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WI-FI CONTROLLED WHEELED ROBOT

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ABSTRACT

A robot is a machine, particularly one that can be programmed by a computer and is capable of autonomously performing a complex series of tasks. Robots can be controlled internally or externally by use of a control mechanism. Nevertheless, some robots are built to many species that robots are task-performing machines that place a greater emphasis more on bare necessity than on artistic expression.

Humanoids like the TOSY Ping Pong Playing Robot and Honda's Advanced Step in Innovative Mobility (ASIMO) (TOPIO), as well as Robots used in industry, medicine, patient support, canine therapy, collaboratively programmable swarm robots, and more unmanned aerial vehicles (UAVs) like the MQ-1 of General Atomics. Examples of autonomous or partially autonomous robots include Predator and even miniscule nanorobots. A machine may appear intelligent or have thoughts of its own by emulating a human appearance or automating movements. Future predictions predict a proliferation of autonomous objects, with home robotics and the autonomous vehicle serving as some of the primary catalysts.

Robotics is the area of technology that deals with the creation, maintenance, use, and application of robots as well as the computer systems that control, sense, and process information for them. These technologies deal with automated devices that can replace people in hazardous settings or production processes or that resemble people in terms of appearance, behaviour, or cognition. The field of bio-inspired robotics has benefited from the inspiration of nature found in many of today's robots. Soft robotics, a more recent field of robotics, was also developed by these robots.

INTRODUCTION

IoT emerges as a prominent technology as it produces a variety of internet applications in response to the huge demand for internet application development that exists today. The internet of things refers to the connecting of devices to the internet. These devices include electronics and other types of hardware, and communication with them takes place online. IoT is an autonomous control capability that enables the control of any device without the need for human intervention. IoT "things" are a concoction of hardware, software, data, and services.

Four distinct components make up an IoT system.

Sensors/devices

A sensor is a device that detects and gathers information in order to react to input from the environment. Any type of input is acceptable, including heat, light, pressure, and temperature. The output is either sent or is in the form of a signal that can be interpreted by people at the sensor location.



Connectivity

The data is transferred to the cloud, and sensors can be directly connected to the cloud through the internet, wi-fi, Bluetooth, or cellular satellite.

Processing of Data

Data Processing

Programming performs some sort of management, such as confirming that the temperature is within the acceptable range when information flies on a cloud, for instance.

User interface

By alerting the clients via email, content, or notice, the data obtained will be made beneficial to the clients. A client may have an interface that they should watch out for.

Applications of IoT:

Personal Home Automationsystem: Home Automation is the major example.

Enterprise: Environment monitoring system is the best example for Enterprise.

Utilities: The major application in this area is smart grid and smart metering.

Medical and Health care: It can be used for those who can't be capable of going to doctors so letting them get the checkups like skin temperature body pressure by remotely

LITERATURE SURVEY

2.1.1 Existing system

In the present system line follow robots are used which makes use of IR sensors, as controlling mechanism Bluetooth devices are used

2.1.2 Limitations of existing system

- Is not compatible with long distance
- IR sensors that are exposed to direct sunlight may malfunction.
- Support for Bluetooth requires additional hardware.

2.1.3 Proposed system

Proposed system is wifi based wheeled robot, the controlling dashboard is developed using blynk app, board and app gets connected via wifi, user can control the direction of robot from distant place using blynkapp

- **Benefits of the Suggested System**
- No distance limitation
- Since the board contains a built-in wifi module, no additional hardware is needed.

2.2 Feasibility study

A study is a feasibility study of project where it will verify whether the projected project is technically and economically possible or not. In feasibility study we analyse the project to determine the ability to complete the project successfully with all the feasible cost and technical services. The primary objective of a feasibility study is to analyse every test for economic, operational, and functional viability in order to reduce the proposed project's cost. A feasibility study is a decision-making tool for projects that will provide you an idea of how to carry out the work using this feasibility report. Additionally, it offers all of the technical, financial, and other resources we need to complete our assignment and propose our idea.

