IoT Based Smart Antitheft System

CS578 IoT Hardware Poject
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I. Objective

The fundamental objective of this project is to bulid an IoT Based Smart Antitheft System. PIR sensor is associated with a micro-controller to detect motion, ESP32-CAM Wi-Fi module is used to capture the images. A micro SD card will also be associated with the ESP32 module that will save the soft copies of all the images captured. Captured images are sent to the server utilizing Wi-Fi. The owner will also receive a copy of the captured images on his/her email-ID. Moreover, the owner have the provision to decide whether he wants to send the email to multiple people or not. This model has the ability to send emails including captured images to multiple users at the same time.

II. Implemented Attributes

The main implemented attributes of the projects are:

- PIR motion sensor is used to detect the motion of the intruder.
- ESP32-CAM module wakes up from the sleep mode when the motion is detected and captures the image.
- A micro SD card, attached to ESP32-CAM, is used as a storage device for storing the captured images.
- An email with captured image as attachment is sent to the user's email-ID by ESP32-CAM Wi-Fi module as soon as the image is captured.
- Same email with the image attached can be sent to different user IDs at the same time.
- User can find all the images stored on the micro SD card by connecting it to mobile phones or laptops.
- Status of the system and the camera module can be seen on the serial monitor in the Arduino IDE.

III. Configuration Diagram

The system consists of PIR sensor, ESP32-CAM Wi-Fi module, Arduino UNO, Laptop, micro SD card, and Laptops or mobile phones to receive email. Motion is sensed using PIR motion detector. ESP32-CAM, which was in sleep mode initially, wakes up as the motion is detected. The module then captures an image using the inbuilt camera and stores the captured image on the attached micro SD card. ESP32-CAM then sends the captured image as an attachment with an email to the user's ID using internet and alerts the user about the detected motion. All the text messages related to the status of the system can be monitored on the serial monitor of Arduino IDE. The basic configuration diagram is shown here.
The ASM flow chart of system can be visualized as follow:

The Physical appearance of the system is also shown on next page.

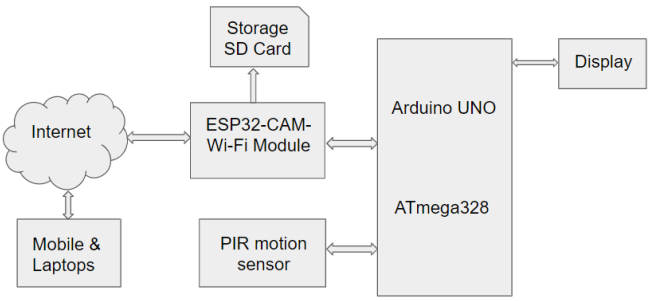

Fig. 1. Configuration block diagram, IoT Based Smart Antitheft System

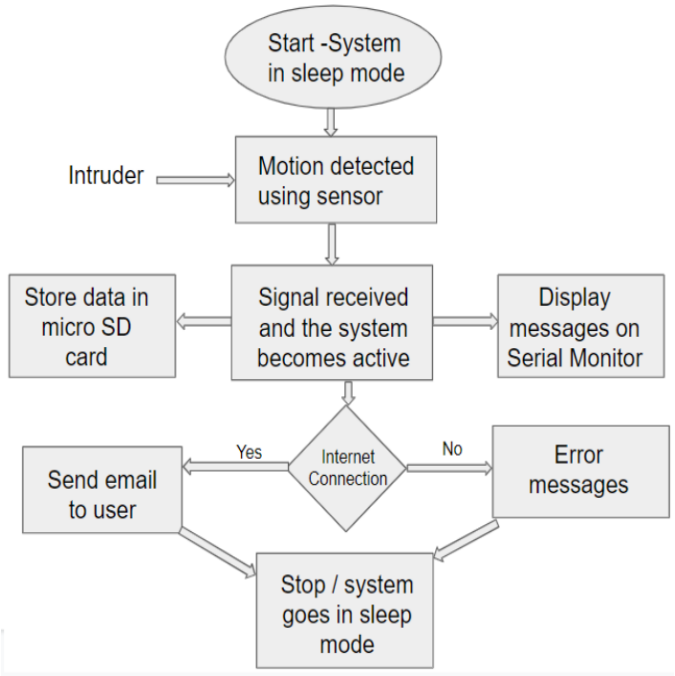

Fig. 2. Flow Chart of Data in IoT Based Smart Antitheft System

IV. Sample Outputs

A sample of mail sent to the user email ID is shown below. Also the status of the system can be monitored on the serial monitor of Arduino IDE as shown below. A screenshot showing the images saved on the micro SD card is also given.

V. Codes

Source codes is available on my github repository:

- Complete code of project, that is uploaded on ESP32-CAM is in the link given below.
  Source Code: git.io/JTd6t

