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IOT Based SMART SECUIRTY SYSTEM

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ABSTRACT: The need for video surveillance systems has risen rather quickly. People are interested in knowing if their security surveillance system has an internet connection so that remote monitoring is possible. Security surveillance systems in the past needed to be watched by someone who spent the day confined in a room all day watching the systems to make sure nothing unwanted happened. The alternative was to revisit the tape for evaluation, but doing so ran the risk of damaging it. In the proposed system, we employ an IoT based system that detects any movement on the floor, creates an alert which then signals the raspberry pi to turn on the camera and inform the house owner about the disturbances.

KEYWORDS: IOT, surveillance, python programming, raspberry pi, OpenCV, raspian OS.

I. INTRODUCTION

In the present era, ensuring the security of homes and workplaces is of utmost importance. One way to ensure security is by incorporating smart security systems. By utilizing Raspberry Pi and the Internet of Things (IoT), it is possible to develop a user-friendly and uncomplicated security system for residential settings. This project has developed a clever security mechanism can be established using a Raspberry Pi 3, a PIR motion sensor, and a webcam. The Raspberry Pi 3 Model B is equipped with built-in Wi-Fi and Bluetooth, enabling straightforward connectivity to a Wi-Fi router and cloud service accessibility. The system can be can be set up at the primary entrance of aa residence or workplace. It uses a PIR sensor to detect any movement and begins taking pictures using a USB webcam. These pictures are saved temporarily the data obtained from the Raspberry Pi can be transmitted to the Google Cloud, where it is then relayed to the owner as an email alert. This means It is possible for the user to promptly access all visitor photographs through email, thereby enabling efficient monitoring can be viewed on a smartphone.

To communicate with the Google Cloud, the Raspberry Pi uses the TCP/IP stack, which is integrated into IoT boards like Raspberry Pi 3, making it easy to connect to an IoT network. The Pi captures photographs from the webcam using the OpenCV library, which then sends the images to the user's registered email account. Although this security system is straightforward and easy to install, This diminutive device can be highly effective in its applications. By situating it at the front entrance, the user can vigilantly monitor their residence or office at all times, from anywhere. Additionally, multiple devices can be installed to add more security levels. Upon detecting any unauthorized entry, an email notification can be sent to the user's smartphone, allowing them to take appropriate action, such as contacting law enforcement or notifying the police. This can help prevent any potential security breaches and protect the user's property.

In conclusion, the development of smart security systems using Raspberry Pi and IoT has made it easier for individuals and businesses to secure their homes and offices. This project has shown that even with simple components like a Raspberry Pi 3, a webcam, and a PIR motion sensor, an effective security system can be created. With the ability to

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view visitor photographs instantly, the user can quickly take action if necessary. By taking advantage of these technological advancements, individuals and businesses can ensure their security and peace of mind.

II. RELATED WORK

The paper titled "Motion Activated Security Camera using Raspberry Pi" presents an all-encompassing and intelligent home security system developed and implemented by the author. The security system utilizes Raspberry Pi (RPI) and OpenCV with Harr cascade to provide continuous monitoring and management of home security. The RPI device can detect movement and send notifications to the user's dashboard, which then informs the monitoring center. Sensors can be activated during the user's absence or when they inform the system of their absence from home. The surveillance camera of the security system can be configured to capture any motion detected in the area. By utilizing the Raspberry Pi, a miniature computer that comes with a built-in camera board, a camera security system can be created with ease. The system employs OpenCV, and the motion sensors can detect various scenarios, such as movement in the living room, opening or shutting doors, or the shattering of a window. Overall, the paper highlights the development of an intelligent security system that provides comprehensive monitoring and management of home security. [1]

The author of the paper "Remote Record-able Security Web-based Camera Server System using Index Search Algorithm" described the limitations of a conventional analog monitoring camera system that is already in place, which could only save and retrieve data within a short distance and limited space, making it unsuitable for various applications. However, with advancements in computer and network with modern advancements in technology, it is now possible to operate a surveillance camera system from a remote location. through a web browser, without any space restrictions. The paper explains the development of a practical remote recordable security system, which digitizes video images and manages them efficiently through a database system. This system also allows for remote monitoring of cameras with user authentication, recording and searching of logs. The database system enhances the overall functionality and enables various applications, allowing for online recording and playback of images. A web browser can be used for authentication to access the system, and recording signals trigger the web cam recording demon, which plays back the corresponding image information through a file classification processor. [2]