Feasibility study also used for identifying the scope of our project.

Feasibility study is over all examination of project strength and weakness of project and required cost to develop our project and also it will provide the problems available in the offered system and what features we need to include in the existing system to overcome from the problem of existing system.

The feasibility study as follows:

- The feasibility of technology
- The feasibility operation
- Business viability
- Technical Possibilities

The technology and platform are IoT-based, and they apply IoT Architecture.

Storing Data

Every piece of information is kept in the cloud using an IoT platform like Blynk.

Server

Users and deployed system messaging are communicated with via a dedicated Blynk server.

The Blynk app's notification widget is used to send notifications.

Arduino IDE



Figure 2 :Aurdio IDE

In this project this IDE is used to write, test and deploy C code to hardware circuit , program written using this IDE are called as sketch, each sketch is written in C or C++, this ide allows to communicate with the circuit boards connected to USB port of the development computer.

The sketch can be compiled and loaded to device connected to the pc, if code has any errors they get displayed for users reference.

Introduction to C

In this project, the hardware is communicated with using the C programming language because it is useful for this purpose. The language has following qualities

- High-level language
- Structured
- Modular approach
- Best suited for communication with hardware.

Each programme in C includes an additional function, therefore the name Here return type indicates the type of value being returned by the function, function name can be any valid identifier. There are one or more statements in the function's body..

<return type><function name>(parameters)

```
{
  Body of the function.
}
```

Here return type indicates the type of value being returned by the function, function name can be any valid identifier. Body of the function includes one or more statements.

2.3 Software and Hardware Requirements

Hardware Specification

Processor - i3 processor or Higher

RAM - 2GB or Higher Hard disk - 500GB

Driver circuit

ESP32 kit

Bread board

Jumper wires

Software Specification

Programming Language - Arduino

Operating System - Windows 7 or Any Compatible

IDE - Arduino

Frontend - Blynkapp

1. IMPLEMENTATION

1.1 Algorithm and coding used in the project

Implementation of the proposed project includes the following steps

1. Installing arduino IDE
2. Installing the ESP32 board manager
3. Installing required libraries
4. Installing blynk app in smartphone
5. Designing the dashboard in blynk
6. Circuit design using various components
7. Assembling all the peripherals
8. Configuring droid cam in phone and also in local server

3.1.1 . Installing arduinoIDE

The IDE is available for free at its official website called www.arduino.cc/en/software, from here based on the platform software needs to be downloaded and installed, while installing care should be taken to install device drivers so that board and system can communicate via USB, by default it supports only UNO boards hence we need to install ESP32 board explicitly by following below steps.

3.1.2 Installing ESP32board

ESP32 board is developed by company called espressif, we need to download board manager packages from respective GIT hub repository and install them using board manger option available in the Tools menu of arduinoIDE, after successful installation one could see the board listed in the Boards option.

3.1.3 Installing respectivelibraries

We need to make use of predefined libraries while developing the code so that we need not write the code from the scratch, in arduino IDE we have option called manage library with which we can install libraries available in the repositories easily. In this project we have used libraries to read information from sensors, connect to wifi etc.

3.1.4 Installing the blynkapp

We use the Blynk app, which is available in the Play Store, to control the robot from a distance. To configure the dash board using widgets, one must correctly provide Digital and Virtual Pin details as they are referred to in the code for executing routines in response to events activated by the user.

3.1.5 Designing the dashboard inblynk

Blynk has widgets like buttons, we need to configure them according the requirements, and making dashboard layout is quite easy job as just by drag drop technique one could design it.

3.1.6 Circuit design using variouscomponents

Circuit design has to be done according to predefined configuration, while making circuit connection pin number, Vcc, gnd must be take care of, while connecting components jumper wires are used.

3.1.7 Assembling all theperipherals

Having done the circuit connection, peripherals such as pvc columns, wodden chassis are to be mounted according to plan.

