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REALTIME MONITORING SECURITY SYSTEM INTEGRATED WITH EMAIL COMMUNICATION

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ABSTRACT

A sophisticated security system that monitors a protected area in real-time and notifies the user via email in the event of a security breach is the goal of the Real-time Monitoring Security System Integrated with Email Communication project. To strengthen security protocols and accelerate reaction times to any threats, the system integrates email correspondence, motion sensors, and surveillance cameras.

Keywords: Arduino,RFID,webcam,L293D.

I. INTRODUCTION

In the modern world, security is a major problem. Protecting assets and guaranteeing people's safety depends heavily on efficient surveillance and monitoring technologies. Real-time monitoring and prompt user notification of security breaches are two areas where traditional security solutions fall short. The Real-time Monitoring Security System Integrated with Email Communication has been suggested as a solution to these drawbacks.

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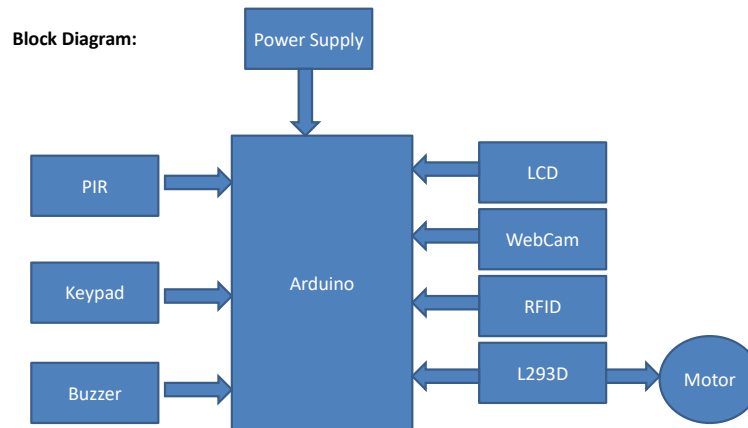Email: gummulanareshkumar0707@gmail.com

Block Diagram:

Figure 1 : Block Diagram

Numerous sectors have used embedded systems, which are frequently paired with an Arduino or Raspberry Pi as the primary system. Ying Wen et al. [7] have presented a surveillance system that uses PIR sensors and ultrasonic signal coding to increase the detecting reliability of ultrasonic sensors. The Arm 7 microprocessor is interfaced with many PIR and ultrasonic sensors. By using a majority voting technique, the system not only identifies an intruder but also publishes the collected image to the internet. The technique for controlling the door lock over the internet is described in the paper "Access control of door and home security through the internet" [6]. After being notified about the guest, the user chooses whether or not to open the door. Moreover, the mechanism tweets the image that was taken, which is not something that should be shared on social media. A security alarm system that employs sound and mail is suggested in "Design and Implementation of Security Systems for Smart Home based on GSM Technology" [8]. An email utilizing GSM technology will be sent to the owner notifying them of any interruptions. The system calls for a PC and a Wi-Fi DSP Kit, both of which must be turned on constantly for a full day, which translates to increased power usage. It is a significant flaw in this system. The following article, "An Intelligent Door System using Raspberry Pi and Amazon Web Services IoT," [9], logs all incursion data

onto the owner's Google Drive account and alerts of any intrusion. The Framework suggested by When motion is detected, Jyoti et al. [10] takes pictures and uploads them to a cloud server. Moreover, the system uses the GSM module to deliver SMS warnings to users.

The PIR sensor is utilized in the newer "Low-Cost Energy Efficient Smart Camera with Information Stamping for IoT Networks" to sense the presence of a live thing and activate the camera, which shortens the recording time and hence uses less storage space [11]. Furthermore, this procedure uses less electricity. The video is made more user-friendly by time stamping each frame during pre-processing, and the system's efficiency is greatly increased by automatically uploading data to cloud storage.

II. SYSTEM ARCHITECTURE

We are receiving real-time email notifications in our suggested system. Through its USB connector, Arduino is linked to the webcam. The Arduino pins are linked to the motion sensor, also known as the PIR sensor. LCD (16*2) and Keypad (4*4) are also linked using pins. An LED that indicates the door is linked. lock and opening conditions. LED ON indicates that the door has to be opened in order to get entry. A locked door is symbolized by an LED that is off.

