A Minor Project Report

On

WIRELESS SECURITY CAMERA

Submitted in partial fulfilment of requirements for the award of the

Degree of

BACHELOR OF ENGINEERING

in **ELECTRONICS AND COMMUNICATION ENGINEERING**

Under the guidance of

Mrs. A. SUGANYA

Submitted By

RAGHURAJ S   (19BEC4156)

NITHISH KUMAR S   (19BEC4136)

ROAHIT S   (19BEC4166)

RAGHUL V   (19BEC4155)

DEPARTMENTOF ELECTRONICS AND COMMUNICATION ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous)

KARUR – 639 113

NOVEMBER - 2021

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

BONAFIDE CERTIFICATE

Certified that this **18ECP105L -** Minor Project III report **"WIRELESS SECURITY CAMERA" is** the bonafide work of **"RAGHURAJ S (19BEC4156), NITHISH KUMAR S (19BEC4136), ROAHIT S (19BEC4166), RAGHUL V (19BEC4155)"** who carried out the project work under my supervision in the academic year 2021-2022.

Signature of the Students:

1. RAGHURAJ S   (19BEC4156)   _____

2. NITHISH KUMAR S   (19BEC4136)   _____

3. ROAHIT S   (19BEC4166)   _____

4. RAGHUL V   (19BEC4155)   _____

Signature of the Guide   Signature of the HOD

Vision and Mission of the Institute and Department

Vision

To emerge as a leader among the top institutions in the field of technical education.

Mission

- ❖ Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- ❖ Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- ❖ Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

Department of Electronics and Communication Engineering

Vision

- ❖ To empower the Electronics and Communication Engineering students with Emerging Technologies, Professionalism, Innovative Research and Social Responsibility.

Mission

- ❖ Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects.
- ❖ Inculcate the students in problem solving and lifelong learning ability.
- ❖ Provide entrepreneurial skills and leadership qualities.
- ❖ Render the technical knowledge and industrial skills of faculties.

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

❖ **PEO1:** Graduates will have a successful career in academia or industry associated withelectronics and communication engineering.

❖ **PEO2:** Graduates will provide feasible solutions for the challenging problems through comprehensive research and innovation in the allied areas of electronics and communication engineering..

❖ **PEO3:** Graduates will contribute to the social needs through lifelong learning,practicing professional ethics and leadership quality.

PROGRAM OUTCOMES(PO'S)

❖ **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems

❖ **PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

❖ **PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

❖ **PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

❖ **PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

❖ **PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

❖ **PO7: Environment and sustainability:**Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

- ❖ **PO8: Ethics :**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- ❖ **PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- ❖ **PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
- ❖ **PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
- ❖ **PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES(PSO'S)

- ❖ **PSO1**: Applying knowledge in various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of Engineering application.
- ❖ **PSO2**: Able to solve complex problems in Electronics and Communication Engineering with analytical and managerial skills either independently or in team using latest hardware and software tools to fulfill the industrialexpectations**.**

Keywords	Matching with POs , PSOs
ESP32-CAM Module, USB to Micro USB cable, FTDI Module, 5V Micro USB Power Adapter, Connecting wires, Micro Memory Card	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2

ABSTRACT:

The ESP32-CAM camera module is used to create compact and low cost Wireless Security Camera. This module is integrated with Wi-Fi and a dedicated Miro Memory Card. By using the ESP32-CAM the video is recorded in the micro memory card. This module needs constant power source. The code is uploaded in the camera module using FTDI Module as the camera module does not have a dedicated data transfer port. It can also be used to connect power source.This ESP32-CAM is connected to the internet through Wi-Fi. Thus the live feed can be viewed through a web page which can be accessed through smart phones, laptops, computers, etc.

Table of Contents

List of Figures

Acronyms/List of Abbreviations

Acronym	Abbreviations
CAM	Camera
USB	Universal Serial Bus
TTL	Transistor – Transistor Logic
FTDI	Future Technology Devices International
DIP	Dual Inline Package

1. INTRODUCTION:

In this project with the help of ESP32-CAM module with integrated Wi-Fi module and dedicated Micro Memory Card is used to make a Wireless Security Camera. This camera module needs FTDI module to upload the code as it does not have dedicated data transfer port. The video is directly recorded in the micro memory card. The live feed can be viewed through the web page which can be accessed through mobile phone, laptops, computer, etc. As the camera module established internet connection through Wi-Fi. The video feed quality can be customized in the web page. The main reason for using ESP32-CAM is to make a low cost and compact wireless security camera.

