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MOTION SENSOR ALARM WITH T1 LAUNCH PAD AND ESP8266 NUTTYFI IMPLEMENTATION

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ABSTRACT

Recent times have overseen exceedingly high crime rates, and the appalling situation demands additional personal security measures. In light of the new advancements in technology, the demand for wireless systems has witnessed tremendous affinity, with major domains rapidly attempting to adopt the technique into their custom applications. Security is one such domain where wireless technology has thescope to achieve numerous practical applications. In one such instance, this study deploys the WiFi protocol over an intruder detection system using a TI LaunchPadMSP430. The TI launchpad is connected to the NuttyFi board which provides it with the internet connectivity required to put it online.The motion sensor acts as the input device that triggers the alarm which triggers output devices for intruder warning, in this case, a buzzerin parallel.The system also updates the alert in real-time online over the Blynk web server. This article combines embedded programming, wireless communication, hardware components, and sensing to build an intruder alert system. Using a page from technological baskets like IoT, RF, andembedded systems, the system fulfils a crucial requirement of the current society.Cross-platform usage boosts the utility of this system, putting it in the hands of millions of users.

I. INTRODUCTION

For autonomous intrusion detection, a low-cost system with better resolution is used [1]. When motion-sensing and Raspberry Pi are combined, motion detection is made possible, and once engaged, the Pi camera module starts recording videos. Users may see photographs remotely and receive email alerts when an incursion is detected by usingIoT-based applications. The system is primarily concerned with facial recognition, intrusion detection, and security [1].The IoT technology is used in this research to present a unique security and recognition method for home automation [2]. The findings show that integrating closed circuit television (CCTV) and motion sensors improves intrusion detection effectiveness by reducing blind areas. In addition, facial recognition technology is used to tell homeowners apart from outsiders, immediately warning them of any incursion [2]. This study proposes a method to identify intrusions in IoT systems using machine learning techniques, particularly cooperative studying and the synthetic minority oversampling technique (SMOTE), in order to obtain enhanced performance [3]. A thermal imaging camera is incorporated into the

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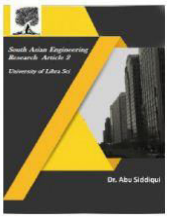

proposed system to identify various items and intruders. A local network is used to link this camera to a control center and assign it an IP address. The program records movies in order to later detect intrusions. In addition, the location is lit up as necessary by a motor-controlled spotlight utilizing infrared and laser technology. To identify certain noises and ominous motions, the device additionally incorporates motion and sound sensors [4]. For monitoring purposes, a system that can trace an intrusion's path, speed, and time of occurrence is necessary.An ultrasonic sensor, like the HCSR04, is used because of its elevated frequency, sensitivity, and cutting power for sensing intruders, enabling accurate distance tracking to within meters [5]. In order to highlight potential areas for development, open research questions, and safety concerns, this paper offers a working model for a connected device home security system. Motion detectors, which offer distinctive ways for motion detection of house intruders in the IoT ecosystem, were one of many options considered for each attribute [6].Using a USB cord to connect the Raspberry Pi 3 and Arduino, the suggested design is implemented. The webcam is put on the Raspberry Pi 3, while a PIR detector is installed on Arduino. The Raspberry Pi 3 analyses sensor data and image data to find people.The webcam is turned on to take pictures when the PIR sensor picks up movement [7].

II. EXISTING SYSTEM

A revolutionary deep learning-based intrusion detection (IDS) for video is proposed. Our suggested approach is used to assess intrusion events based on the shifting center of mass of the observed item when the You only look once (YOLO) algorithm is applied for object detection [10]. The planning and execution of a GSM-based motion detection system for home security are presented in this study.With the help of the designed microcontroller, vital security and control functions can be provided within as well as outside the home. A growing area of interest in increasing security is the use of motion trackers and cameras into web-based applications

III. PROPOSED SYSTEM

As per the flow diagram shown in Fig.1, the project illustrates the interconnected components and their functionalities. The system comprises a microcontroller, an ESP8266 NuttyFiWiFi board, a motion sensor, a buzzer, and a power supply [18].The processing unit of the system is the TI Launchpad MSP430. It handles I/O devices, takes in data, processes it, and generates outputs according to the program written. The motion sensor acts as a digital input. if the IR footprint changes in the subsequent frame, the sensor is set off. It then sends a high pulse for a specified interval until it resets back to OFF position [19]. The microcontroller takes in the trigger inputfrom the motion sensor for processing. Once the signal is received by the microcontroller, the microcontroller is programmed to switch on the alarm buzzer which attempts to notify the users of potential intrusionsand serves as a warning signal to potential intruders.

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IV. LITERATURE SURVEY

M.J.S. Villanueva, "Theft alarm system using Arduino Uno's PIR motion and tilt ball switch sensors." International Journal of Research 11, no. 3 (2023): 11-20.

