("AP IP address: ");
  Serial.println(myIP);

 // Starting WEB-server
    server.on ( "/", HTTP_handleRoot );
    server.onNotFound
( HTTP_handleRoot );
    server.begin();
}

void goAhead(){

  digitalWrite(IN_1, HIGH);
  digitalWrite(IN_2, HIGH);

 }

void goBack(){
digitalWrite(IN_2, HIGH);
     }

void goRight(){

  digitalWrite(IN_1, HIGH);
 }

void goLeft(){

    digitalWrite(IN_2, HIGH);
 }

void goAheadRight(){
   digitalWrite(IN_3, HIGH);
  }

void goAheadLeft(){
       digitalWrite(IN_4, HIGH);
    }

void goBackRight(){

 }

void goBackLeft(){
 }

void stopRobot(){

    digitalWrite(IN_1, LOW);
    digitalWrite(IN_2, LOW);
    digitalWrite(IN_3, LOW);
    digitalWrite(IN_4, LOW);
}

void loop() {
   server.handleClient();

     command = server.arg("State");
     if (command == "F") goAhead();
     else if (command == "B") goBack();
     else if (command == "L") goLeft();
     else if (command == "R") goRight();
     else if (command == "I")
goAheadRight();
     else if (command == "G")
goAheadLeft();
     else if (command == "J")
goBackRight();
     else if (command == "H")
goBackLeft();
     else if (command == "0") speedCar =
400;
     else if (command == "1") speedCar =
470;
     else if (command == "2") speedCar =
540;
     else if (command == "3") speedCar =
610;
     else if (command == "4") speedCar =
680;
     else if (command == "5") speedCar =
750;
     else if (command == "6") speedCar =
820;
     else if (command == "7") speedCar =
890;
     else if (command == "8") speedCar =
960;
     else if (command == "9") speedCar =
1023;
     else if (command == "S") stopRobot();

//      else if(digitalRead(s)==LOW)
//      { digitalWrite(o,HIGH);
//      }
//      else if (digitalRead(s)==HIGH)
//      {
//        digitalWrite(o,LOW);
//      }
}

void HTTP_handleRoot(void) {

if( server.hasArg("State") ){
    Serial.println(server.arg("State"));
  }
  server.send ( 200, "text/html", "" );
  delay(1);
}
```

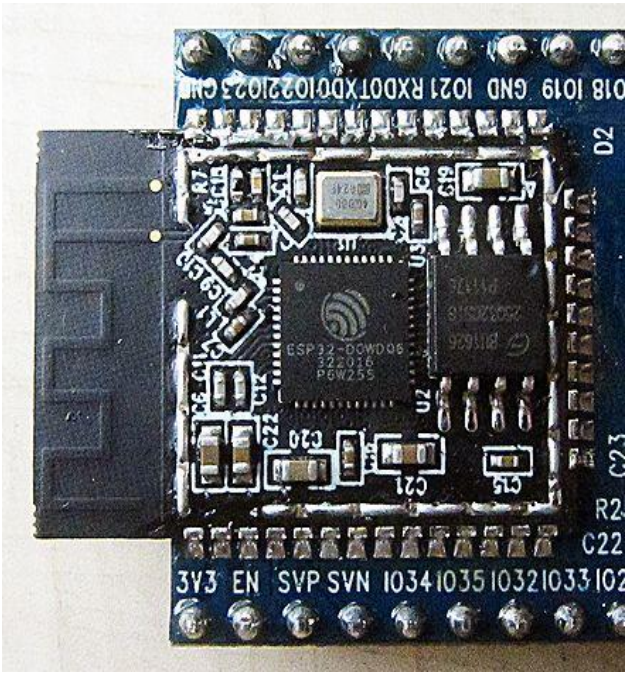


Fig 3.3 Heat induction exchanger

2. ADVANTAGES

1. Remote Monitoring: Medical surveillance robots can be equipped with various sensors and cameras to remotely monitor patients' vital signs, movements, and behaviors. This allows healthcare providers to keep track of patients' conditions without direct physical presence, particularly useful for patients in isolation or those with contagious diseases.
2. Continuous Monitoring: Unlike human staff who may need breaks or rest periods, medical surveillance robots can provide continuous monitoring, ensuring that patients are under constant observation. This can be particularly beneficial for critical care patients who require close monitoring around the clock.
3. Efficiency: Robots can efficiently cover large areas or multiple patients simultaneously, reducing the workload on healthcare staff and allowing them to focus on other essential tasks such as patient care, treatment, and administrative duties.
4. Reduced Risk of Infection: By minimizing direct contact between healthcare providers and patients, medical surveillance robots can help reduce the risk of transmitting infections, particularly in settings such as intensive care units (ICUs) or during outbreaks of contagious diseases.
5. Improved Safety: Medical surveillance robots can perform tasks in hazardous environments or situations that may pose risks to human health and safety. For example,
6. they can navigate through contaminated areas or unstable structures during disaster response operations.

6.CONCLUSIONS

In conclusion, we effectively created a Medical Surveillance Robot that helps us to moniter the patient's physical health condition and also provide him/her with the necessary food and medical supplies while retaining them in the medical isolation ward (given the situation demands so like the COVID19 pandemic). The Medical Surveillance Robot has shown to be a financially a viable way to improve the efficiency of patient healthcare operations through testing and adjustment. When put into practice, it has measurable advantages for environmental sustainability and resource conservation. The initiative emphasizes the value of innovation in solving emergency medical service related problems and the potential of least human contact and environmentally friendly medical services.

7.REFERENCES

- F.Tang, Y.Ying ,J.Wangand Q .Peng," A novel texture synthesis based algorithm for object removal in photographs", .LNCS ,vol.3321 , ASIAN2004 ASIAN2004 pp.248-258.
- Haritaoglu, D.Harwoodand L.S.Davis,"W4:"Real-TimeMedical Surveillance of People and their Activities",IEEE Transactions on Pattern Analysis and Machine Intelligence, 2020.vol.22,pp.809-830.
- J.Schiff,M. Meingast, D.K.Mulligan, S.Sastry and K Goldberg, "Respectful cameras: Detecting visual markers in real-time to address privacy concerns", Privacy in Video Medical Surveillance,2019,pp.65-89.
- M. Md Athiq U R Raza Ahamed and Wajid Ahamed," A Domestic Robot for Security Systems by Video Medical Surveillance using Zigbee Technology", international Journal of Scientific Engineering and Technology, May 2021, vol. 2, no. 5, pp. 448-453.
- P Kumar, A. Singhal, S. Mehta and A. Mittal, "Real-time moving object detection algorithm on high resolution using GPUs", Journal of Real-Time Image Processing, International journal of computer application, Mar. 2019, vol. 11, no. 1,pp.93-109,2020.vol.117.
- P. Vamsi Krishna, S.R. Hussain, N. Ramu, P.M. Rao, G. Rohan and B.D.S Teja, "Advanced Raspberry Pi Medical Surveillance (ARS) system", Proceedings of the 2015 Global Conference on Communication Technologies (GCCT), 23–24 April 2019, pp.860-862.