1.1 BACKGROUND:

Wireless security cameras are cameras that transmit a video signal to a wireless receiver through a radio band. Many wireless security cameras require at least one cable or wire for power, "wireless" refers to the transmission of video . However, some wireless security cameras are battery-powered, making the cameras truly wireless from top to bottom. Wireless cameras are proving very popular among modern security consumers as it has flexible mounting options, wireless cameras can be mounted/installed in locations previously unavailable to standard wired cameras. In addition to the ease of use and convenience of access, wireless security camera allows users to leverage broadband wireless internet to provide seamless video streaming over-internet. But the price is on higher side also it does not have many models.

1.2 PROBLEM STATEMENT:

Nowadays the wireless security camera has become the best choice when it comes to a security cameras.

- This system cost higher than the regular security camera.
- The wireless cameras are bigger when compared to regular cameras.
- The power consumption is more.
- The existing wireless security camera is visible to anyone as its size is larger.

1.3 OBJECTIVES:

To create a low cost and compact wireless security camera.
To view the live feed through the web page.

2. LITERATURE REVIEW:

In this chapter, the analysis of the different circuit stages. Review of the component used in the project circuit and the basic information necessary for the achievement of the module is being dealt with/discussed.

3.PROJECT METHODOLOGY:

3.1 EXISTING METHOD:

Wireless security cameras are cameras that transmit a video signal to a wireless receiver through a radio band. Many wireless security cameras require at least one cable or wire for power, "wireless" refers to the transmission of video . However, some wireless security cameras are battery-powered, making the cameras truly wireless from top to bottom. Wireless cameras are proving very popular among modern security consumers due to their low installation costs (there is no need to run expensive video extension cables) and flexible mounting options, wireless cameras can be mounted/installed in locations previously unavailable to standard wired cameras. In addition to the ease of use and convenience of access, wireless security camera allows users to leverage broadband wireless internet to provide seamless video streaming over-internet.

3.2 PROPOSED METHOD:

The wireless security cameras are made with high price tag. The probability of buying a pricer camera by the people is very less. So, by using ESP32-CAM the wireless security camera is more affordable, compact and consumes less power.
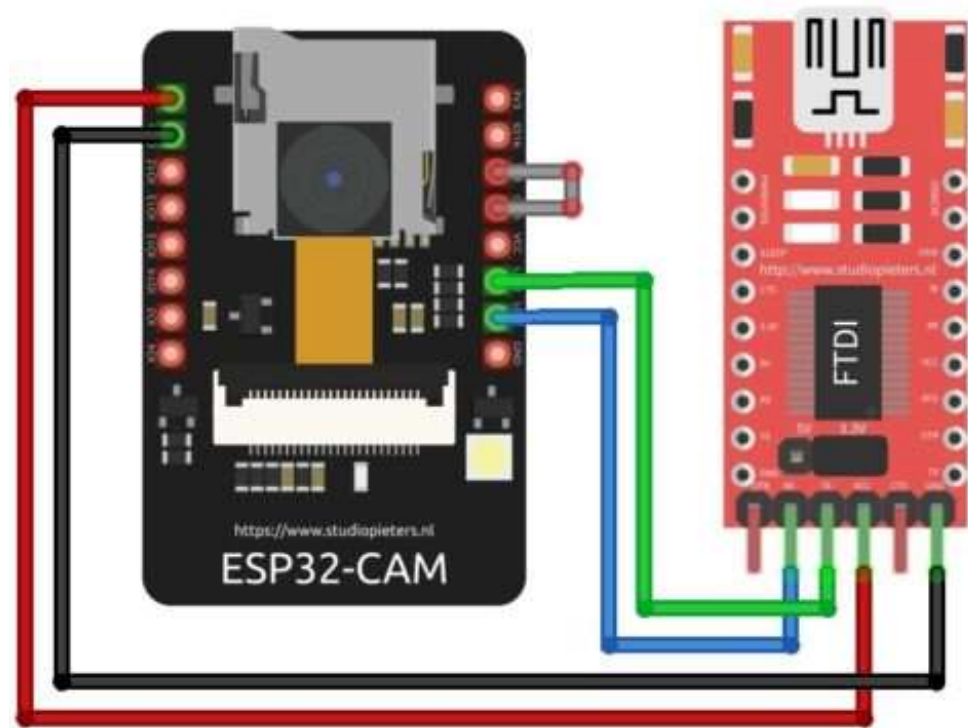
3.2.1 CIRCUIT DIAGRAM:

Fig. 3.21 Circuit diagram

In the above circuit the 5V & GND Pin of ESP32 is connected to 5V & GND of FTDI Module. Similarly, the Rx to UOT and Tx connected to UOR Pin. And the most important thing, you need to short the IO0 and GND Pin together. This is to put the device in programming mode. Once programming is done you can remove it.

3.2.2 WORKING PRINCIPLE:

The ESP32-CAM module with integrated Wi-Fi module and dedicated Micro Memory Card is used to make a Wireless Security Camera. This camera module needs FTDI module to upload the code as it does not have dedicated data transfer port. The video feed is directly recorded in the micro memory card. We need to connect the 5V & GND Pin of ESP32 to 5V & GND of FTDI Module. Similarly, connect the Rx to UOT and Tx to UOR Pin. And the most important thing, you need to short the IO0 and GND Pin together. This is to put the device in programming mode. Once programming is done you can remove it. Then the live feed can be viewed through the web page which can be accessed through mobile phone, laptops, computer, etc. As the camera module established internet connection through Wi-Fi. The video feed quality can be customized in the web page.

3.2.3 REQUIRED COMPONENTS:

- ➢ ESP32-CAM Module
- ➢ USB to Micro USB cable
- ➢ FTDI Module
- ➢ 5V Micro USB Power Adapter
- ➢ Connecting wires
- ➢ Micro Memory Card

A. ESP32-CAM Module:

The ESP32-CAM has a very competitive small-size camera module that can operate independently as a minimum system.

ESP32-CAM can be widely used in various IoT applications. It is suitable for home smart devices, industrial wireless control, wireless monitoring, QR wireless identification, wireless positioning system signals and other IoT applications. It is an ideal solution for IoT applications.

ESP32-CAM is packaged in DIP and can be directly plugged into the backplane for quick production. It provides customers with a highly reliable connection method and is convenient for use in various IoT hardware terminals.

Fig.3.22 ESP32-CAM Module

B. FTDI Module:

The FTDI Micro USB to TTL serial converter module is a UART (universal asynchronous receiver-transmitter) board used for TTL serial communication. It is a breakout board for the FTDI FT232R chip with a USB interface, can use 3.3 or 5 V DC and has Tx/Rx and other breakout points.

FTDI Micro USB to TTL serial converter modules are used for general serial applications. It is popularly used for communication to and from microcontroller development boards such as ESP32-CAM, which do not have USB interfaces.
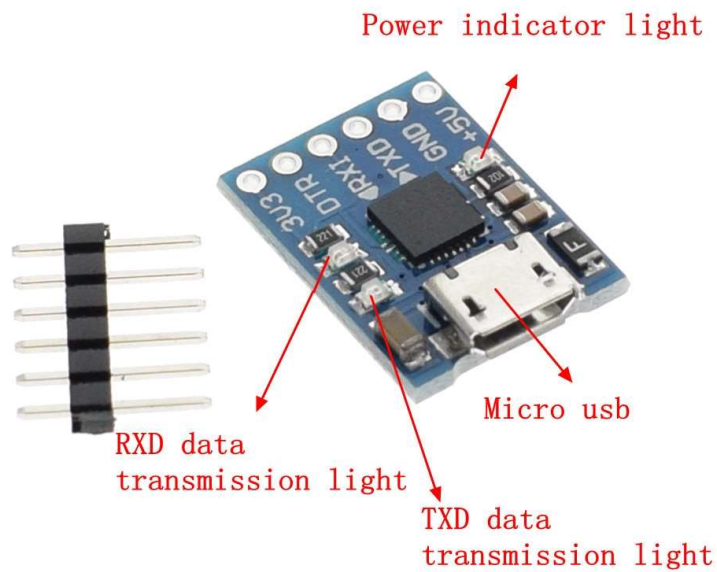

Fig.3.23 FTDI Module

C. USB to Micro USB cable:

The USB to Micro USB cable is used to both power and upload the code in the ESP32-CAM module when we short the IO0 and GND Pin together in the module.