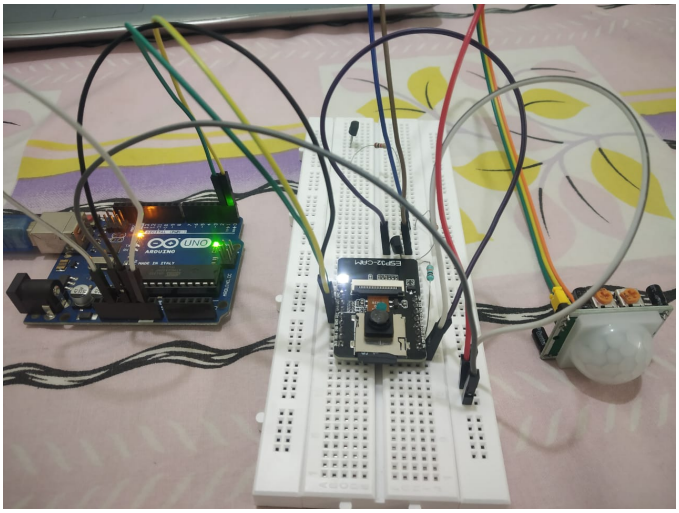

Fig. 3. The physical appearance of system, IoT Based Smart Antitheft System

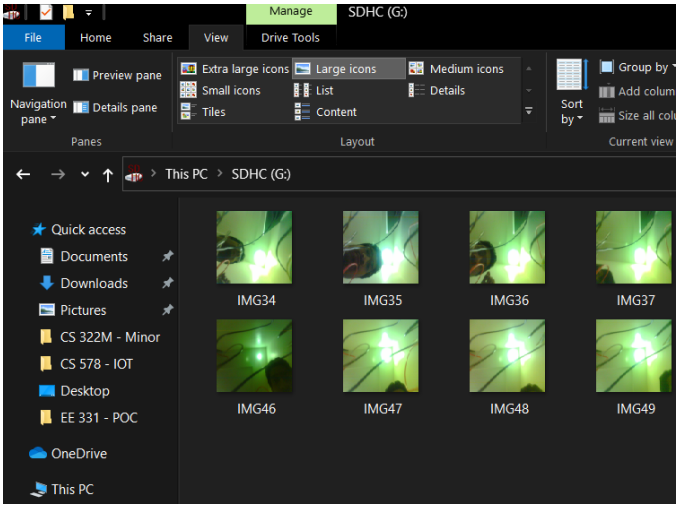

Fig. 5. Sample Output: Images saved on micro SD card

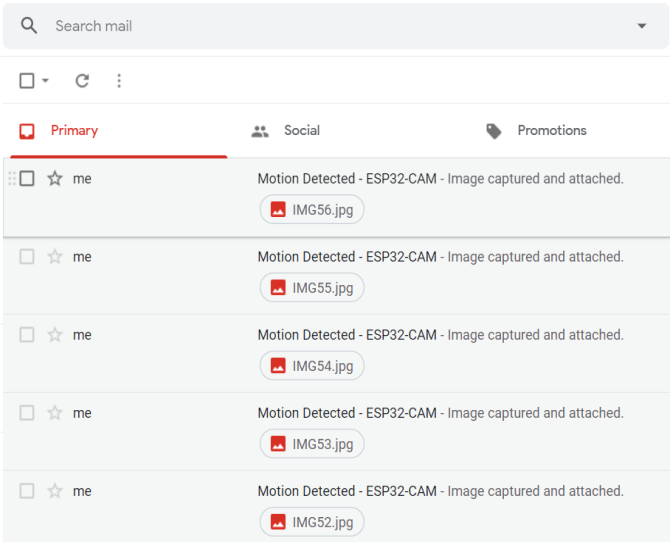

Fig. 4. Sample Output: Screenshot of email sent to user ID

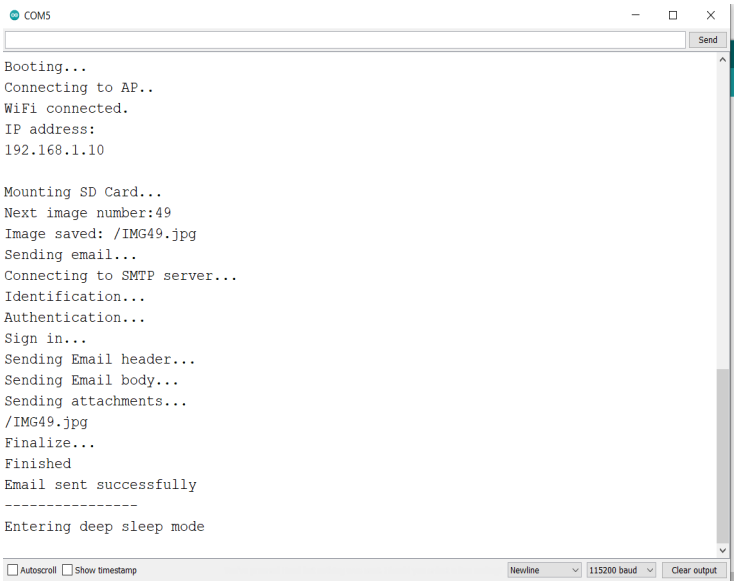

Fig. 6. Sample Output: Serial Monitor

VI. User Manual

To use this project follow the instructions given below:

- Download source code from given link.
- Set connection by updating Wifi SSID and password of your network in the code.
- Mount a micro SD on ESP32-CAM module.
- Add the email ID and password of the sender. The email will be sent to user ID via this sender's ID.
- Add one or multiple user email IDs on which the email will be received.
- Download the mail-client library and ESP32 libraries on the Arduino IDE and setup the IDE for ESP32-CAM module.
- Before uploading the code make sure that GPIO pin 0 and ground pin are shorted together. This is necessary while uploading the code.
- After compiling the code press the reset button on the ESP32-CAM and let the code upload.
- Remove the GPIO pin 0 and ground pin connection after uploading is successful.
- Open the serial monitor and press the reset button on ESP32-CAM board once more to view the messages.
- Captured images can be seen anytime by mounting the micro SD card on laptops or mobile phones.

VII. Demo Video

A demo video of the working project can be viewed here: *Demo Video*