The paper titled "Using the Security Camera System Based on Individually Maintained Computers for Homeland Security: The e-JIKEI Network Project" describes a project initiated by the author to develop a global community security system that utilizes personally home computers that are linked to the internet and kept in proper working order. The project is called "the e-JIKEI Network Project", with "JIKEI" referring to "Vigilante" in Japanese. The fundamental idea behind the project is for individuals to employ low-cost cameras as their eyes and utilize their personal computers as their brains to surveil their homes and the surrounding areas, and the Internet as their means of communication, all at their own expense. The article elaborates on utilizing the e-JIKEI Project as a foundation for establishing a security infrastructure for one's homeland. [3]

The author of "Threat Image Projection in CCTV" argues that a routine test should be implemented in CCTV control rooms during normal shifts to provide operational performance data for management. The paper suggests using The Threat Image Projection (TIP) system, currently employed in X-Ray luggage scanners to maintain operator vigilance against possible threats. The TIP system randomly superimposes a threat target image over the live CCTV feed, requiring operators to respond to it The system logs the date and time. of each TIP, the operator's response time, and the percentage of the TIP size. Additionally, it captures a screenshot of all TIPs to ensure that they were visible in case the user overlooked them. The system generates an easily searchable log to evaluate the performance of each operator., which can be searched by time and date for data analysis. Implementing TIP in CCTV control rooms provides management with real-time data on operational performance, allowing them to identify areas of improvement and address any issues quickly. By measuring response time and TIP visibility, TIP can also help increase operator alertness and prevent complacency. The TIP system has the potential to improve CCTV operators' performance and efficiency while providing management with valuable data on operational performance. [4]

The author of the paper "Object Recognition and Security Improvement by Enhancing the Features of CCTV" proposes a system to augment the level of security provided by CCTV cameras. The system is designed to capture and recognize potential threats and respond accordingly. Currently, CCTV cameras can only capture video footage without the ability to recognize objects or threats. However, the proposed system uses object recognition (OR) and an alarm system to improve CCTV security. Various technologies and APIs such as the system employs various tools such as TensorFlowObject Detection, Twilio (Communication API), OpenCV (Open-Source Computer Vision), and MySQL

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Connector to function effectively. are used to enhance the system's security and reliability. The proposed system aims to address the limitations of existing CCTV systems by providing enhanced security features. The system can capture and recognize potential threats, and then trigger an alarm to alert security personnel. Technologies such as TensorFlow Object Detection allow the system to recognize objects and analyse the footage in real-time. Twilio is used for communication and messaging, while OpenCV is utilized for image and video processing. Additionally, the MySQL Connector is used to store the captured data and provide searchability for analysis. Overall, the proposed system offers significant improvements to the reliability and effectiveness of CCTV systems for enhancing security in various settings.[5]

The author of the paper titled "A Smart IoT Security System for Smart- Home Using Motion Detection and Facial Recognition" has developed a smart home can be fortified with an intelligent IoT security system.. The security system utilizes a Raspberry Pi as the main component In conjunction with a No Infrared (NoIR) Pi Camera Module for video recording and image capture, the system employs a Passive Infrared (PIR) Motion Sensor to detect movement. The system incorporates data from the motion sensor and images from the NoIR Pi Camera Module to identify potential security risks by utilizing a facial recognition classification technique through their custom algorithm. In case of an emergency, the system can notify the user. The proposed system boasts an impressive detection accuracy of 95.5% and a precision of 91%. With this system, the user can feel secure in their smart home, knowing that the system is capable of detecting potential security threats with high accuracy. The incorporation of facial recognition technology into the system enhances the security measures provided by the system, ensuring that only authorized individuals are granted access. The notification feature further adds to the system's reliability, ensuring that the user is alerted in case of an emergency.[6]