A. Arduino

A set of microcontroller boards called Arduino was created to make electronic design,

prototyping, and experimentation easier for amateurs, artists, hackers, and even professionals. It's used to create new digital musical instruments, robot brains, and systems that allow your houseplants to tweet you when they're dry. An ATmega microcontroller, the foundation of all Arduinos (we utilize the basic Arduino Uno), is essentially a single chip that contains the CPU, RAM, Flash memory, and input/output ports. In contrast to a Raspberry Pi, for example, these pins may be used to connect a wide range of sensors, LEDs, tiny motors, speakers, servos, and other devices directly. These pins can read in or output digital or analog voltages between 0 and 5 volts. The Arduino is linked to your computer by USB, and then upload your developed code to the board using the free Arduino IDE to program it in a basic language (C/C++, which is comparable to Java). Once configured, the Arduino may operate independently of your computer via a USB connection or with it connected; all it needs is power to function.
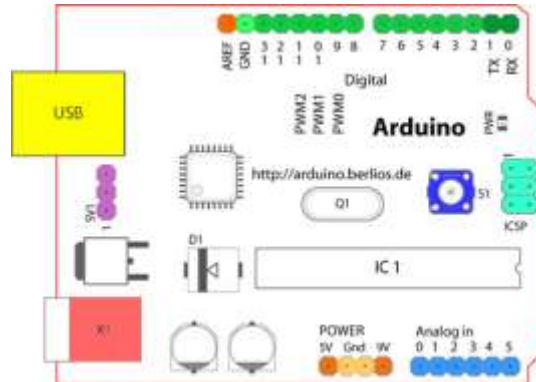
(A)

(b)

Fig.2: (a) Pin Description of Arduino (b) Arduino

B.   Webcam

A webcam [18] is a type of video camera that uses a computer or computer network to deliver live video or photos. It has a USB cord linked to it. The low cost and high flexibility of this sort of video communication make it a dependable and affordable option. It's inexpensive, but the resolution is great. The primary purpose of webcams is to create video connections, which allow computers to function as video phones or nodes for video conferences. Security surveillance [12], computer vision, and video broadcasting are more uses. This concept uses a webcam as a smart security camera [16], which may be used to record live video over the Internet and take pictures of unauthorized individuals who may be intruders.

The webcam that we've been using is the Logitech C310 HD Webcam, which has a maximum resolution of 720p and 30 frames per second. It also has a built-in microphone with noise reduction, automatic light adjustment, and a 60-degree field of vision with fix focus type specialized.

Fig.3: Logitech C310 HD Webcam

C. PIR Sensor

An electrical device called a PIR (Passive Infrared Sensor) [13] detects infrared radiation from objects in its range of sight. Infrared radiation, or heat energy, is emitted by all items with a temperature greater than absolute zero Kelvin None. Anytime a live thing enters its area of interest, the At that location in the sensor's range of vision, the temperature will rise Temperature range: body to room temperature. The sensor initiates the detecting process whenever there is a change in the incoming infrared radiation within its field of vision.
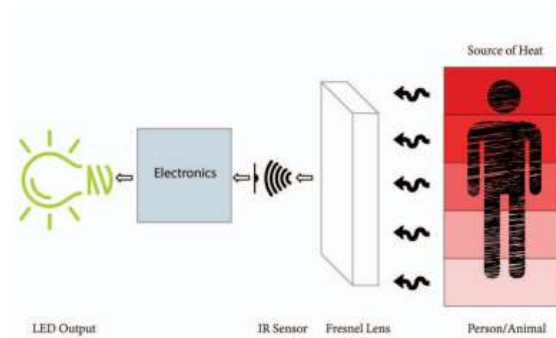

Fig.4: Working of PIR Sensor

This system has employed this sensor to determine whether someone is in front of the door. The moment it senses a person's presence, it activates the Webcam and starts a series of further commands. As a result, its utilization guarantees longer equipment life and increases the system's power efficiency.

D. Keypad 4*4

A keypad [19] is a group of buttons with alphabetical letters, symbols, and numbers displayed in a block or pad. The 16 keys on the 4*4 Keypad are made up of the numbers 0 through 9, the alphabets A through D, and the symbols * and #.