This applied experimental research aimed to enhance a theft alarm system that will be installed in the doors, cabinets, and lockers of homes and buildings to promote security and nurture a safer and thief-free community by combining PIR motion and Tilt Ball Switch sensors into a single device. Descriptive statistical methods were used to evaluate the level of effectiveness of the alarm system in terms of distance from the source and type of place, as well as the level of efficiency of the product utilizing the GSM module and sim card. The researchers also used the linear regression model to characterize the relationship between the speed of other living organisms entering the vicinity of the PIR motion sensor and the theft alarm system detection time. The study's findings revealed that the level of effectiveness of the theft alarm system depends on how close an individual is to the source, the theft alarm system has a very high level of effectiveness in terms of any type of place, there is a high level of production efficiency using the GSM module and sim card in the theft alarm system, there is a significant difference in the level of effectiveness of the theft alarm system in detecting the motion of individuals in terms of the distance from the source, and the detection capability of the PIR motion sensor is affected by the speed of organisms within its vicinity. The researchers recommend considering using other types of sensors or technologies that may be better suited to detecting organisms moving at high speeds. The COVID-19 pandemic that has been happening for the past three years has forced people to stay and do their work and study at their respective homes. Even though this caused a decrease in crime rates in the country, the total number of crime incidents recorded in the Philippines in 2021 is still high, with 375 thousand cases, and the most prevalent crime that occurred was theft (Statista Research Department, 2022). Region 4B- MIMAROPA has been facing a lot of theft and robbery cases not only before, but also during the pandemic, despite the reduction in crime rates. According to "An Analysis on the Location and Type of Index Crimes in the Philippines" by Baculinao and Ceballos (2017), Region 4B- MIMAROPA has ranked 8th out of 17 regions on the theft rates with 24.0%, a total of 2,826 cases. The region also ranked 10th on the robbery rates in the country with 8.1%, a total of 955 cases. The current reports of the Philippine National Police (PNP) have stated that from January 1- May 31, 2022, there were 3,219 criminal incidents in the MIMAROPA region. The eight focus crimes that have occurred this year were murder, homicide, physical injuries, rape, theft, robbery, carnapping, and motor napping. Though they also disclosed that carnapping, rape, and physical injuries have shown a remarkable decrease, it can be concluded from these statements that theft and robbery cases in the region and province are still prevalent. As reported by the San Jose Municipal Police Station of the Occidental Mindoro Police Provincial Office in their Crime Clock and Crime Mapping from January to December 2021, index crimes, which include theft, robbery, and burglary, commonly happen in the town during the daytime rather than

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during the night in Brgy. San Roque, one of the places where crimes frequently occur. According to their data, index crimes occur between 8:00-8:59 A.M., 9:00-9:59 A.M., 11:00-11:59 A.M., 7:00-7:59 P.M., and 10:00-10:59 P.M. San Jose Police Station (2022). Indeed, the eagerness of people to gain profit, property, and other assets for their own sake, has urged them to commit transgressions like property crimes. It is well known that crimes like theft, robbery, and burglary generally decrease safety, disturb social order, cause confusion within the community, and greatly affect the lives of people. In accordance with Flatley et al. (2011), households with 'less than basic' home security measures were six times more likely to have been victims of burglary (5.8%) than households with 'basic' security (0.9%) and ten times more likely than households with 'enhanced' home security measures (0.6%). Over time, many studies and inventions have been developed and produced in terms of preventing property crime. Yet, to this day, thefts are still everywhere in the community and may bombard other people's property. Considering all of those concerns and to aid in the reduction of theft occurrences in the province, the researchers intend to enhance a theft alarm system with the use of the Arduino Uno's P.I.R. Motion and tilt ball switch sensors. This theft alarm works with the help of specified sensors. When a human's thermal energy is detected by the PIR Motion Sensor, a few minor noises, that may be modified, will be audible. For instance, Cavas and Baballe (2019) stated in their study that many households, industries, schools, and organizations today are now primarily broken into by force, either by criminals destroying a window, entering via a cut ceiling, or even breaking through a locked door or occasionally even an open window. In the P.I.R. motion sensor, people can save power, and achieve effective management at a low cost, and it requires little memory space. The Passive Infrared Sensor (PIR) is responsible for detecting the change in infrared radiation levels when an intruder or human is passed through the system or space where it is arranged. Depending on the change in radiation levels the change in voltages occurs and then with the voltage the signal is amplified and hence the sound will be produced (Umamaheswari, 2020). Therefore, in contrast to other alarm systems available or being sold now on the market, the researchers decided to employ a Tilt Sensor to detect unauthorized handling of objects and trigger the sound of an alert. The purpose of the study is to produce a theft alarm system to be implemented in the doors, cabinets, and lockers of households and buildings to increase security and help promote a safer and theft-free community.

Block diagram

V.CONCLUSION

In this study, we have proposed a novel and robust security system. The method integrates a TI LaunchPad MSP430 microcontroller, an ESP8266 NuttyFiWiFi board, a motion sensor, a buzzer, and a power supply. This system produced a solution that detects motion, triggers an alarm, and sends alerts to the Blynk IoT server and mobile app. The system necessitates a wireless security system that is easy to install and has minimal maintenance requirements of its own. The system offers greater control over the setup and is more scalable, versatile, and cost-effective than its other counterparts in the market currently. Also, it is effective in detecting unwarranted intrusions and notifying the user base in real-time. The system connects to a cross-platform web service that can be accessed on any device with a web browser, allowing more freedom in terms of the hardware required to use it. In the future, there are multiple directions this development can pursue by further improving accuracy, adding camera modules, cloud storage and analytics, proactive security measures, pattern recognition, and smarter data-backed decision-making. In addition to monitoring and switching, the utility of the Blynk app can also be extended using voice control, AI assistance, and automated pin reader gauges. The Blynk dashboards can provide much more compatible functions customized to the specifications of the hardware. As compared to some state-of-the-art methods, the proposed system has shown better performance in terms of accuracy, detection rate, and false alarm rate, but its performance in terms of processing time has not shown satisfactory results which one of is its limitations. Also, the need for security has become a growing concern in recent years, so we are concentrating on making our security system intelligent so that it can be both affordable and used in several environments.There are still certain shortcomings which can be addressed by incorporating latest technology in the future in order to develop a more advanced alarming system.

VI.REFERENCES

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