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Theft Investigation and Message Transformation System Using Internet of Things (IOT)

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Abstract: In computer and digital age the risk of theft is more and so the researcher has taken up this problem. The present project focuses on the use of Electronics, Internet Computing Techniques (ICT), and Digital Technology (DT) along with Computing Techniques (CT) in preventing and investigating the thefts. It is also depicted that there were limitations to the present systems like only alarming the home owner about the theft. In many cases despite of knowing the fact that someone is stealing the valuables, the house owner was helpless. In such cases proving the identity of the thief was difficult. So we are in need of finding new and newer technology for making innovative mechanics and machines on the automation platform. This work presents the journey of the antitheft processes from traditional to the modern which will be useful to develop such type of project works.

Keywords: Theft, ATS, IoT, PIR, Raspbery pi.

I. INTRODUCTION

There are many reasons why theft and its prevention should be effectively and efficiently controlled. Often, the desire to minimize theft cases using preventative actions then its control should be possible and it is a known practice in the society. Apart from the consoling this chapter discusses the physical tools and techniques which have been used for avoiding the theft. This chapter focuses on extracting basics of theft problem for making its enhanced solution for it prevents and controls by means of the physical tools and techniques.

This chapter discusses the basics of the theft and its preventive techniques in detail; it also gives the theoretical background in the human society. The chapter also discusses the importance of the social effect and needs in preventing the same. The informative background of the said topic is kept for discussion which emphasizes on the true need of it for the human society. With reference to the synopsis and problem statement this chapter discusses the key facts of the theft and its risk which provides the motive solution to resolve the said problem towards the innovative idea to be introduced in the technical solution.

The potential benefits of prevention and control of theft is more importance for the society however this chapter provides motivation to develop new technical idea on the basis of risk of the theft event. This chapter concludes with a statement of the objectives of the work. The established technologies of theft control have been reviewed.

This is also motivation to strengthen Antitheft Modern Digital Computational System based on the Internet of Things (IoT) [1]-[4].

In general usage, theft is nothing but the illegal taking of other person's property or services without that person's permission or consent with the intent to despoil the rightful ownership of it. The word is also used as an informal shorthand term for some crimes against property, such as burglary, embezzlement, larceny, looting, robbery, shoplifting, library theft, and fraud (i.e., obtaining money under false pretenses). On account of some jurisdictions, theft is taken as a larceny. The act of theft is also known as thieving, stealing, and filching.

The theft may be because of any reason, it is observed that it is common practice is that it is due to uncertain human tendency against the property of the rights law and its rules governed by the human society. It is clear that to run the human life the basic needs are there.

However, to extract needs there are certain rules to obtain it. If it is not getting by rules made by the society then he can break the rules and try to get it, and hence whatever the procedure he will apply to get further property or thing from the other person that procedure is known as theft process.

It is also clear that in the society such a theft processes create the fear and unbalancing of human life in the society. Due to such important theft activity human society gets loss of their human values and ethics. Due to this fact it is difficult to run the human life safely.

On account of such information and true facts human society creates themselves the strong and convenient preventive action by means of counselling and using techniques does in physical manner to avoid of theft. The next paragraph expresses the antitheft processes and its need.

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In order to develop the Antitheft System related with the theft prevention using IoT device along with Raspberry Pi and PIR sensors. It can be able to detect the motion or presence of a warm blooded body (human like) and also give the notification for transfer to get alert the theft surrounding area. There is an arrangement to make the relays triggered to switch ON lights and ring the buzzer. Project development also takes the care about capturing the image of intruder and further it will be send to the owner by SMS. Objectives of Antitheft System Development are as below:

*1)*To deliver a system this will secure users valuable belongings in his absence.

*2)*This system will detect the presence of human and will help to alert neighborhood and surrounding relatives by ringing buzzer so that they can take appropriate action.

*3)*To captures the image which could be used as evidence and notice owner through SMS.

*4)*To design a desirable system which is further becomes low cost and high quality, so it can be used by the society.

*5)*It will maintain on reasonable cost.

