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Motion Detector Alarm and Security System

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ABSTRACT

The study focuses on motion detector-based indoor geolocation security system development utilizing microcontrollers. With linked controls and alert operation that detects intruders, the system will provide the essential security while strengthening surveillance technology. The planned security is distinguished by effective video cameras for remote sensing and surveillance, which are equipped with streams for live recording and video for later playback as well as a cost-effective omnidirectional surveillance system that is quick and simple to set up. The integration of cameras and motion detectors into online applications is the key to security. A motion detector is used to trigger the raspberry Pi, a smart surveillance system, which then activates the camera for remote sensing and monitoring and sends the footage to a web server so that the user or homeowner may see it via a web application. enables access.

INTRODUCTION

Researchers and developers today have created a variety of surveillance systems that are installed in homes, businesses, and remote locations while controlling the duties using cost-effective, clever, and simple-to-implement hardware and software systems. While some have already been completed, others are currently a work in progress.

A security system is made up of both hardware and software, and it works to keep people and things safe in both residential and commercial facilities. The development of security systems has an intriguing history since there has long been a need for protection and security. The concept of security systems was developed as a result of the perception that value of life and property might be lost unexpectedly by fire, robbery, force, etc., without a previous warning or information, according to. Over decades, security systems have changed from simple control panels and locks into high-technological gadgets.

Due to the clever and creative strategies thieves use to succeed in their operations in residential flats, crime is today a very dexterous act. The protection of the family and house is one of the things that everyone wants. Globally speaking, the rise in criminal activity is quite concerning and has sparked widespread public outcry for the government to take immediate mitigating steps. This uproar has been marked by several forms of disorder, such as herdsmen invasion, robbery attack, political upheaval, and human abduction.

The "Home Alarm System using Detector Sensor" was

Passive infrared (PIR) sensors, a buzzer, a timer circuit (555 timer), and a recording device were all used in the creation of the project. The authors effectively used the installation of remote buzzers along with various sensors for effective detection. Its video cannot be viewed online; it can only be kept locally. Because the location of the device where the video is kept and recorded may be found and destroyed, this continues to be one of the system's drawbacks.

An alarm

The "Global System for Mobile Communication (GSM)

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Based Home Security System with SMS Alert Using Human Body Motion Detective and GSM Module, was a system put into use that included an infrared movements detector and a magnetic sensor as a transducer for detecting intruders' motion or break-in via a door. An embedded microprocessor unit processed the signals, activating the GSM module, activating the alarm system, and sending SMS messages to the home owner's mobile phone. The system featured remote vigilance and cost-effectiveness as advantages, but lacked streaming video coverage, which is necessary to recognise the intruder(s) and maybe capture them.

To choose the security system needed to protect a facility, several variables were taken into consideration. The cost of installation, remote monitoring, and efficiency have been the most important of all of them. As a microcomputer, the Raspberry Pi is incredibly useful. The Raspberry Pi is an option for a quick, dependable, reasonably priced, and remote surveillance system. The "triple play" access to the video or picture stream of the pi sets this study endeavour apart from all previous pi-dependent surveillance systems. Two of those are web-based and allow for remote access from anywhere in the globe; the third is the actual storing of the feed in the local storage of the Raspberry Pi. The system buzzes the alarm at a convenient distance upon

trespass, notifies the owner through SMS, and records feeds that can be accessed in three different ways. The system has a reliable video camera for remote sensing and surveillance, which streams live footage and records it for later playback.

The Raspberry Pi 3 Model B+, PIR motion sensors, Pi camera module, Micro SD card, buzzer, and Web server are the main system design components that are briefly described in this section.

Raspberry pi 3 Model b+

The motion detector-based security system employing a microcontroller (Raspberry Pi) must include at least three features in order to be used for efficient monitoring and alerting. These features include alerting, video recording, and detection.

