

Iot Based Burglar Alerting System

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ABSTRACT—Today's society has led to the increase in the number of small families while the gradual spread of living into the urban and suburban areas has raised a significant concern in the security of the individuals. many security systems are available in the market today but they are mostly expensive. The objective of the model described in this project is to present a simple and low cost design to make our homes more safer. The Raspberry pi based framework used in this project Ubidots, combined with the ultrasonic sensor which not only alerts of an intruder and their actions but also captures the images through a camera from the scene. An intrusion can be identified with the help of the above mentioned sensor that can detect the presence of a person, distance variations and the location. In case of an abnormal output from the above measurements, the user or owner of the house is immediately alerted through IoT. The rightful person receives a message on their phone immediately followed by images of the person causing the suspicious situation along with a captured image that gives a detailed picture of the happenings and will also serve as evidence for further investigations.

Keywords-Computer Vision, Image Processing, Raspberry pi Camera, Ultrasonic Sensor.

I. INTRODUCTION

Home security system is the most sort after mechanism to ensure the safety of valuables and to safeguard personal security as well. The development of burglar alert gadgets can limit the event of theft, while it can also identify and record suspicious trespassing. The burglars are also getting smarter nowadays, even with the presence

of security guard the burglar enters our premises easily. The guard doesn't know what's happening and even with the CCTV camera the burglar will be identified after the intrusion. A solution to stop burdening of the server works is making an image process devices that would record such an image when it is needed.

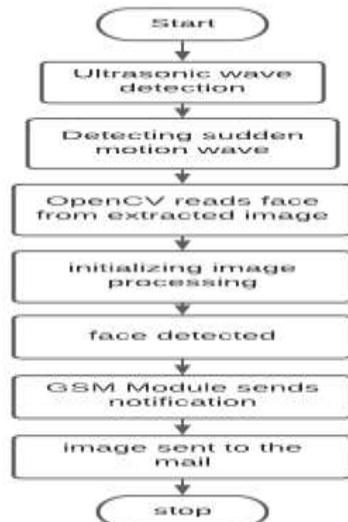
The web camera will record image when an intruder is entering a room, in this case the web camera will detect and capture the motion. It alerts the owner which shows that the room has been entered by an intruder. The notification of this was sent as a short message service (SMS). Giving the potential benefits of saving things, time, cost and unwanted accidents this IoT based Burglar alerting System will give our future life protected. For being aware of these intrusion activities, our project seeks to be aware of whether our home or office is being safe or not.

II. PROPOSED SYSTEM

The proposed system has been designed to overcome the drawbacks of the previous security system and to improve the security, flexibility, efficiency. The data set will be collected and trained the model using image processing. The face was identified from the image which was captured from the camera in this system. Ubidots framework will be used to transfer the sensor data into the information. The Ultrasonic sensor which we are using will be placed in the board to detect the sound waves in the room, if the sensor detects the sudden abnormal reflecting wave frequencies then only it will allow the camera to use and process the image to identify the confirmation of intrusion.

METHODOLOGY

The Burglar will be detected using the computer vision, machine learning algorithm, image processing technique by extracting the image from the camera then processed to match the datasets to confirm that intrusion takes place by the human and the user will be notified.



Working Module

A. Sensor Detection

A Ultrasonic is an electronic sensor that measures sound wave reflecting distance from objects in its field of view. They are most often used in sound wave motion detection. They work entirely by detecting the distance of frequencies emitted by or reflected from objects. When an object, such as a person passes in front of the background, such as a wall, the sound reflecting at that point in the sensor's field of view will reduce by motion reflected from body, and then back again. The sensor converts the resulting change in the incoming frequencies into a change in the output distance, and this triggers the detection. Objects of similar sound waves but different surface characteristics may also have a different reflecting frequencies distance, and thus moving them with respect to the background may trigger the detector as well.

B. Dataset Collection

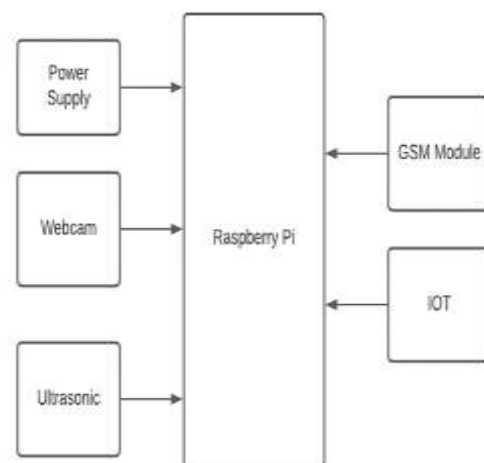
The datasets are collected for processing the image to identify the face found in the extracted image from the live video camera, and a different dataset of images are collected for the more accurate of detecting the face to identify the human in the room. Noiseless images are gathered to get the accuracy and process the image for frequent time. The accuracy will be stable only with the

more number of datasets to be gathered to process the image. Using the openCV library in the python was used to read the images that have been given in the dataset and will recognize the face in the all possible way for identity, even with the covered mask the face will be identified and gives notification.

C. Image Processing

Image processing is the technique which process the image extracted from the live video of the camera and compare the dataset given to identify the match of the data. Image with the optical scanner or by digital photography, analysing and manipulating the image which includes data compression and image Enhancement and spotting patterns. Computer Vision analysis involves the examination of the image data to facilitate solving vision problem. Second analysis includes two other topics as feature extraction which is the process of acquiring higher level image information, such as like shape or colour information and next is Pattern Classification which is the act of taking this higher level information and identifying objects within the image. By the Machine learning algorithm and computer vision algorithm the image will identify the face in the image and will immediately sends notification to the user as like an alert message and also will capture the images and send it to the owner or user.

III. BLOCK DIAGRAM



The Block diagram of this security system shows the working blocks of the component with IoT. The components will be going to used are Ultrasonic sensor, camera, GSM module, Raspberry pi board. The abovementioned components are connected to the raspberry pi and will implement the algorithm for detecting the burglar. When the power is turned on the Ultrasonic sensor we are using will detect the motion by sensing the wave reflection with the sonic wave passes through it. After deducting the motion distance of the person in the room by the sensor then only it will turn on the camera.

Camera connected with the raspberry pi will have the feature of implementing the machine learning and computer vision algorithm on the live frame of the recordings. Datasets are used to identify and detect the face model from the extracted image of live camera recordings. Using the openCV library, image processing technique will be initialised and from the model datasets process the image and identify the face in the room and will detect with a high accuracy rate.

Deduction process on the image processing level will be used to overcome the false alert like in case of intrusion taken by the animal. After confirming the intrusion by the human the GSM module will send SMS to the user or owner of that premises at that instant of time and also GSM module can be used for sending the mail to the particular user with the image capture while intrusion action happens. The image which is sent by the GSM will be used to take the further action of investigation.

IV. CONCLUSION

The IoT based smart surveillance system has been aimed to design in such a way that it can fulfil the needs of the user for a particular surveillance area. It has countless applications and can be used in different environments. When the motion is detected in the surveillance area the image is captured and GSM Module notification is sent to the user informing about the motion detection. User can view the image from the remote area using internet or Wi-Fi connection. The user gets notification when the Application is in Auto mode. The Ultrasonic sensor used and image processing implemented will give us accurate detection of the human and will not give us a false alert because of using the two levels of detection.

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