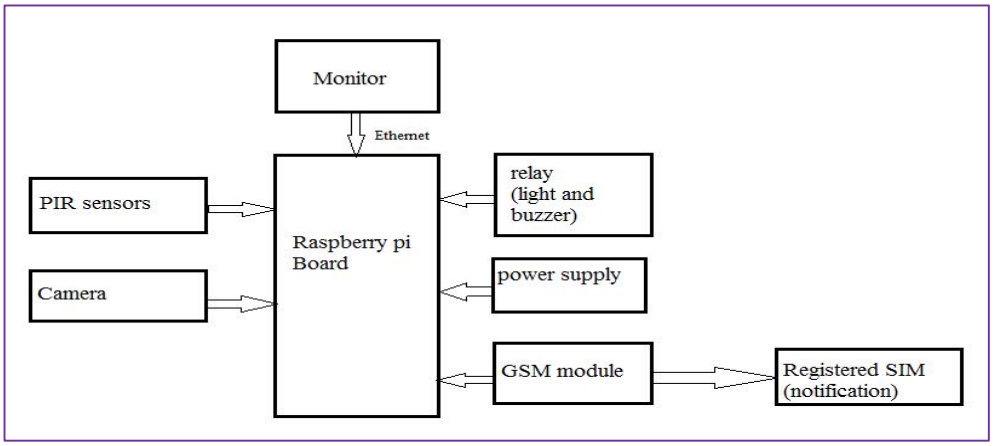

Fig. 1 Architecture of the Antitheft System Design

II. METHODOLOGY

This is one of the important concepts to be used while going to complete the project work in this connection here the following Fig. 1. gives the complete idea of the mouldering of the said project work. From the above diagram we can understand the two modules of the system design.

A. Server Module

Server module is nothing but the Raspberry pi Module which acts as server; The radiations are received from PIR sensors which is nothing but input. Then it is activated in the relay module. When image is captured it is stored in Raspberry pi. It is also responsible for activating GSM module for notification purpose.

B. GSM Module

When GSM Module is triggered it will send the notification through SMS to owner of the system. This module contains the registered SIM. This module works from 850 MHz to 1900 MHz frequency band. For working of GSM model signal range is required for SIM which we are using. Such single range is depends up on the place to place.

For the design and development purpose above said components/hardware are used according to the block diagram which is as shown in the Fig. 2 is used. From the figure it is clear that the Raspberry Pi board is connected to all other hardware components. Let us they are described in the following section.

The following algorithm is based on actual traditional working or theft process and then action produces the antitheft system actually. Let us consider that situation where an intruder enters in a room for attempting theft:

*1)*If he comes in range of sensor; signals are sent to Raspberry Pi (motion/movement of the warm blooded organism is recorded or detected)

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2) Raspberry Pi acts as server and controls relay and GSM Module. This action depends up on the action of relay i.e. on or off. This step followed by sending message and through relay bulb will be on then keep on alert is a actual action and it is action of antitheft.

3) Another alert message is to keep buzzer on simultaneously (sound of the buzzer crates antitheft situation).

4) Simultaneously Image of the object is captured and uploaded on web page.

5) GSM module sends notification to the victim so that he becomes aware from of intrusion.

III. IMPLEMENTATION

There are various types of the software testing methodologies have been used and then it will be implemented. The White Box Testing (WBT) and Black Box Testing have (BBT) gives the satisfactorily results. In WBT processes the internal mechanism of a system get enabled by software and its machine related hardware link is ensured it is being done at the unit level, it is used for integration and system testing more frequently as on today. While in BBT that supervises or examines the functionality of an application without peering into its internal structures or working; it has the technology in which ignorance of the internal mechanism of the system takes place. It also focuses on the output generated looking into the any input and related execution of the system bot the testing's carried out for further implementation of the said task of the research work. The next paragraph describes the actual testing methodologies.

There are certain methods have been used in this project for validation process. The Unit Testing (UT) is the testing of an individual unit or group of related units. It falls under the class of white box testing. It is often done by the programmer to test that the unit he/she has implemented is producing expected output against given input. In this project software development test runs are carried out accordingly. In the Integration Testing (IT) a group of components are combined to produce exhausting output. The interaction between software and hardware is also tested by an integration testing on account if there are software and hardware components have any relation. It contributes for both which may fall under both white box testing and black box testing. It is carried out by two methods namely top to bottom and bottom to up and then according to the results it is proceed further. In this research work such testing has been carried out in order to obtain the integrity of the software to getting best results from the testing.