Eight PINS—four for each row and four for each column—connect the keys of each row and column. The Keypad may be connected to other devices via these pins. We have built a password-based authentication mechanism for the door lock in this system. To enter a PIN, utilize the Keypad. Any combination of alphanumeric characters can be used as the password, which is used to restrict access to only authorized individuals.
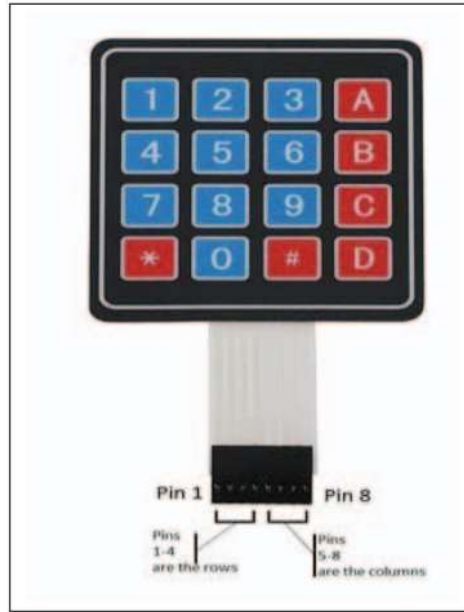
Fig.5: Keypad of structure 4*4

E. LCD 16*2

Liquid Crystal Displays, or LCDs, are electronic display modules that offer an affordable means of adding a text output unit to any kind of system. There are 16 columns and 2 rows on a 16*2 LCD. It can show 16 characters on the two lines, one for each line.

Because it is an alphanumeric display, symbols, numbers, and alphabets may all be seen on it. Every character has a 5 x 8pixel area surrounding it. It uses 1 mA of electricity and runs in the 4.7 V–5.3 V voltage range without a backlight. It has sixteen connecting pins. This system communicates with the user by sending relevant messages via LCD. It helps the user all the way through the login procedure.

Fig.6: LCD Display

III Proposed System:

By utilizing cutting-edge technology and including email communication, the suggested Real-time Monitoring Security System Integrated with Email Communication seeks to overcome the shortcomings of the current systems. The system is made up of motion sensors that identify any unwanted activity and surveillance cameras that are positioned strategically to cover the protected area. These gadgets keep a close eye on the surroundings and record live video when they detect movement. A central processing unit,

which is attached to the system, examines the video stream and looks for any unusual behavior or security lapses.

The system immediately sends out an email notification in the event that a security breach is discovered, such as an intruder breaking into the restricted area or interfering with the security system. No matter where they are, the user may receive real-time notifications on their desktops, tablets, or cellphones by having the email delivered to their specified email address. This guarantees that consumers are notified of security breaches as soon as possible and may take the necessary steps right now.

The system's integration of email communication allows the user to keep a track of security occurrences in addition to receiving warnings in real-time. Users may monitor security breaches over time by tracking event details, timestamps, and pertinent information recorded by the system and included in the email message. Investigating occurrences or assessing the efficacy of security measures might benefit from this record.

Users may strengthen their security measures, respond to possible threats faster, and respond quickly when security breaches occur by putting the Real-time Monitoring Security System Integrated with Email Communication into practice. The technology offers a practical way to get beyond the drawbacks of current security systems, guaranteeing improved safety and comfort.

IV Result Analysis:

The system operated faultlessly and flawlessly during its installation. Because webcams are utilized during brief periods of observation (i.e., just when there human activities), electricity use drops, and also Storage is not required. Different screenshots taken at various steps are shown here to illustrate every aspect of this framework.