1. Pin configuration of ESP32

One of the microcontrollers that supports both Bluetooth 4.0 (BLE) and Bluetooth Classic is the ESP32, which is an 802.11b/g/n integrated microcontroller (BT). Due to its low cost and low power consumption, the system is more advantageous for project implementation. This ESP32 microcontroller was devised, invented, and developed by ESP Resistor Systems and a Shanghai-based Chinese firm. TSMC produces it using their 40 nm technology. It occasionally links its own network. Through USB, it offers a power supply of around 5V. The ESP32 supports wi-fi Direct and is a viable alternative for peer-to-peer connections without the requirement for an access point.



Figure 3.2.1 ESP32 microcontroller

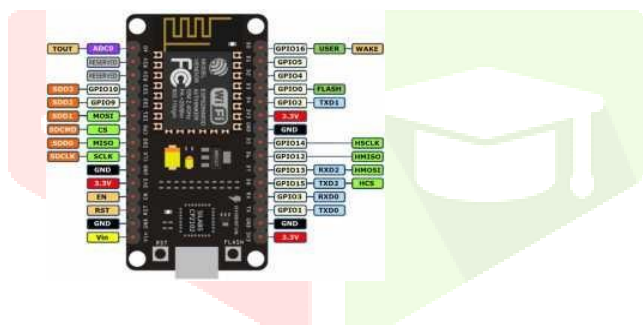


Figure 3.2.2: block diagram of ESP32

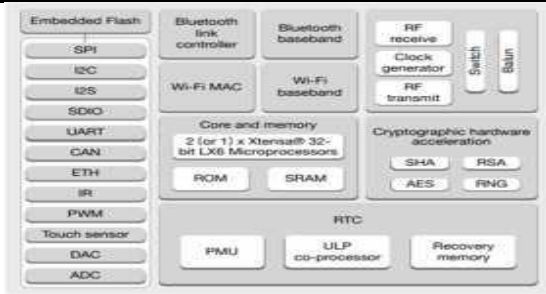


Figure3.2.3:Pin description of ESP32

Figure 3.3: Jumperwires



Figure 3.3: Jumper wires



Figure 3.4: External battery

The figure 3.4 Demonstrates the battery with cap, which is used in the suggested project to power BO motors and keep them running. It serves as a source of power for the submercible motor that releases sanitizer. It features a 9v battery.

Figure 3.5:Driver circuit



Figure 3.5: Driver circuit

Above image shows the project uses a driver circuit to control the direction of the motors. The driver circuit gets control signals from an esp32 board, which in turn receives orders or instructions from the blynk app. It features input pins for the battery and control unit as well as output pins for the motor connections.

Features:

1. VCC PIN
2. GNDPIN
3. A1 PIN
4. A2PIN
5. B1PIN
6. B2PIN

Figure:3.6 BO Motors



Figure 3.7: BO motors

Figure 3.7 demonstrates pictures of BO motors, which are 100 RPM DC motors that assist the ROBOT model move in the desired directions. They can run on voltages between 3.3 and 9 volts, and the direction of the motors can be changed by switching their polarity.

Figure:3.8:BO Motor wheels



Figure 3.8: BO motor wheels

Figure 3.8 shows the model's wooden chassis is attached to BO motors and the wheels, which together with the motor are responsible for the system's movement. As the motor rotates, the wheels continue to move.

3.2 Screens shots of module



Figure 3.3.1: Prototype of the proposed model Above image shows various components being connected in the module

4:RESULTS

Developed a robot prototype this can be controlled from mobile app using wifi.

The prototype has been tested for various test cases.

5:CONCLUSION

The proposed model is an attempt to make use of robot and iot concept to develop an innovative product which is handy and use full for the society in many ways.

The prototype has been tested for various test cases and it has performed well and it has some

limitations too which could be solved using latest technologies

6. REFERENCES

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SITE

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