IV. TEST RUNS OF ANTITHEFT SYSTEM

In this system testing procedure, various runs of the test are carried out. In order to get the required results and to make sure that the system is to become a strong in working and the predefined goals and objectives of this project. It also ensures that by putting the software in different environments (e.g., operating systems) it will be work properly. To get starting and initializing the antitheft system some test runs are to be also carried out for success the further testing accordingly. The one of the screen shot illustrates the same, from the Fig. 3.

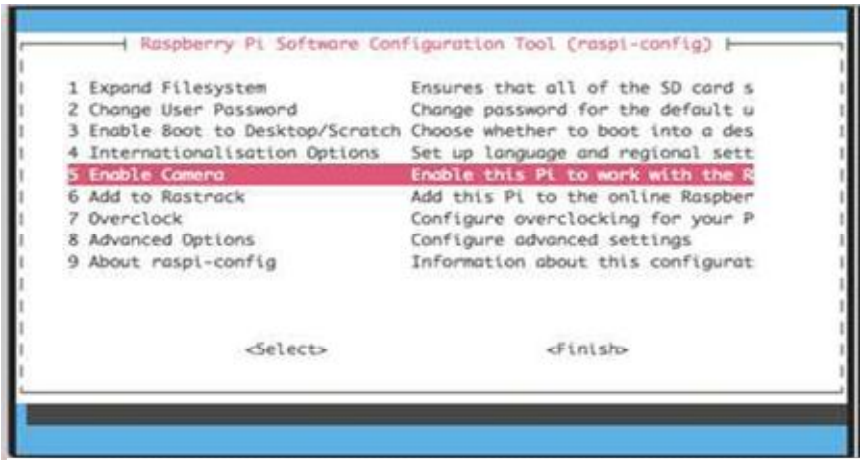

Fig. 3. Screen shot of system initialization of Antitheft System

System testing is done with full system implementation and environment. Our system testing falls under black box testing category. The numbers of test runs have been carried within the different categories of the software testing, some of them are listed below for our ready reference. In this designed system of antitheft there are three types of tastings have been used which are :

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A. Unit Testing

In this, testing system is tested under the unit test category and various parameters have been considered for testing and experimental results have been recorded for various test runs:

1) Test Run-1

- ☑ Test Id No. : 1
- ☑ Test Description : To check if data is being sent
- ☑ Expected Result : Sensor data should be received
- ☑ Actual Result : Sensor data is received
- ☑ Status : Pass the message is waiting for next action

2) Test Run-2

- ☑ Test Id : 2
- ☑ Test Description : Check if Light is turned ON
- ☑ Expected Result : Light should be turned ON immediately
- ☑ Actual Result : Light is turned ON immediately
- ☑ Status : Pass for steady action

3) Test Run-3

- ☑ Test Id : 3
- ☑ Test Description : Check if GSM is working
- ☑ Expected Result : SMS should be sent to the user
- ☑ Actual Result : SMS is sent on the mobile
- ☑ Status : Pass for next action

B. Integration Testing

In this testing system is testing under the principles of integration in which black box technique is used for validation of output results. Under this unit test category various parameters have been considered for testing and experimental results have been recorded which are **:**

1) Test Run-4

- ☑ Test Id :4
- ☑ Test Description : Interfacing of PIR sensor and Buzzer
- ☑ Expected Result : After receiving radiations, buzzer should start ringing.
- ☑ Actual Result : Buzzer starts ringing
- ☑ Status : Pass and flow waiting

2) Test Run-5

- ☑ Test Id : 5
- ☑ Test Description : Interfacing PIR sensor and Relay
- ☑ Expected Result : Light should be turned ON
- ☑ Actual Result : Light is turned ON till next action
- ☑ Status : Pass and waiting for next action

C. System Testing

in this category of testing the system is actually testing for getting actual results and further installation for a long time, Thus various experimental tests are carried out and they are recorded for our ready reference which :

