# THE UNIVERSITY OF FAISALABAD

# Autonomous Video Surveillance and Charging Robot

## INTRODUCTION

Nowadays, research on cognitive sensors have been evolving with a fast pace, such that multiple sensor are used to demonstrate environmental conditions as well as for human motion detection, obstacle avoidance, location detection, metal detection, spectrum detection, etc. which can be used in this proposed project.

This project presents a speed and direction control of cost-effective robot which can be used for surveillance in places where human beings are unable to enter. Always the customer expects single device usage for various applications; this requirement makes the designer to incorporate all the features in a device that leads to increased cost and reduction in speed.

The proposed method incorporates many features and increases the speed of operation by doing parallel operation with different sensors.

## PROBLEM STATEMENT

- Have to Include multiple libraries.
- Have to download many directories.
- Create separate object program folders to use in the main code program to avoid complexity.
- Balanced the supply voltages for module , Arduino uno & motors.
- Arduino board problem.
- Code uploading and connecting to server problem in ESP32 module.

## OBJECTIVES

The objectives of this project are as follows.

- To create Surveillance RC Robot with ESP32-CAM and Arduino Uno module.
- Which can be controlled from anywhere by web browser on any smartphone.
- To create an IOT environment in which we can see live streaming with camera & control the car with control panel through internet.

## METHODOLOGY

**Camera driver part:**

For this part, basically It is based on the sample code of the camera driver part of ESP32/Camera/CameraWebServer. In my project, I divided into 3 files: camera_pin.h, camera_wrap.h and camera_wrap.cpp.

- camera_pin.h: contains the definition of ESP32 pin used for communication with the attached camera.
- camera_wrap.cpp: contains a basic configuration for camera initialization and a function for taking image.
- camera_wrap.h: contains the prototype functions which used in another module.

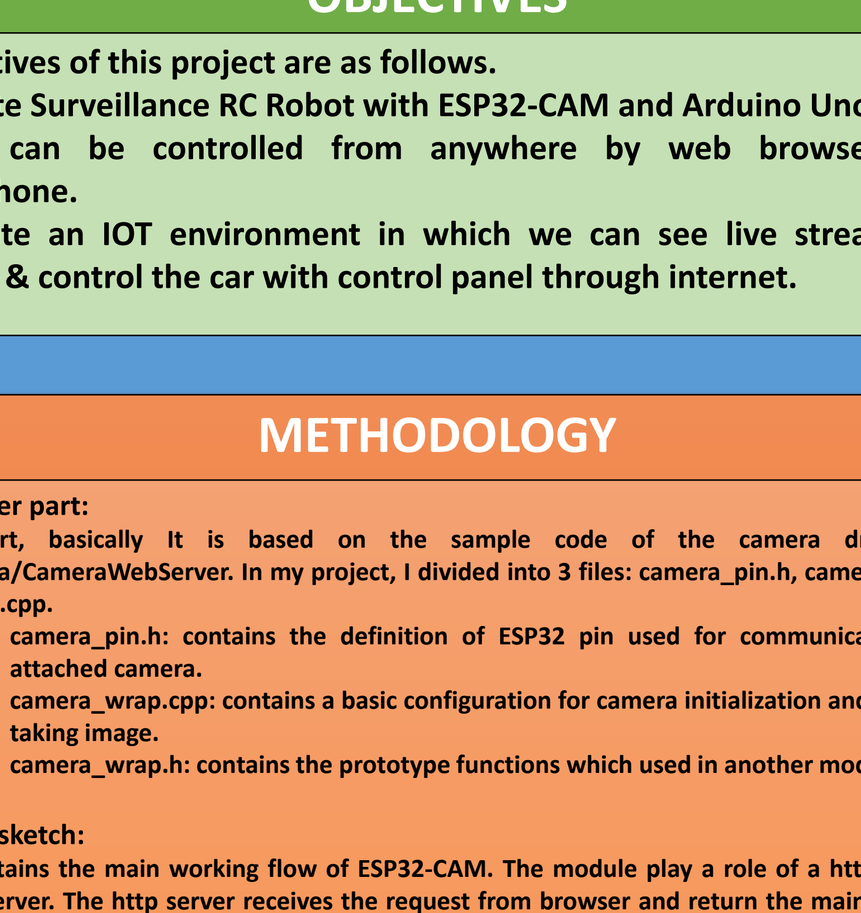
**ESP32-CAM sketch:**

This part contains the main working flow of ESP32-CAM. The module play a role of a http server and a web socket server. The http server receives the request from browser and return the main page which is used as a GUI to control the robot, the web socket server is used to send the images repeatedly to the GUI display on the web browser.

