



Esp32cam -IoT spy robot with laser gun and head light

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Abstract:

The project aims in designing a War field spy robot which is operated wirelessly through smart phone using IOT technology. This is the internet of things (IOT) based project, where we are particularly uses the Esp32 camera, Laser light, head light and two DC motor along with l293d motor driver. While seeing the video user can control the robot as well as control the laser light and head light through web application.

Keywords:

ESP32 camera, DC motor shield L293d, laser light, Head light and web application.

1. Introduction:

Robot is a kind of machine that performs very complex & multiple tasks by the instructions that is stored on a programmable device automatically or by giving instructions externally [1]. It needs an interfacing device such as Bluetooth, Wi-Fi, ZigBee etc. for external controlling. In this work our concern is to build a spy robot i.e. such type of robot that can remain hidden and do the work without notifying any human being. This robot can work automatically or can be controlled by smartphones over Wi-Fi a kind of wireless personal network which can be used to interface between esp32 camera and smartphone.

The main objective of this system is used to transmit video from dangerous places and can be controlled remotely from distant places. This robot can be used as a spy robot to collect any information, photos, and videos from any dangerous areas. The robot can also be used in any rescue missions. As the size of the robot is compact it is very easy to send anywhere without notifying anyone.

This robot consists of laser gun to shoot the enemies. This project makes a use of ESP32-CAM is a small size, low power consumption camera module based on ESP32. It comes with an OV2640 camera and provides onboard TF card slot. The ESP32-CAM can be used in this project for wireless video monitoring and robot controlling. This robot can moves in all directions like left, right, front and back. By using web application user can control the robot and laser gun through Wi-Fi. Here DC gear motor is used to move the system back and forth and also towards move any direction.

2. LITERATURE SURVEY

Ritika Pahuja et. al has proposed and implemented an Android based Bluetooth UART interfacing robot [3]. They have used 8051 microcontrollers, HC-06 Bluetooth module, and Bluetooth RC car app to implement that robot.

Mrumal.K.Pathak et. al has proposed Android based robot controlled by using Bluetooth from Android phone [4].

Aniket R. Yeole et al has developed a smartphone controlled robot [5]. In this work we have used

Atmega328p microcontroller, JY MCU BT HC-06 Bluetooth and ultrasonic sensor. That work deals with the system that can detect obstacles. If the sonar sensor detects the echo signal then it automatically stops. Also, it is controlled by Bluetooth signals such as numerical values. This robot can be used as a surveillance robot

Dipak Gonde et al Give a concept and develop a robot that is controlled by smart phone [6]. That proposed system is constructed using smartphone, two apps and sensor to measure distance from obstacle. This system works properly. One app send text to another app. Second app send signal to the controller. There has sonar to detect obstacle. A very outstanding concept for controlling a robot in three different ways [7].

Arita De et al has developed and implemented this robot. They use direction control, voice control and tilt control to control robot. That app is develop by them. They used accelerometer sensor from Android phone to use the tilt option in the app. An image transferring robot is designed by Saravana Kumar K et al [8]. In this robot Android mobile is used to control it. The App is also developed by them. Android webcam is used to capture image and image is uploaded in the server. An app IP webcam display these images.

Prof. Y. M. Naik et al has suggested and implemented an Android controlled spyrobot [9]. They had used two smartphones, one is placed on robot and other is used as a controller.

The first phone can capture image in different angle when commanded and sends them to a corresponding email id. Simple Android phone control robot has been implemented by Rahul Kumar et al [10]. In that work, an Android app with button is used to control the robot. Interfacing device Bluetooth is used in this system. Here also numerical values are used to control the robot.

Aaruni Jha et.al implement a night version camera based spy robot [11]. In that robot, RF transceiver is used to transmit and receive the signals. Wireless CCD camera for this purpose. That camera can send audio and video. Premangshu Chanda et al has implemented a gesture controlled robot [12]. In this robot accelerometer sensor is used from smart phone.

3) Implementation:

The basic block diagram for the implementation of the project is as shown in figure1.

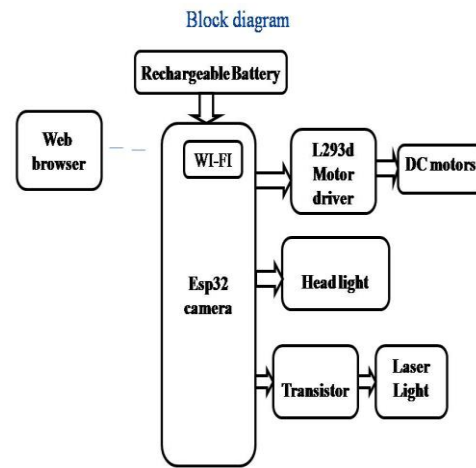


Fig 1: Block Diagram of the system

The main controlling device of the project is ESP32 camera which is interfaced with laser gun, head light and DC motors along with l293d motor driver. It has an ESP32 camera mounted over it, through which we will get live video feed and the interesting part here is that, we can control the robot like forward, backward, left and right from a web browser over the internet. The ESP32 cam will capture live data with regards to its surroundings and then send it to a particular IP address through internet. User can access this device using mobile phone and while seeing the video user will control the robotic vehicle along with headlight and laser gun from webpage. 12V rechargeable battery is used to provide the power supply of the robot and esp32 camera. The main controlling device of the project is ESP32 camera module which is interfaced with input and output modules.

