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IOT Based Spy Robot with Laser Gun

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Abstract— Design and implementation of an IoT-controlled spy robot using ESP32-CAM for live video streaming and remote control via a web browser.

Live video feed, remote directional control, headlight control, laser activation, powered by a 12 V rechargeable battery.

Intended use: Surveillance, rescue, restricted-area monitoring.

The project aims in designing a War field spy robot which is operated wirelessly through smart phone using IOT technology

I. INTRODUCTION

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. 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.

II. LITERATURE REVIEW

1.A Review of explains the development of a spy robot using the ESP32-CAM module for live video streaming and wireless control. The robot can be operated through a web browser over Wi-Fi. The system provides real-time surveillance for military and security applications.

2.A Review of a wireless surveillance robot controlled through Arduino and motor driver circuits. The robot uses DC motors for movement and a camera module for monitoring restricted areas. The project improves safety by reducing human involvement in dangerous environments.

3.A Review of This project presents a rescue robot capable of detecting humans in disaster areas using sensors and camera systems. The robot helps in rescue operations where human access is difficult. It also supports live monitoring and remote navigation.

4. This literature describes a military spy robot controlled through IoT technology. The robot includes night vision camera support, wireless communication, and remote-controlled movement. It is mainly designed for border security and defense applications.

5. This study presents a Wi-Fi controlled robotic system using the L293D motor driver and DC motors. The robot performs directional movements like forward, reverse, left, and right through wireless commands. The system is suitable for industrial monitoring, surveillance, and military applications.

III. PROBLEM STATEMENT

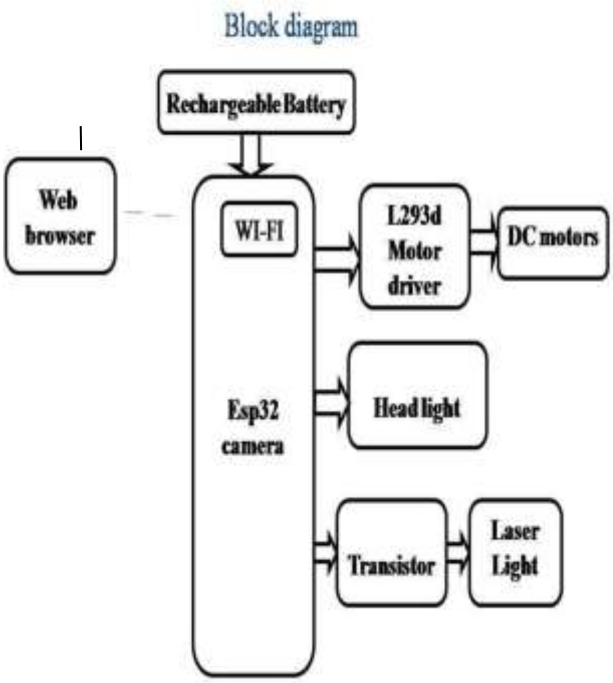
Gathering real-time video and situational awareness from dangerous or confined environments remains risky and limited by fixed surveillance systems. Many mobile solutions are costly, bulky, or lack secure, low-latency remote control. This project develops a compact, Wi-Fi controlled ESP32-CAM robot that enables discreet, affordable, and secure remote inspection and monitoring.

IV. OBJECTIVES

1. IOT based Warfield spy robot.
2. Controlling robot, gun and head light from web browser while seeing the video.
3. Drive two DC motors using L293D motor driver.
4. Provide headlight and laser control via GPIO and transistor switching.
5. Use a 12 V rechargeable battery with voltage regulation.
6. Integrate ESP32-CAM for video capture and web server.

V. PROPOSED SYSTEM

A. Block Diagram



System Overview

The DC motor you will find in modem industrial applications operates very similarly to the
simple DC motor described earlier in this chapter. Figure 12-9 shows an electrical

diagram of a simple DC motor. Notice that the DC voltage is applied directly to the field winding and the brushes. The armature and the field are both shown as a coil of wire. In later diagrams, a field resistor will be added in series with the field to control the motor speed.

When voltage is applied to the motor, current begins to flow through the field coil from the negative terminal to the positive terminal. This sets up a strong magnetic field in the field winding. Current also begins to flow through the brushes into a commutator segment and then through an armature coil.

The current continues to flow through the coil back to the brush that is attached to other end of the coil and returns to the DC power source. The current flowing in the armature coil sets up a strong magnetic field in the armature.

The magnetic field in the armature and field coil causes the armature to begin to rotate. This occurs by the unlike magnetic poles attracting each other and the like magnetic poles repelling each other. As the armature begins to rotate, the commutator segments will also begin to move under the brushes. As an individual commutator segment moves under the brush connected to positive voltage, it will become positive, and when it moves under a brush connected to negative voltage it will become negative. In this way, the commutator segments continually change polarity from positive to negative. Since the commutator segments are connected to the ends of the wires that make up the field winding in the armature, it causes the magnetic field in the armature to change polarity continually from north pole to south pole. The commutator segments and brushes are aligned in such a way that the switch in polarity of the armature coincides with the location of the armature's magnetic field and the field winding's magnetic field. The switching action is timed so that the armature will not lock up magnetically with the field. Instead the magnetic fields tend to build on each other and provide additional torque to keep the motor shaft rotating.

VI. SOFTWARE ARCHITECTRURE

There are several different types of software architecture in common use.

• Simple Control Loop:

In this design, the software simply has a loop. The loop calls subroutines, each of which manages a part of the hardware or software.

• Interrupt Controlled System:

Some embedded systems are predominantly interrupt controlled. This means that tasks performed by the system are triggered by different kinds of events. An interrupt could be generated for example by a timer in a predefined frequency, or by a serial port controller receiving a byte. These kinds of systems are used if event handlers need low latency and the event handlers are short and simple

Usually these kinds of systems run a simple task in a main loop also, but this task is not very sensitive to unexpected delays. Sometimes the interrupt handler will add longer tasks to a queue structure. Later, after the interrupt handler has finished, these tasks are executed by the main loop.

This method brings the system close to a multitasking kernel with discrete processes.

• Cooperative Multitasking:

A non-preemptive multitasking system is very similar to the simple control loop scheme, except that the loop is hidden in an API. The programmer defines a series of tasks, and each task gets its own environment to ―run‖ in. When a task is idle, it calls an idle routine, usually called ―pause‖, ―wait‖, ―yield‖, ―

nop‖ (stands for no operation), etc. The advantages and disadvantages are very similar to the control loop, except that adding new software is easier, by simply writing a new task, or adding to the queue-interpreter.

- Primitive Multitasking:

In this type of system, a low-level piece of code switches between tasks or threads based on a timer (connected to an interrupt). This is the level at which the system is generally considered to have an "operating system" kernel. Depending on how much functionality is required, it introduces more or less of the complexities of managing multiple tasks running conceptually in parallel.

VII. TESTING

Complete integration of ESP32-CAM, motors, laser, LED, and battery was tested together.

The robot successfully performed live streaming and remote movement simultaneously.

Final testing confirmed successful operation of the IoT spy robot.

VIII. RESULT

The project —Esp32cam -IOT spy robot with laser gun and head light‖ was designed a face detection and live streaming robot using esp32 camera and web application.

IX. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

X. REFERENCES

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