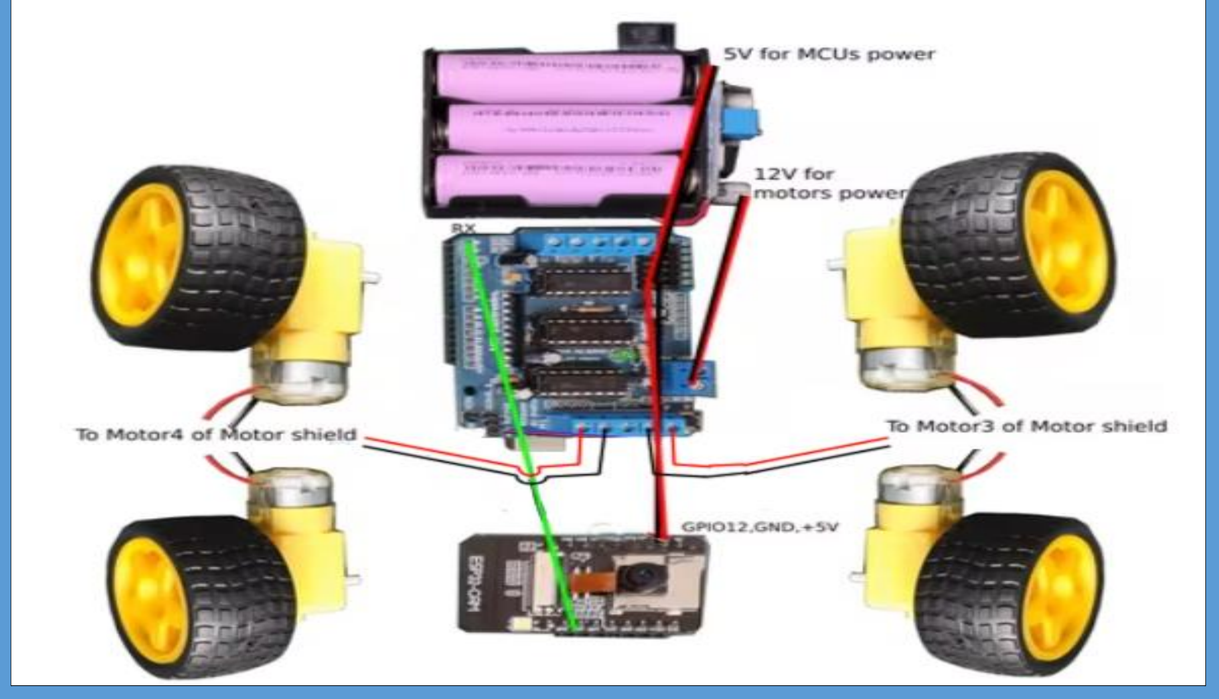
**Arduino Uno sketch**

This part contains the source code of the Arduino module ESP32-CAM via serial then control DC, RC motors.

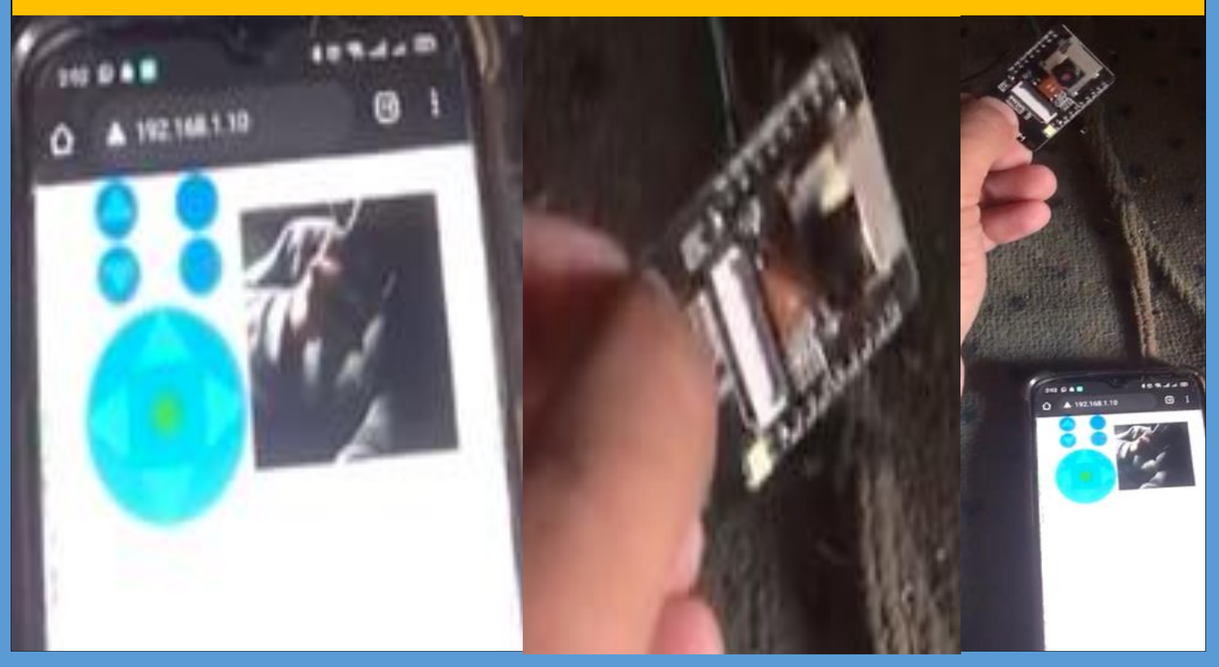
**System flow:**




## CIRCUIT DIAGRAM/ SCHEMATICS




## RESULTS AND DISCUSSION



## FUTURE WORK

We want to upgrade it to a complete security Surveillance RC Robot car Using different sensors. Also to involve Computer Vision using OpenCV. So, we can do object detection and recognition. We will be adding these features in future:

- Object Detection.
- Object Recognition.
- Moveable Camera.
- Headlights and indicators etc.

## CONCLUSIONS

- After solving many problems we have achieved our goal.
- We have been successful in our project and in the given time under the guidance and support from our Supervisor and Department.
- This IOT based project will help as Security Surveillance robot in future.

## REFERENCES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# DEPARTMENT OF ELECTRICAL ENGINEERING