PIR motion sensors

Every item, alive or not, that has a temperature that is higher than zero degrees Celsius emits infrared radiation. Although this radiation (energy) is undetectable to the human eye, it may be detected by special electronic equipment. The word passive in the term passive infrared refers to how the detector behaves when it passively absorbs infrared energy. The sensors may capture information about the object's location, acceleration, and velocity. A passive IR receiver that monitors the surrounding temperature makes up a PIR motion detector. A controller receives an alarm condition if this temperature changes quickly, such as when a human walks across its field of vision.

Pi camera module

A gadget that can record both still and moving images is the Pi camera. It is currently the only camera designed especially for the Raspberry Pi gadget. Specific configurations are needed, including a python script created to enable the device to take images, to configure and activate the camera option.

Micro SD card

The installation of the operating system, booting, and storage/memory for the recorded films all took place on a 32GB card. The system was configured with Raspbian software to connect a Raspberry Pi device to a PIR sensor, buzzer, and camera.

Buzzer 5v

An auditory signalling device, such as a buzzer or beeper, can be mechanical, electromechanical, or piezoelectric. The Buzzer 5V is the buzzer that is utilised in the security system design. What it does is as follows: The buzzer module would emit a loud 2 MHz BEEP sound if 3V to 5V were applied. This buzzer does not require an AC signal, in contrast to a standard piezoelectric buzzer. The piezoelectric material and the driving electronics that cause the Buzzer 5V to oscillate at 2 MHz are both inside the device.

Web Server

A web server is a device that connects to the internet to offer customers content or services. A web server is made up of a physical server, a server operating system (OS), and software that permits HTTP connection.

System Initialization and Configuration

The Raspbian Operating System (ROS) is first installed on the 32GB SD Card before the Raspberry Pi is configured. The Raspberry Pi was then fitted with the SD card. The initialization and setup procedures involved the usage of a router. An Ethernet connection was used to link the Raspberry Pi to the router. A PC and the Raspberry pi both connect to the router's hotspot. Port scanning created a Local Area Network (LAN), which is connected to its Internet Protocol (IP)

Database and Web Server Protocol

A database is a collection of data that has been arranged to make it simple for a computer programme to pick out the specific information it needs. The went on to describe it as any grouping of facts or information that has been carefully arranged to allow for quick computer search and retrieval. In response to queries, a database management system (DBMS) retrieves data from the database. Two stands—user and pivot—make up the database built for the security system.

Human Detection

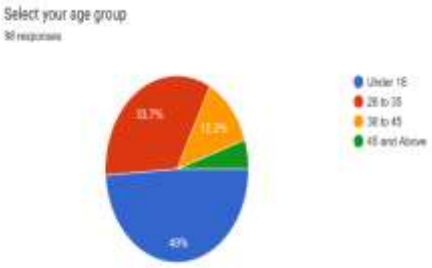
The Python computer script that is in charge of motion detection and device actuation is wholly responsible for the Human detection component of the planned security system. The PIR sensor that detects motion adapts to the infrared signature of its surroundings and continuously scans for changes. The software will keep updating the environment even if there is no motion since the LED indication will stay off and the buzzer won't ring. The motion

detection indicator will turn on and the buzzer will sound if the sensor detects movement since the frame for motion detected serves as the input frame for the human detection procedure.

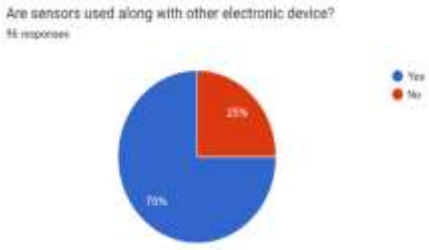
The Passive Infrared sensor activates the Pi camera through the Raspberry Pi when a human incursion is detected in the area of vision of the sensor. The raspberry pi gives the pi camera instructions to record video, then sends the video to the web server.

The Raspberry Pi commands the pi camera to record a video and the buzzer to ring when a PIR sensor detects an incursion. Additionally, the Raspberry Pi sends a Short Message Service (SMS) to the designated system user informing them of an intrusion event and directing them to the web application to examine and validate the identity of the invader before taking any further action.