When a PIR sensor notices a human nearby, it provides a triggering output to the Arduino to start additional behaviors. An email including a link to a live video broadcast and an alert about the discovery of an intrusion is sent to a pre-specified email. The screen grab of the email that was received by the proprietor. You may undertake real-time monitoring by clicking the link. obtained via email. It unfolds a fresh window with the default Arduino IP address. Fig. 8 depicts a screen grab of the webcam's live feed. In the event that an erroneous pin is entered, the webcam will click the image of the trespasser. This image and a message stating that "the wrong person" are sent to the predetermined email address. password discovered," which is additionally useful as a proof. The snapshot of the email sent in Fig. 9 if a random or incorrect password was entered.
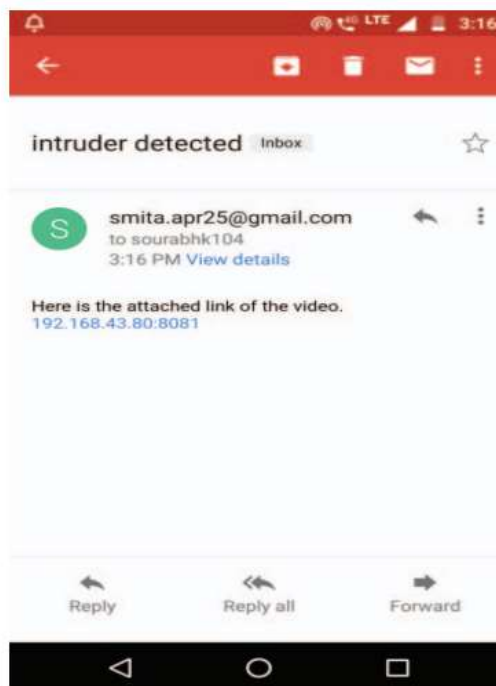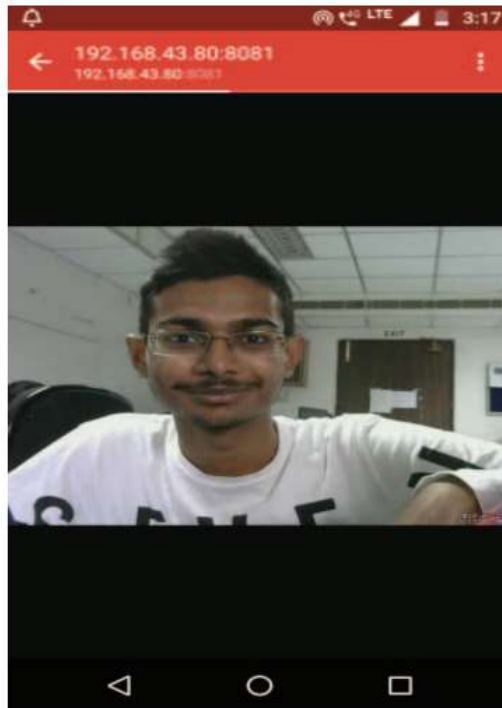

Fig.7: Screenshot of 1st mail received
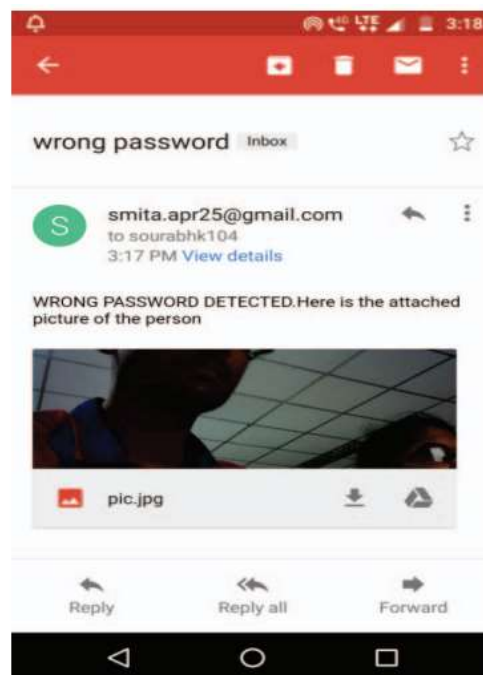
Fig.8: Screenshot of Live Video Stream

Fig.9: Screenshot of 2nd mail with a photograph of an intruder

V Conclusion:

An innovative and effective way to strengthen security protocols and accelerate reaction times to any attacks is the Real-time Monitoring Security System Integrated with Email Communication. The system enables real-time monitoring of a protected area and instantly alerts the user via email in the event of any security breach by integrating surveillance cameras, motion sensors, and email communication.

No matter where they are, users may always receive instant notifications on their PCs, tablets, or cellphones thanks to the integration of email communication. This gives consumers the ability to respond right away and take steps like calling the police, keeping an eye on the situation remotely, or taking preventative action.

Moreover, users may keep a record of security occurrences with the system's email integration, which offers a useful way to save incidents, timestamps, and other information. Investigational needs or long-term assessments of the efficacy of security measures can

both benefit from this data.

All things considered, the Real-time Monitoring Security System Integrated with Email Communication greatly raises the efficacy and dependability of security systems, providing more security and comfort.

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