The author of "IOT based facial recognition system for home security using LBPH algorithm" presents a facial recognition system that utilizes LBPH (Local Binary Pattern Histograms) is utilized to recognize family members from a local database in the system. The system's primary components are security, monitoring, and real-time automation. The hardware necessary for implementing the system includes the system consists of a Raspberry Pi 3 microprocessor, an external web camera, a speaker, and a stepper motor. The system implements The technique of Histogram of Oriented Gradients (HOG) is utilized for detecting faces and LBPH for face recognition, which is an efficient algorithm. The system stores A local image database is used, which contains the images required for recognition known persons' images in the home. If the system recognizes a person After recognizing a family member from the image database, the system unlocks the door automatically After the system recognizes the individual from the image database, the door. However, if an unknown person is detected, an The homeowner receives an email, allowing them to decide whether to allow the person entry or not. [7]

The author of the paper "Design and Implementation of a Cost-Efficient Smart Home System with Raspberry Pi and Cloud Services" Introducing an affordable smart home solution that enables remote monitoring and surveillance of multiple areas within the home, including movement detection, surveillance, temperature, and humidity, In addition to providing notification alerts, the system also helps reduce energy consumption and automate everyday tasks like detecting motion, the system can control various devices such as lights, thermostats, and more, turning them on or off as needed. a person's presence. The system is built around Raspberry Pi, which manages the system leverages Amazon Cloud Services, including Simple Email Service (SES) and Simple Notification Service (SNS), to deliver notifications to homeowners regarding all of the available services. The paper describes the system as a prototype that can be customized with additional features to create one's version of a smart home. To evaluate the system's usability and success, a survey was conducted among a few users who used the system. According to the survey, users had differing opinions on the various features. However, the "Motion Detection and Notification" feature was deemed the most valuable, whereas the "Video Generation" feature received the least amount of positive feedback from respondents.

To summarize, this paper introduces an affordable smart home solution that allows for remote monitoring and surveillance of various aspects within a household., helps reduce energy consumption, and automates everyday tasks. The system is based on Raspberry Pi and uses cloud services for notification alerts. The system is a prototype that can be customized with additional features. The survey results indicate that the system's "Motion Detection and Notification" feature is the most useful. [8]

The paper titled “Shield: An Intelligent and Affordable Solution for Home Security” presents a proposed wireless, this paper proposes an intelligent and cost-effective IoT-based security system for the home, which is also portable. The system is comprised of several sensors situated at entry points around the house, such as SONAR, motion, and

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sound sensors. These sensors gather data on the conditions at the entry points and wirelessly transmit it to a Raspberry Pi server via NodeMCU and an online database. To detect human presence at the gate, the server utilizes a logistic regression classification algorithm, and alerts are sent to the user when an intruder is detected. Additionally, the system includes a facial recognition module that is capable of distinguishing between recognized and unfamiliar faces. Whenever an intrusion is detected, the system transmits information to the Shield's mobile app, including a timestamp and an image of the intruder. This proposed system aims to offer an economical and portable home security solution that is also energy efficient and intelligent. For enhanced security, wireless input modules may be installed at various entry points throughout the home, and the adoption of an online database for input recording eliminates the necessity for a dedicated storage area. Various classifiers, including logistic regression, were used to evaluate the prediction power of the Shield system, and Support Vector Machines (SVM) and decision trees were utilized to cross-validate the system. The results showed that the system's classification performance was least affected The effectiveness of the classification algorithm determined the overall outcome, the Shield system proposed the solution presented in this paper offers an economical and intelligent approach to home security that incorporates various sensors and classification algorithms to detect and alert users of intruders, as well as differentiate between known and unknown individuals. The system is also portable and wireless, making it easy to install and move to different locations as needed [9]

The paper "Smart Home Security using IoT and Face Recognition" outlines an IoT-based security system for smart homes that includes face recognition technology. The system comprises a web camera linked to a Raspberry Pi, as well as Passive Infrared (PIR) and Ultrasonic sensors. When motion is detected, the camera captures an image of the individual standing in front of the door, and real-time face recognition is carried out using the Local Binary Pattern (LBP) algorithm. If the person's face matches one of the home's residents, the door unlocks; otherwise, the doorbell rings. If an intruder attempts to break in, an alarm is activated, and the homeowner receives an SMS and email containing the intruder's image. The face recognition feature is effective for recognizing multiple faces and identifying strangers, meeting the security requirements for home protection. To ensure its functionality during power outages, the system is battery-operated. Additionally, the homeowner can monitor events inside the house via an Android and web application connected to the Raspberry Pi via the internet. The owner can also use the application to add new faces to the database, such as guests. This proposed system provides an optimal approach to smart home security, providing increased security at lower costs. The integration of IoT and face recognition technologies yields a sophisticated level of security. The system's ability to recognize and detect faces in real-time enables the identification of individuals, thereby enhancing security measures strangers and alert the homeowner through an LED display. Additionally, SMS and email notifications are sent to notify the homeowner of any potential security risks.[10]