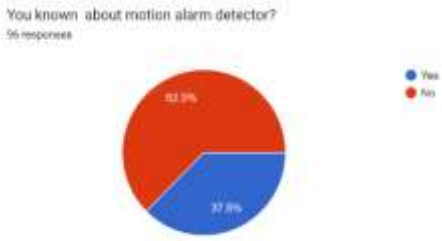
Figures and survey result



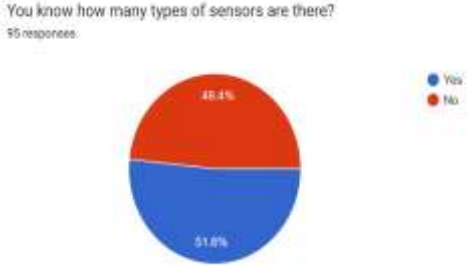
Are sensors used along with other electronic?



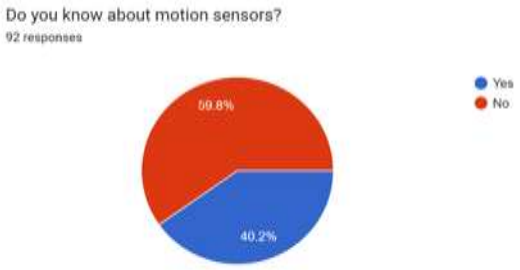
You known about motion alarm detector?



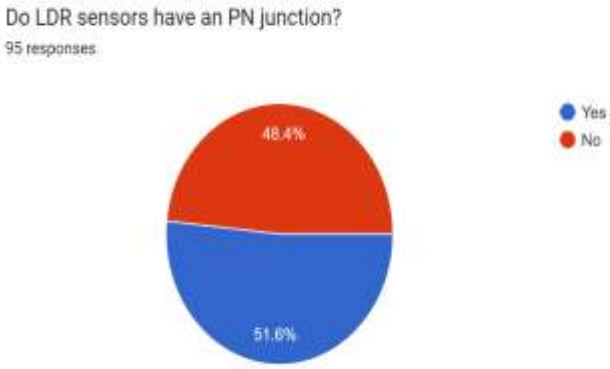
You know how many types of sensors are there?



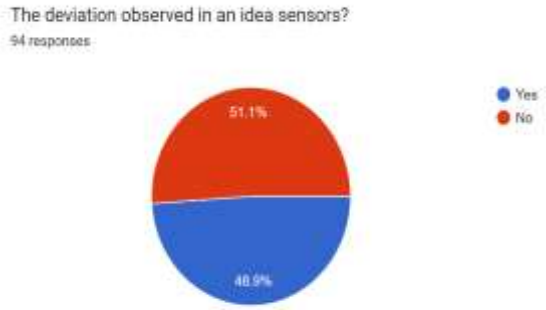
Do you know about motion sensors?



Do LDR sensors have an PN junction?



The deviation observed in an idea sensor?



CONCLUSION

Homeowners, employers, and employees are on the search for an effective surveillance system that is budget-friendly since security in residential and commercial structures is becoming increasingly important. Passive infrared sensors allow for the detection of intrusions into homes and offices. The sensor makes use of infrared radiations, which change in response to human movement within its range of view. The raspberry pi enables the buzzer to inform the staff about a potential incursion when movement is detected. The captured video is then uploaded to a specific web server, where the homeowner may log in and watch the footage sending a Short Message Service (SMS) to owner‟s mobile phone. The system designed is energy efficient and is applicable particularly in areas with low energy supply as aresult of inadequate electricity supply. It enables the owner to be aware of the security situation at home or office. The proposed security system is recommended for residential applications due to its efficiency and effectiveness in home The web server is also tasked with sending a Short Message Service (SMS) to owner‟s mobile.

The method is energy-efficient and particularly useful in places with insufficient electrical supplies and low energy supplies. It enables the owner to monitor the security situation at their house or place of business. The proposed security system is recommended for residential applications due to its efficiency.

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