1) Test Run-6

- ☑ Test Id : 6
- ☑ Test Description : Check if notification is sent on users mobile
- ☑ Expected Result : SMS should be sent on users register SIM
- ☑ Actual Result : SMS is sent on users register SIM
- ☑ Status : Pass

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2) Test Run-7

- ☑ Test Id : 7
- ☑ Test Description : System controlled remotely and continued
- ☑ Expected Result :Though web page light should be turned ON/OFF
- ☑ Actual Result :Though web page light is turned ON/OFF
- ☑ Status :Pass and system is on simultaneously

V. RESULTS

The observation is carried out on the basis of actual test runs. Results have been contributed to extract the conclusion of the project work using designed IoT based prototype. From the above test runs, we have observed that the system is responding well according to its goal and objectives. Observations are made for the following purposes which are: verifications and validation have two aspects one is confirmation and another is as per requirements (in view of quality). It is found fit for use (consumers' point of view). On account of this we can make the observation that, the various test run have been reported that system gives the true results accordingly (ref. test run numbers 1-7).

Observations of the verification process is nothing but the process of evaluation the mediator products to check whether the product satisfies the conditions imposed during the beginning of the phase. It is observed that said validation is found satisfactory. It is also observed that designed product of software to check whether the software meets the business need. Observations from the test runs are also recorded in which document describing the scope, approach, resources and schedule of intended test activities.

The main observation is that the other test items, the features to be tested, the testing tasks, degree of tester independence, the test environment and exit criteria to be used. It is the record of test planning process hence these observations are submitted for the report of the actual results in the next section.

This section presents that the number of results with reference to the various test runs and observations are made accordingly. Almost all test runs give the satisfactory results on account of aim and goal of this project and its planned activities. It is observed that before report of the result the outcome of the each test is view based and message received is actually on test in the form of text. Further it is resulted that this IoT based system which is working on the internet and networking principle. The following screen shots and photographs of the working systems presents the better results which are reported in Fig. 5.

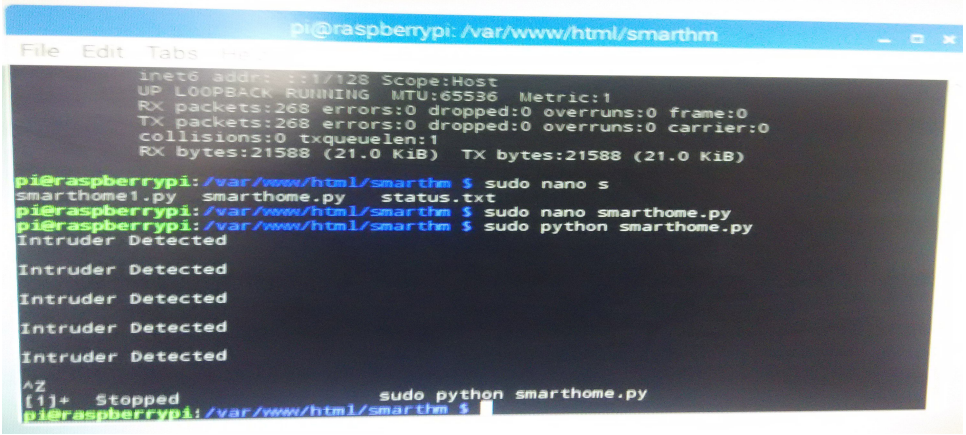

Fig. 5. Screen Shot of Test Result of Intruder Detector

VI. CONCLUSION

The proposed Antitheft System (ATS) is basically designed and developed for the human society and then for industrial customization. It fetches services in the form of theft solution for its prevention and risk minimization of the theft by detecting presence of intruder. It services and gives cost effective benefit solution as we can install number of PIR sensors. As soon as intruder is detected Buzzer starts ringing and this frightens the intruder and also alert the neighbourhood which prevents the theft.

System is also reliable as we provided battery backup in case of power cut. In this system captured image can be used as strong evidence for further investigation and reduces the measure burden with reference to justice process for burglar. It is also found to be

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durable and scalable. It is proved that system is most durable and low cost as compared to the other developed system also. As a system use the IoT then it confers that it covers the wide range over a world through internet and theft prevention possible from any remote place. In conclusion, we can conclude that this ATS is found to be successfully implemented on its own technological characterises and principles.

