Theft Detection and Prevention using Image Processing

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ABSTRACT: In Contemporary residential area, especially apartment complex, robberies affect the quality of life and sustainability of cities. So our interest is an all-time high in the role that planning processes and the design of the physical environment can play in reducing the opportunity for robberies. Recently, as increase of residential density, diverse robberies are increasing in urban apartment complex. Our project focuses on preventing from robberies in contemporary residential areas, especially apartment complex.

We can overcome this problem, by using an IR sensor which detects the motion of the objects and sends the alert message to each house member in the apartment complex and a camera which captures images of the things and sends those images to police station. After receiving the alert message the doors gets automatically closed and will not open until the owner of the house opens the doors. The result of this study has implicated, increasing importance on daily safety issue in urban life and examining the possibility of applying robbery prevention and reduction program and systems.

KEYWORDS: Sensor, camera, buzzer, Lock, Image processing

I. INTRODUCTION

In the present system, robberies are prevented in two ways. The first one is by using electrical fencing which does not allow the thieves to jump from the wall. The second one is by using cc cameras that records the video regarding to robbery. In this system we have several disadvantages, some of them are, and the use of electrical fencing causes threatto man's life as shown in figure 1.

Figure 1: Using electrical fencing

We cannot catch the thieves when they are alive and the use of cc cameras takes a lot of time to catch the thieves. If the thieves Uses the masks then his face may not be visible in the video it will be difficult to catch the thief.

To overcome all these drawbacks we proposed a system, we use an IR sensor as shown in figure 2.
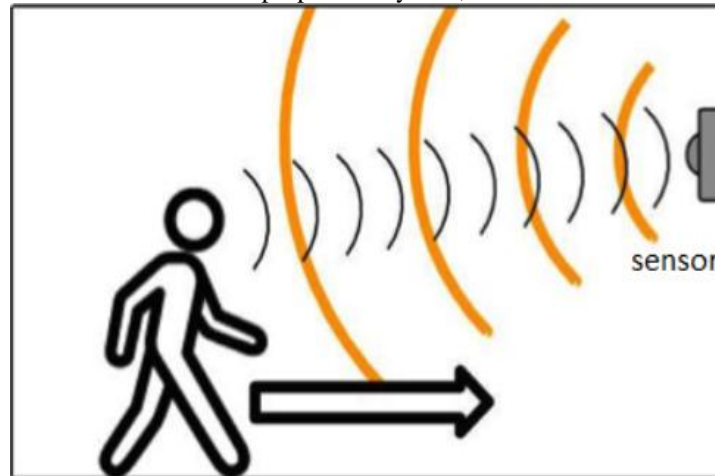

Figure 2: Using IR sensor to detect the motion of the object and make a alert.

It detects the motion of objects, As soon as it detects the object as a human it sends the alert message to each house person in the apartment and the door gets automatically closed, The door will not be opened until it is opened by the owner of the house and we also use a cc camera which captures the images and sends those images to the police station in the form of fax.

Benefits of Proposed System

➢ By using IR sensor, we can easily prevent from robberies by sending alert messages to the person in each house and by sending the images of the thieves to the police station.
➢ The thief cannot enter house because the door is equipped with smart lock and key is only known to the members of respective house.

II. RELATED WORK

According to Naude [1] (2000:7) high levels of crime are more prevalent in countries where there are a high proportion of people who feel economically deprived. From the suspects arrested for housebreaking residential and house robbery in Westville policing area for the period 2012/2013 it is evident that the suspects are not resident in Westville policing area. This study will therefore focus on locations of crime, the characteristics of those locations, the movement paths that bring offenders and victims together at those locations as it would be easier to alter the environmental opportunities for crime than to influence the complex soci-economic factors motivating offenders (Smith 1986:82).

According to Sovensend [2] in (David 2003:7) argues that a crime only occurs when there is integration in what motivates the offender to commit the crime. The aim would thus be as also found in Smith (1986:84), to reduce opportunities for crime as perceived by potential offenders, by introducing target hardening, target removal, reducing the payoff and encouraging public surveillance.

According to Wilcox [3] (1990:1) the following elements must be present in order for a crime to occur: Desire, Ability and Opportunity. This is depicted in the crime triangle.

Research on burglaries done by (Brantingham and Brantingham 1981, Rengert and Wasilchick 1985) [4] suggests that residential burglars engage in a search process along "activity spaces" in order to select neighborhoods in which to commit burglaries. Neighborhoods are chosen along familiar routes and this is done during the day to day movement of the burglars. This was also found in Schneider and Kitchen 2002:107 who stated that , offenders , like ordinary people, have day to day schedules which involve trips to and from work, visiting friends, going shopping and it is during the course of these activities that they search out likely targets. These targets may even be repeatedly victimized.