4) Related Work:

A. Esp32 Camera Module:



Fig: ESP32 camera

Specifications:

- Wireless Module: ESP32-S WiFi 802.11 b/g/n + Bluetooth 4.2 LE module with PCB antenna, u.FL connector, 32Mbit SPI flash, 4MBit PSRAM.
- External Storage: micro SD card slot up to 4GB.
- Camera
 - FPC connector.
 - Support for OV2640 (sold with a board) or OV7670 cameras.
 - Image Format: JPEG(OV2640 support only), BMP, grayscale.
 - LED flashlight.
- Expansion: 16x through-holes with UART, SPI, I2C, PWM.
- Misc: Reset button.
- Power Supply: 5V via pin header.
- Power Consumption.
 - Flash LED off: 180mA @ 5V.
 - Flash LED on to maximum brightness: 310mA @ 5V.
 - Deep-sleep: 6mA @ 5V min.
 - Modem-sleep: 20mA @ 5V min.
 - Light-sleep: 6.7mA @ 5V min.
- Dimensions (ESP32): 40 x 27 x 12 (LxWxH) mm.
- Temperature Range: Operating: -20 ~ 85 ; storage: -40 ~ 90 @ <90%RH.

B. L293D Motor Driver:

The **L293D** is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. A single **L293D** IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently.

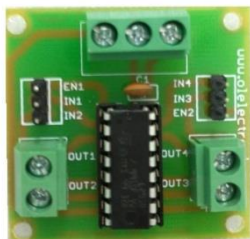


Fig: L293D Motor Driver

L298D Motor Driver Shield – Overview

L293D is a monolithic integrated, high voltage, high current, 4-channel driver. Basically, this

means using this chip we can drive DC motors with power supplier up to 36 Volts, and the chip can supply a maximum current of 600mA per channel. L293D chip is also known as a type of H-Bridge. The H-Bridge is typically an electrical circuit that enables a voltage to be applied across a load in either direction to an output, e.g. motor.

C. DC motor:

Fig: DC motor

A Direct Current (DC) motor is a rotating electrical device that converts direct current, of electrical energy, into mechanical energy. An Inductor (coil) inside the DC motor produces a magnetic field that creates rotary motion as DC voltage is applied to its terminal. Inside the motor is an iron shaft, wrapped in a coil of wire. This shaft contains two fixed, North and South, magnets on both sides which cause both a repulsive and attractive force, in turn, producing torque.

D. Laser Light:

Fig: Laser light

This project presents a laser light instead of laser gun which can be controlled from web application through Wi-Fi by using smart phone/pc.

5. ACKNOWLEDGEMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

6. RESULTS:

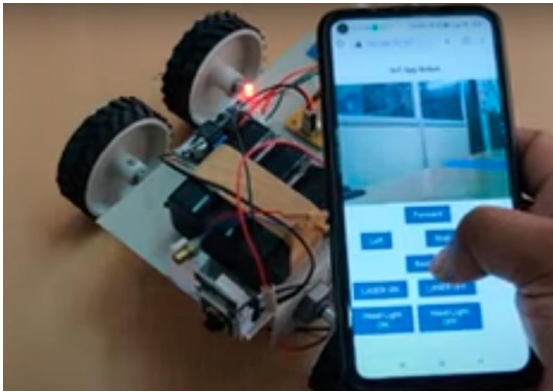


Fig:controlling the robot from web application

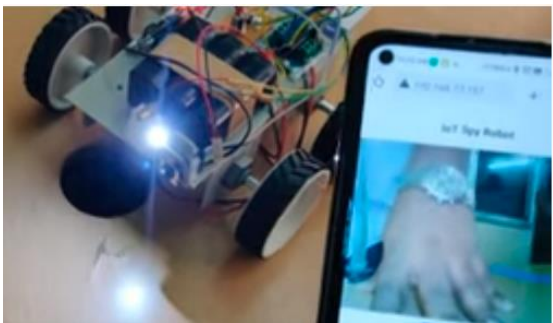


Fig: controlling the head light from web application

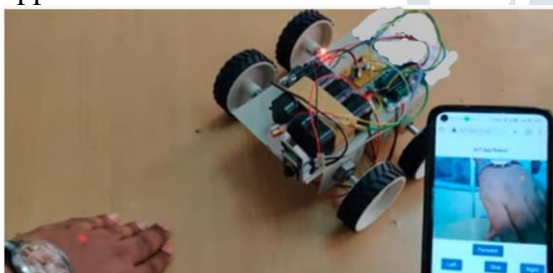


Fig: Controlling the laser gun from web application.

7) CONCLUSION:

The proposed system shows how the Android smartphone can be used as remote controller for robot and various embedded technologies with the help of the IOT technology. It could be improved with Wi-Fi module for large area coverage. The proposed system also shows that how a robot can be used for spy & rescuing purpose. The operating system of the smartphone is effective remote controller program and by using Wi-Fi wireless network, which makes it simple and convenient to control the robot. If the motor wheel is changed and replaced by a chain wheel than it can move anywhere at any rough condition.

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