Fig.3.24 USB to Micro USB cable

D. 5V Micro USB Power Adapter:

The 5V Micro USB Power adapter is used to power the ESP32-CAM module.

Fig.3.25 5V Micro USB Power Adapter

E. Connecting Wires:

Connecting wires allows an electrical current to travel from one point on a circuit to another, because electricity needs a medium through which to move.

Fig.3.26 Connecting wires

F. Micro Memory Card:

Micro Memory Card is a non-volatile micro sized storage. Mostly used in portable devices. Here this type of storage is used to store the video feed from wireless security camera.

Fig.3.27 Micro Memory Card
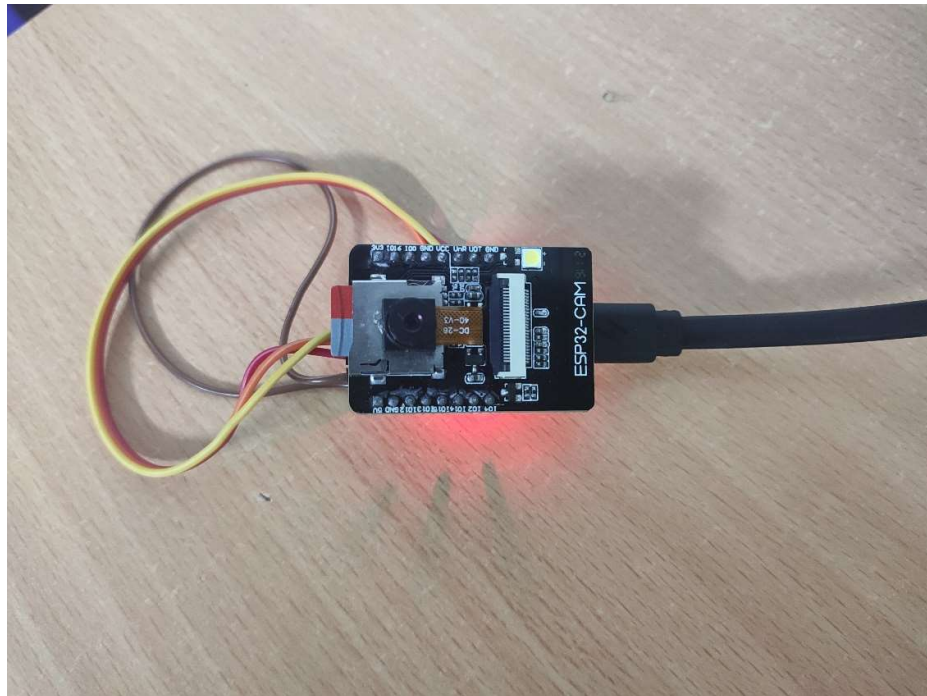
3.2.2 PROJECT IMAGE AND WEBPAGE IMAGE:

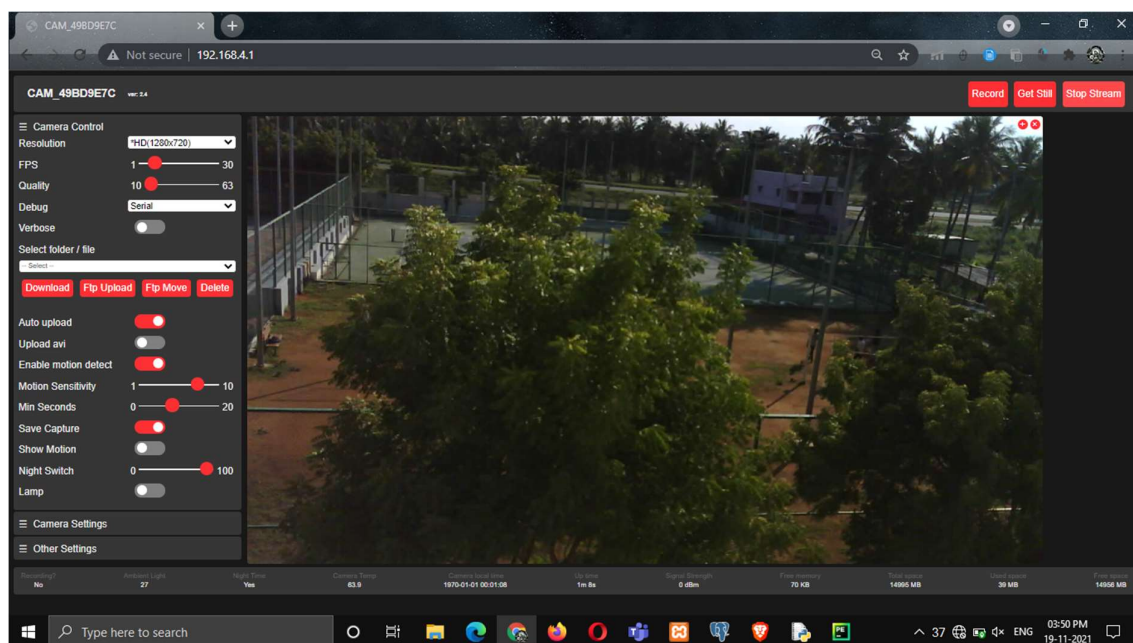**Fig.3.28 Project Image**

Fig.3.29 Webpage

3.3 SOURCE CODE:

```cpp
#include "esp_camera.h"
#define CAMERA_MODEL_AI_THINKER

static const char* TAG = "ESP32-CAM";

#include "camera_pins.h"
#include "myConfig.h"

const char* appVersion = "2.4";
#define XCLK_MHZ 20 // fastest clock rate

//External functions
void startCameraServer();
bool prepMjpeg();
void startSDtasks();
bool prepSD_MMC();
bool prepDS18();
void OTAsetup();
bool OTAlistener();
bool startWifi();
void checkConnection();

void setup() {
  Serial.begin(115200);
  Serial.setDebugOutput(true);
  Serial.println();

  if(!prepSD_MMC()){
    Serial.println("SD card initialization failed!!, Will restart after 10 secs");
    delay(10000);
    ESP.restart();
  }
```

4. RESULTS AND DISCUSSION:

- After sensing the data from the device, which are placed in particular area of interest.
- The sensed data will be automatically sent to the web server, when a proper connection is established with sever device.The web server page which will allow us to monitor and control the wireless security camera.
- The web page gives the live video feed in that particular region, where the wireless security camera is placed.
- The data stored in the Micro memory card can be used for the analysis and continuous monitoring purpose.

5. CONCLUSION:

While the security cameras were used for prevention of thefts and break-ins, with advnacements in technologies, security cameras now become wireless. As all new technologies does come with a price tag and it is not affordable for all people. So, in this project we offer a affordable and compact wireless camera as an alternate for those pricer wirelesss security cameras.

6. REFERENCES:

1. "What is the difference between 2.4 GHz and 5 GHz?". Stuff Fibre. Retrieved 2020-02-11.

2. EST, digitaldoc77Friday Jan 06 2017 16:00. "Wireless Basics: Understanding 900 MHz". DSL Reports. Retrieved 2020-02-11.

3. "Digital Wireless Cameras: Frequently Asked Questions | Lorex". www.lorextechnology.com. Retrieved 2020-02-11.

4. "StackPath". www.powerelectronics.com. Retrieved 2020-02-11.

5. "Choosing a Recording System for Your Security Cameras • NSSF". NSSF. 2017-03-01. Retrieved 2020-02-11.

6. Thiel, Bill (31 January 2002). "Online Dairy". New York Times. The New York Times.

7. Hays, Tom (16 April 2006). "NYPD deploys first of 500 security cameras". USA Today. The Associated Press. Retrieved 7 June 2014.