According to Reppetto[5] (1972:21) the satisfaction of a perceived need for money appeared to be the primary motive for most burglaries although offenders did acknowledge that subsidiary satisfactions such as excitement revenge curiosity and feelings of group solidarity also played a role in their decision to offend. This was also found in the study done by Dr. Zinn( ) where he interviewed 30 convicted residential robbery perpetrators on the motivation for offending. 97% of the perpetrators in the study stated their motivation being economic gain; the victims were target because of their wealth. 80% stated that their families and friends and acquaintances in their communities had knowledge of their criminal activities. They stated that residential robbery resulted in quick money.

III. PROPOSED WORK

A. MODULE DESCRIPTION

Sensor module:
Sensor detects the motion of object over a compound and makes a sound.
Camera module:
Camera analyze the type of object based some parameters.
Admin module:
Admin should maintain data of flat number and phone numbers of each house and phone number of nearby police station.
Alert module:
When object is human we simply send an alert message to member of house and to police station along with images.
Lock module:
Door gets locked automatically.

B. WORK FLOW DIAGRAM

Figure 3 simply depicts interaction between objects in a sequential order i.e. the order in which these interactions take place. We can also use the terms event diagrams or event scenarios to refer to a sequence diagram. This figure describes how and in what order the objects in a system function.
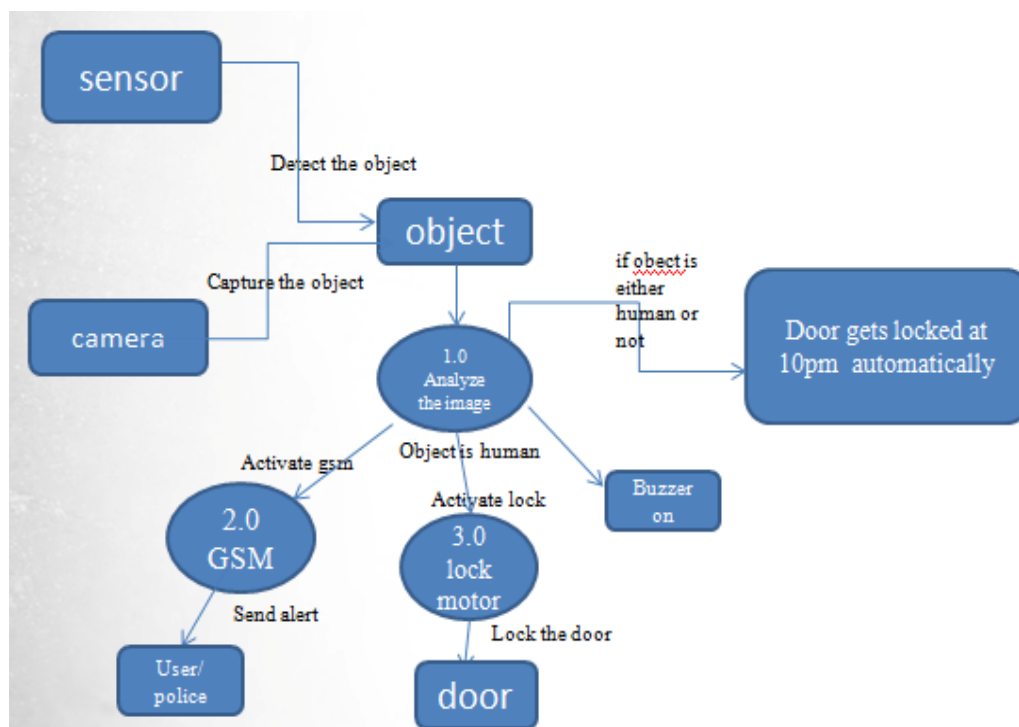

Figure 3: Work Flow Diagram of Detection

C. ARCHITECTURAL DESIGN

Architectural design is defined as the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer.

Using this hardware and software components our project detects whether object is human or not. If the object is human then it sends an alert to owner and nearby police station as well as door will locked automatically.