III.LIMITATIONS

3.1 Heavy machinery and equipment usage for surveillance in the current security Systems:

The use of heavy machinery and equipment in the field of security and surveillance has become increasingly prevalent in recent years. With the advancements in technology, the need for sophisticated and reliable security systems has grown exponentially. In order to meet this demand, companies have developed a range of heavy machinery and equipment that can be used for surveillance purposes. One of the most common types of heavy machinery used in security systems is cameras. These cameras can be placed in a variety of locations and can be programmed to record and store footage at specific times. They can also be equipped with advanced features such as night vision and motion detection, which make them ideal for use in low-light environments and for detecting movement in real-time. Another type of heavy machinery used in security systems is microphones. These microphones can be placed in strategic locations to pick up sound from a specific area. They can be used to detect and record sounds such as alarms, voices, or other noises that may indicate a security breach. In addition to cameras and microphones, companies have also developed software that can be used to analyse and store recorded data from security systems. The software has the capability to identify patterns and anomalies within the data, which can aid in the detection of potential security threats. It can also be used to store and retrieve footage and audio recordings, making it easier for security personnel to review and analyse recorded data. The use of heavy machinery and equipment in security systems has also been made more efficient through the use of wireless technology. This allows security personnel to remotely access and control cameras, microphones, and other equipment from a central location. This can prove to be especially advantageous in extensive facilities or regions. In situations where accessing security equipment physically is challenging, this can be of immense help. In conclusion, the use of heavy machinery and equipment in the field of security and surveillance has become an

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essential component of modern security systems. With the ability to detect and record potential security threats, these tools have become an indispensable tool for ensuring the safety and security of individuals, businesses, and communities.

3.2 Constant Monitoring by a human Counterpart:

The requirement of constant monitoring by a human counterpart for surveillance cameras has its disadvantages as well. One of the main challenges is the cost associated with hiring and training personnel to monitor the cameras. Smaller organizations may face difficulties due to limited resources, which might hinder them from investing in additional staff. Another disadvantage is the potential for human error. While human counterparts are trained to respond to potential security threats, they may still make mistakes or miss important details. For example, a security guard may become distracted or fatigued, leading to a delay in responding to a potential security threat. In addition, human counterparts are also subject to factors such as bias, prejudice, and personal opinions that may impact their ability to make objective decisions when monitoring surveillance cameras. This can be particularly problematic in situations where the use of cameras may raise privacy or civil liberties concerns. Another disadvantage is the potential for security breaches if the human counterpart responsible for monitoring the cameras is not properly trained or equipped. For example, a security guard may inadvertently provide unauthorized access to the cameras or leave them unsecured, leading to a potential security breach. In conclusion, the requirement of constant monitoring by a human counterpart for surveillance cameras has its advantages and disadvantages. While human intervention is necessary to ensure the most effective and efficient response to potential security threats, organizations must also consider the cost and potential drawbacks associated with hiring and training personnel to monitor the cameras. By carefully weighing the benefits and drawbacks, organizations can ensure that they are implementing the most effective and secure surveillancesolutions.

3.3 Generates huge amounts of data that is not stored properly and if access is required, might lead to the corruption of the data:

The use of surveillance cameras in modern security systems has led to the generation of huge amounts of data. However, if this data is not properly stored and managed, it can lead to significant challenges in the event that access is required. One of the main issues is the potential for data corruption, which can occur if the data is not stored in a secure and reliable manner. Data corruption can occur in a number of ways, including hardware failures, software glitches, and human error. For example, if the storage devices used to store the surveillance data are not properly maintained or protected from physical damage, they may become damaged or corrupt, leading to the loss of valuable security information. In addition, if the data management systems used to store the surveillance data are not properly secured, they may be vulnerable to hacking or unauthorized access. This can lead to the theft or manipulation of sensitive security information, potentially compromising the effectiveness of the overall security system. Another challenge is the difficulty in retrieving and accessing the data in a timely manner. If the data management systems are not properly organized or if the data is stored in a formatthat is not easily accessible, it may be difficult to retrieve the information when it is needed. This can be particularly problematic in emergency situations where quick access to the data is critical. In conclusion, the generation of huge amounts of data by surveillance cameras in modern security systems can lead to significant challenges if the data is not properly stored and managed. Data corruption, unauthorized access, and difficulties in retrieving the data are just a few of the potential issues that organizations must consider when implementing surveillance solutions. By carefully designing and implementing secure and reliable data management systems, organizations can ensure the most effective and secure surveillance solutions

3.4 Highly complex system that cannot be operated by average people and requires professional care in case of breakdown:

Modern security systems, particularly those that utilize heavy machinery and equipment for surveillance, are highly complex systems that require professional care and attention. These systems are not designed to be operated by the average person and require specialized training and expertise to properly maintain and repair. One of the main challenges with these systems is that they can be prone to breakdowns and malfunctions, particularly if they are not properly maintained. When this occurs, it is essential to have access to professional technicians who are trained and equipped to diagnose and repair the problem. Another issue is that these systems often require regular maintenance

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and upgrades to ensure that they are functioning at optimal levels. This can include software updates, hardware replacements, and other technical tasks that must be performed by trained professionals. Furthermore, the complexity of these systems also means that they may be vulnerable to cyber-attacks and other security threats. In order to prevent these types of incidents, it is essential to have access to professional security experts who can provide ongoing support and protection for the system. In conclusion, modern security systems that utilize heavy machinery and equipment for surveillance are highly complex systems that require professional care and attention. Whether it is to repair a breakdown, perform regular maintenance, or protect the system from security threats, organizations must have access to trained professionals who can provide the necessary support and expertise. By investing in professional care and attention, organizations can ensure the most effective and secure surveillance solutions.

IV. COMPONENTS

4.1 Raspberry Pi 3:

A noteworthy computer, the Raspberry Pi 3 is the third-generation model that has powerful capabilities while having a small footprint, similar to a credit card. The Raspberry Pi 3 contains a 1.2 GHz Quad-Core ARM Cortex-A53 processor that features a Broadcom BCM2837 system-on-chip (SoC). A majority of the system's elements, including the central and graphics processing units, audio and communications hardware, are consolidated onto a single component, along with a 1 GB LPDDR2 memory chip. The BCM2837 is distinct from the processors utilized in conventional desktops and laptops, owing to its SoC architecture. Moreover, it employs a unique instruction set architecture (ISA) known as ARM.

4,2PIR Sensor:

The Passive Infra-Red (PIR) Sensor employs a pyroelectric sensor for detecting motion through the measurement of alterations in the infrared emissions of nearby objects. To ensure superior sensitivity and minimal noise, the device incorporates a Fresnel lens and a motion detection circuit. It can detect motion within a range of up to 6 meters and has two slots composed of a specially designed material that is sensitive to IR radiation is utilized in the sensor. Under normal circumstances, when there is no movement in the vicinity, both slots receive the same amount of IR radiation. However, when someone passes by the sensor, one of the slots is blocked, leading to a positive potential difference between the slots. When the individual moves out of the sensor's range, the other half of the slots is blocked, resulting in a negative potential difference..The detection of motion is indicated by a pulse generated through positive and negative differential. Overall, the PIR Sensor provides a reliable way to detect motion and is commonly used in security systems and other applications.

4.3 Power Supply: To power the Raspberry Pi, For optimal performance, it is recommended to use a 5V adapter with a 2A current output, and connect it to the micro-USB socket on the Pi.

4.4 USB Web Camera: The proposed system incorporates the utilization of a standard web camera by connecting it to One of the USB ports on the Raspberry Pi can be used to connect to an external device.. To enable the camera's functionality, the OpenCV library is employed.