It is also concluded IoT uses the ATS and contribution of all electrical/electronic devices like smart mobile phone, personal computer, tablet and their monitoring, PIR, Camera etc. controlling and alerting in any way not possible before. However, this proposed system provides many advantages including, improved comfort, energy and cost savings along with high range safety and security.

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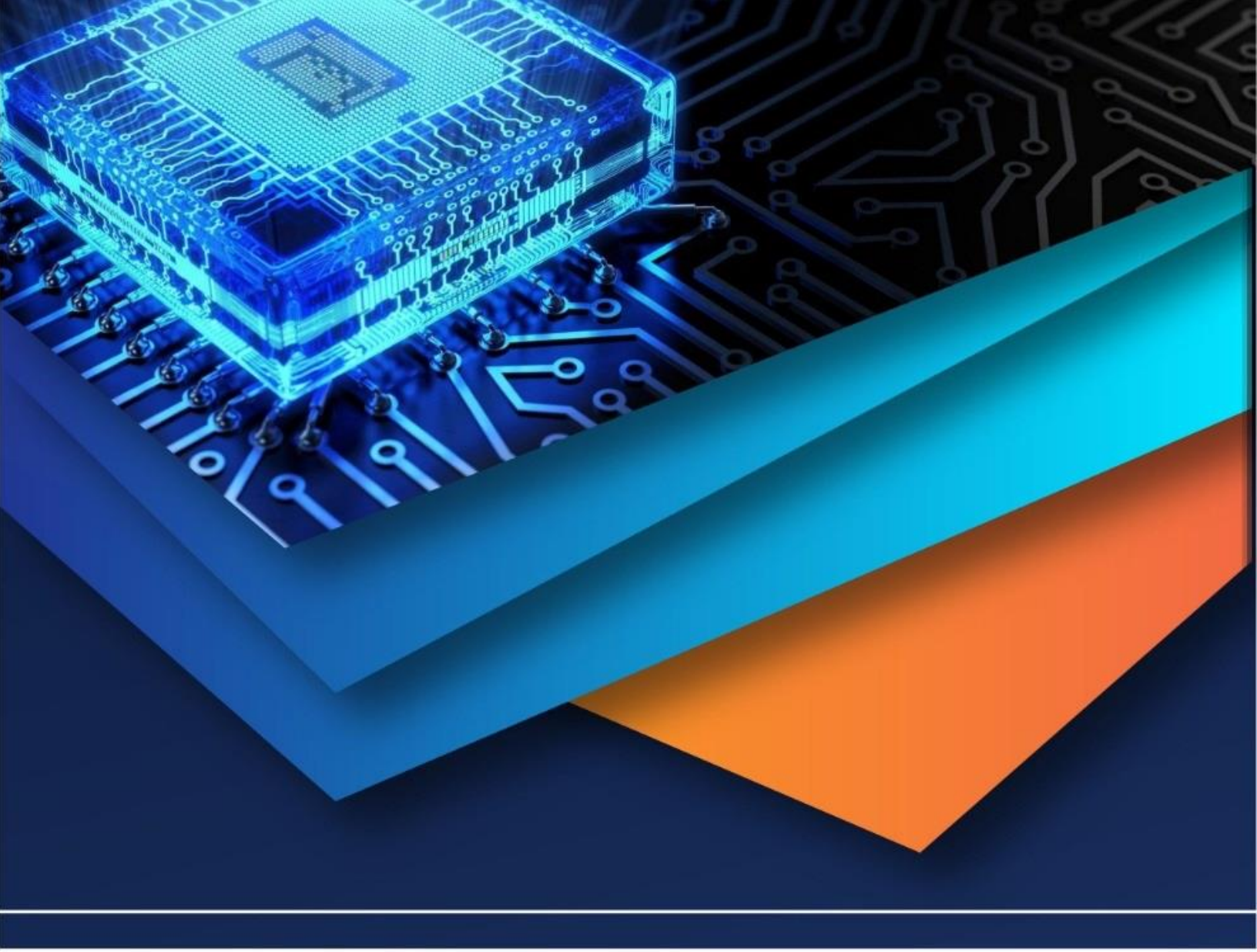

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