Raspberry-Pi is an open-source electronics platform based on easy-to-use hardware and software. Raspberry-Pi is able to read inputs on a sensor, and turn it into an output by publishing something online. In our project IR sensor detects the motion of an object and detects if it is an object or human. If the object is human then it sends an alert message to all

The people in the apartment and sends notification to the nearest police station. The software that we are using in our project is python programming. Python is a high-level programming language designed to be easy to read and simple to implement. In our project we can use python programming language with Arduino. PYSerial is a Python API module which is used to read and write serial data to Arduino or any other Microcontroller.
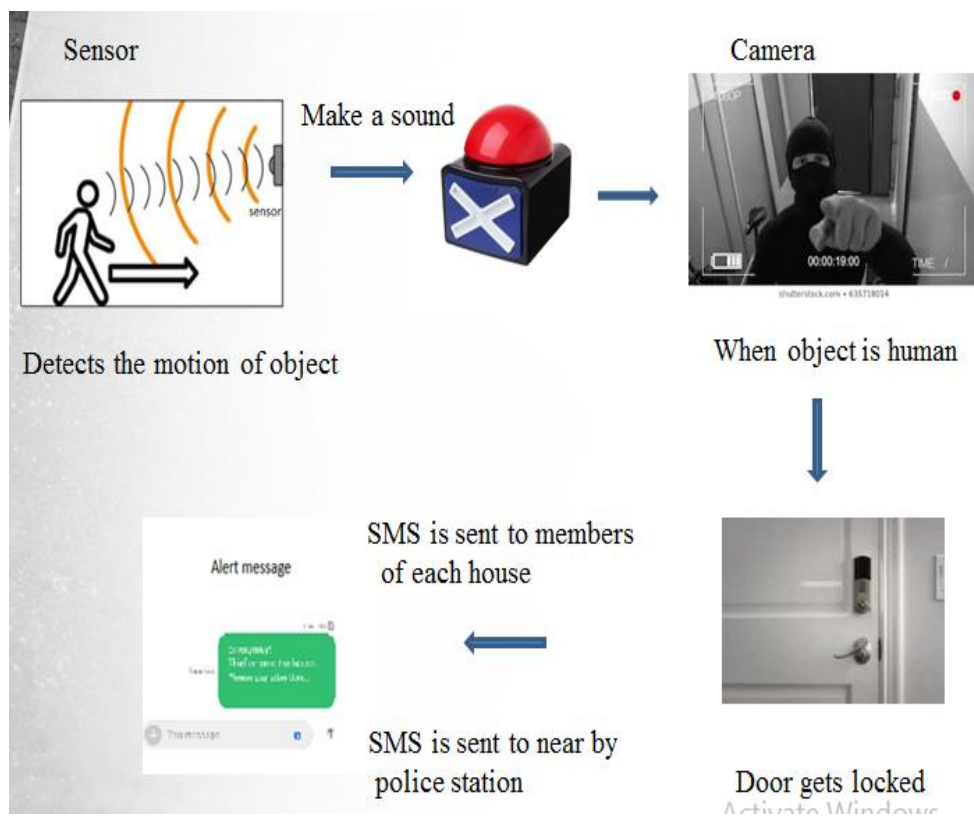

Figure 4: Architectural design

IV. IMPLEMENTATION PROCESS

Implementation is the carrying out, execution, or practice of a plan, a method, or any design, idea, model, specification, standard or policy for doing something. As such, implementation is the action that must follow any preliminary thinking in order for something to actually happen. Many preparations are in implementation of the proposed system.

STEPS:
1. Start the process.

2. Fix the IR sensor over the compound wall with its range.
3. Fix camera with face detection algorithm should be placed in view with the compound wall.
4. Need to attach the smart door locking system to each door of the apartment.
5. Maintain proper connections between all the components along with arduino node MCU.
6. Whenever an object passes over the compound wall IR sensor must detect the motion of object and make an alert sound.
7. After make an alert sound, the camera must analyze the type of object based on some parameters.
8. If the object is human then the door gets locked automatically, and with help of node MCU an SMS will be sent to each house in the apartment.
9. Though the thief enters or not door must be locked at a certain time.
10. Stop.

V. CONCLUSION

Theft detection and prevention using image processing main theme is to prevent the robberies by connect the house with a smart future. In our proposed system we prevent the robberies and also we provide the security to each house in the apartment. In our project we make an alert sound using IR sensor when object entered from the compound wall and we also use camera to analyze the object type, and when it is human it simply sent an SMS to each house in the apartment and to nearby police station also door gets be locked immediately.

VI. FUTURE ENHANCEMENT

In our proposed system we prevent the robberies and also we provide the security to each house in the apartment. In our project we make an alert sound using IR sensor when object entered from the compound wall and we also use camera to analyze the object type, and when it is human it simply sent an SMS to each house in the apartment and to nearby police station also door gets be locked immediately. In future enhancement our system will capture the image of the thief and that image will be sent to the each member and also to nearby police station along with SMS. Another future enhancement is when house members forget to lock the door then we send an alert message to each members of the each house it helps provide security to house at all the time.

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