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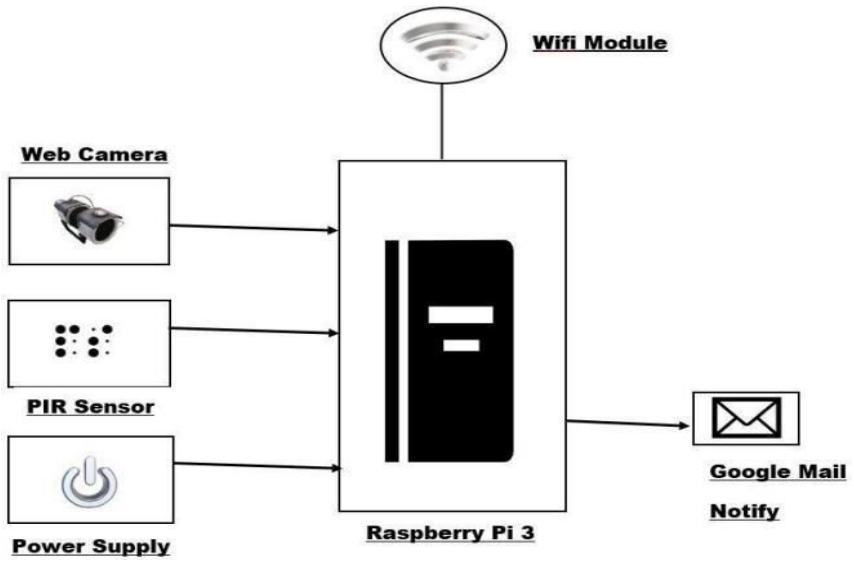

Fig: 4.1 Block Diagram of proposed Methodology

This endeavor involves constructing an IoT device by utilizing a Raspberry Pi 3 single-board computer that comes equipped with wireless LAN and Bluetooth capabilities. To create an all-inclusive system that can be placed at any desired location, the Pi is combined with a PIR sensor, USB web camera, and a power supply. The PIR sensor is linked to the GPIO pins of the Raspberry Pi, and an LCD monitor can be employed to set up the Raspberry Web Server. In addition, the images captured by the USB Web Camera can be annotated with date and time information and stored on an SD card.

Fig: 4.2 Use Case Diagram of Proposed Methodology

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Although the home security system developed for this project is relatively uncomplicated, it has substantial benefits. Placing this small device at the entrance of the home allows the user to monitor their residence from anywhere, at all times. Installing multiple devices can increase the level of security. If an intruder enters, upon detecting any suspicious activity, the system sends an email notification to the user's smartphone, who can then take appropriate action, such as alerting the police or law enforcement agencies. The foundation of the IoT device developed for this project is the Raspberry Pi 3.has a simple and straightforward operation. The PIR sensor detects motion, and the device starts capturing images when it does so. Once the images are captured, they are saved onto a MicroSD card and subsequently dispatched to the user's registered email address through the system. The Raspbian Operating System executes a python script that manages this entire process. However, before running the python script, it is imperative to install the operating system and necessary libraries, such as OpenCV, on the Pi 3. During the installation, it is essential to connect the Raspberry Pi to a display monitor via an HDMI cable.

V. ADVANTAGES

Compared to the current system, ours has some advantages: It can reduce the significant amount of data that traditional systems generate. Security staff keep constant watch; it might minimizelabor requirements and reduce human effort. When needed, it will give us remote access to the same photos and videos as well as security. The complicated current method is made simpler by our proposed solution so that even the average home owner may use it with ease.The pros of the proposed system that developed the usefulness of applications while being rather simple. The user can always keep an eye on his home from anywhere by placing this small device at the front entry. Many of these gadgets can be installed to increase security levels. A smart phone may detect any intruder's entrance and send an email alert Empowering the user to undertake necessary measures, such as contacting the police or alerting law enforcement, based on the situation at hand.

VI. CONCLUSION

Creating a home security system is essential for modern households, and it can be accomplished by utilizing a Raspberry Pi and IoT technology. This project aimed to create a simple and easy-to-use the project aims to create a home security system utilizing a Raspberry Pi 3, a PIR motion sensor, and a webcam. The Raspberry Pi 3 model b is equipped with built-in Wi-Fi and Bluetooth, enabling it to effortlessly connect to a Wi-Fi router and access cloud services. At the primary entrance of a residence, the home security system can be set up., and it uses the PIR sensor to detect any movement of visitors, which triggers the camera to take pictures. Initially, the Raspberry Pi is used to temporarily store the photographs before they are posted to the Google Cloud. Following this, the images are sent as an email alert to the homeowner's registered email address., which can be accessed from a smartphone. The Raspberry Pi employs its on-board TCP/IP stack to connect to the Google Cloud, enabling seamless integration with an IoT network. To capture images, the Pi utilizes the OpenCV library, allowing it to transmit the images to the user's designated email address.

REFERENCES

[1] K. N. Karthick Kumar, H. Natraj and T. Prem Jacob, “Motion Activated Security Camera using Raspberry Pi”, IEEE, International Conference on Communication and Signal Processing, April 6-8, 2017,India.

[2] Mike Myung-Ok Lee, Chil-Woo Lee, “Remote Recordable Security Web-based Camera Server System using Index Search Algorithm”, IEEE, Chonnam National University, 500-757, Republic ofKorea.

[3] NoriakiYoshiura, YusakuFujii and NaoyaOhta, “Using the Security Camera System Based on Individually Maintained Computers for Homeland Security: The e- JIKEI Network Project”, IMTC 2005 Instrumentation and Measurement Technology Conference, Ottawa, Canada, 17- 19 May2005.

[4] David Neil, Nicola Thomas and Bob Baker, “Threat Image Projection in CCTV”, Home Office Scientific Development Branch Langhurst House, Langhurst Wood Road, Horsham, West Sussex, UK. RH12 4WX,IEEE.

[5] Hoshiyar Singh Kanyal, MukulitGoel, Amit Singh Tomar, Harshit Kumar Yadav and Koshinder Singh, “Object Recognition and Security Improvement by Enhancing the Features of CCTV”, 2020 9th International Conference System Modelling and Advancement in Research Trends (SMART) | 978-1- 7281-8908-6/20/$31.00 ©2020 IEEE | DOI:10.1109/SMART50582.2020.9337065.

[6] AKM Jahangir AlamMajumder, Joshua Aaron Izaguirre, “A Smart IoT Security System for Smart- Home Using Motion Detection and Facial Recognition”, 2020 IEEE 44th Annual Computers, Software, and Applications

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

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©2020 IEEE DOI 10.1109/COMPSAC48688.2020.0-132.
[7] Prayag Bhatia, Shakti Rajput, Shashank Pathak, Shivam Prasad, "IOT based facial recognition system for home security using LBPH algorithm", Proceedings of the International Conference on Inventive Computation Technologies (ICICT-2018) IEEE Xplore Part Number: CFP18F70-ART; ISBN:978-1-5386- 4985-5, 978-1-5386- 4985-5/18/$31.00 ©2018IEEE.
[8] SwojeetKayastha, PranitaUpadhyaya, "Design and Implementation of a Cost-Efficient Smart Home System with Raspberry Pi and Cloud Services", 2019 byIEEE.
[9] AimenShahid, Mahroo Ali, Mariam Eijaz, Sidra Minhas, NosheenSabahat, "Shield: An Intelligent and Affordable Solution for Home Security", ECAI 2019 - International Conference – 11th Edition Electronics, Computers and Artificial Intelligence 27 June -29 June, 2019, Pitesti, ROMÂNIA, 978-1-7281-1624- 2/19/$31.00 ©2019IEEE.
[10] SurajPawar, Vipul Kithani, Sagar Ahuja, SunitaSahu, "Smart Home Security using IoT and Face Recognition", 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), 9781-5386- 5257-2/18/$31.00 ©2018IEEE.
[11] Balajee, R.M., Jayanthi Kannan, M.K., Murali Mohan, V. (2022). Image-Based Authentication Security Improvement by Randomized Selection Approach. In: Smys, S., Balas, V.E., Palanisamy, R. (eds) Inventive Computation and Information Technologies. Lecture Notes in Networks and Systems, vol 336. Springer, Singapore. https://doi.org/10.1007/978-981-16-6723-7_6
[12] MK Jayanthi Kannan, Dilkhush, Nikhil Pal, KedarNathParida, Nishant Singh, Accident Detection and Notification System using GPS and GSM Navigation Technology", International Research Journal of Engineering and Technology (IRJET),Volume 7, Issue 6, June 2020, https://irjet.net/archives/V7/i6/IRJET-V7I684.pdf

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