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RFID Based Theft Detection and Vehicle Monitoring System using Cloud

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Abstract: ***The rapid advancement in technology has become important to deploy various technology boosters in our daily life that fulfil our requirements by increasing security. Now a day's thefts are making up their offence on committed areas like banks, street robbery, commercial robbery, jewellery, public vehicles etc. Theft is not just about losing property, sometimes, victims may get seriously injured. Generally when the vehicles get robbed, we file compliant or search CC footages for identification which is time consuming and inaccurate. In this paper we propose a system for theft detection and vehicle security. Our main aim is to implement IOT & RFID based theft detection and vehicle monitoring system using cloud. The RFID tag is used for authentication and raspberry pi is used as the micro controller .Whenever a vehicle theft takes place, the authorized person (owner) will receive a mail including the picture of the vehicle from the information that is stored in cloud.***

Keyword: street robbery, commercial robbery, jewellery, public vehicles

I. INTRODUCTION

Everywhere technology is being used in our day to day life to fulfil our requirements. We make use of different sensors depending on type of applications sometimes we may even use same sensors differently for different applications. Users can accelerate the different tasks in life provided with security coming up with good ideas to make technology in use. These new opportunities are created by rapid growth of Internet of Things (IOT) in terms of its usage in daily life by extending the Internet and the Web into the physical realm[1]. The IOT promotes to interconnect various smart devices that form an advanced computing environment by including the communication platforms, sensor nodes and interactive display units. Due to the increase in urbanization and the development in economy, people are concerning more on theft prevention for their property. Hence to increase the security various anti-theft vehicle detection devices have been developed. This paper brings in, the idea about Radio Frequency Identification (RFID) technology based theft detection technology and also vehicle monitoring system.

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II. Problem Definition

In general, people lodge a complaint when the vehicle is lost or stolen. The stolen vehicles are searched using cc camera footage at each signal, which is done manually[2]. If the vehicle is not found in the next signal then it is assumed that the vehicle is in the location between the present signal and the next signal. This manually procedure provides a very inefficient solution which is more time consuming. Hence we are introducing a RFID technique to solve this problem. In this technique a unique RFID tag ID value is placed on each vehicle and the information about the ID of each vehicle is recorded in the police database. If the vehicle is lost, a compliance report can be registered immediately with the ID of the vehicle as theft id. Whenever any stolen vehicle crosses a signal, immediately the mail is sent with the captured picture of the vehicle to the department. The vehicle identification and searching of vehicle is easy and efficient.

III. SYSTEM DESIGN

The IOT & RFID based theft detection and vehicle monitoring system consists of following components as shown in Fig 1.

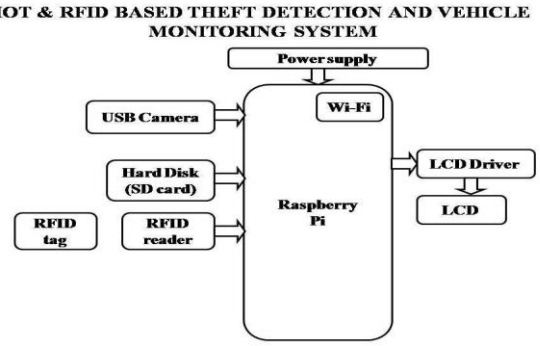

Fig 1.USB camera connection to Raspberry pi

3.1 Micro controller

The Micro controller forms the control unit of the system. The Microcontroller is associated with circuitry that consists of Reset circuitry, capacitors, Pull up resistors. The Microcontroller controls the devices that interfaced and communicates with the devices.

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3.2 Raspberry Pi

The Raspberry Pi is a single board computer that can be compared with size of a credit card. It deals with various components like RS Components, Newark element14 and Egoman. This design relays on a micro SD card especially for booting and long term storage instead of hardware design. This board is runs on Linux Kernel operating system.

3.3 RFID

Radio Frequency Identification (RFID) is a technology which makes radio frequency to couple the electromagnetic spectrum for identification of a person, thing or animal. It comprises of three components: a transceiver, an antenna and a transponder known as the tag. The radio frequency signals are transmitted using the antenna that activates the transponder. As soon as transponder (the tag) gets activated it transmits the information signal back to the antenna. This data notifies the programmable logic controller to perform action that raises an access gate to interface with the database for monetary transaction. This functionality of the RFID has been well depicted in Fig 2.

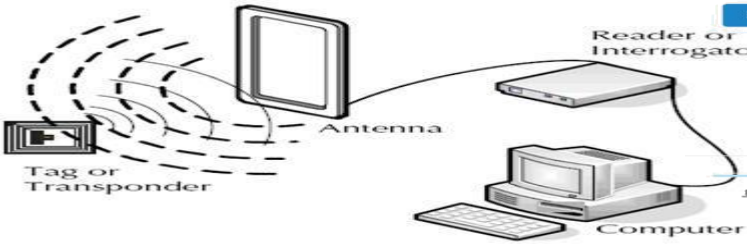

Fig 2.Functionality of RFID

3.3.1 RFID Reader

RFID reader is used to connect any microcontroller UART directly or with a RS232 converter to PC. UART/Wiegand26 is given as output[5]. The RFID Reader Module can works with any 125 KHz RFID tags [6].

The USB based web cam can be turned up into fully functional IP web using the Raspberry PI by making use of various programming tools like Linux, Python. We can access the web cam from anywhere with the help of an internet connection.

3.3.3 LCD Background:

LCD is important and the most common devices that is fixed to a micro controller .There are many LCD's used commonly most of them are 16x2 and 20x2 displays. This means there will be 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

IV. Working Model

The large extent of an application mainly depends on the communication frequencies that are used during communication between various devices [10]. Communication takes place between a reader and a transponder (tag). Reader has to first register his vehicle details in the cloud database as shown in the figure 3. Then he links it with the active tags that have their own transmitter and power source. The information stored and transmitted onto the microchip. They operate at the frequency of 455 MHz, 2.45 GHz to 5.8 GHz, and typically they have the read range of 60 feet to 300 feet [9]. The longer read range for the active tag is obtained by the battery power. Active transponders get active when the reader sends the signals to them which are used in tracking the vehicles[7]. Transponders preserve battery life to have the tag broadcast its signal when it is surrounded by range of a reader.

RFID reader

RFID reader reads the tag values and feds to the Raspberry pi processor. We can enter the theft vehicle's RFID Tag details from any browser which is in turn given as input to the Raspberry Pi. The raspberry pi compares the RFID tag[5] details that are saved already with the dynamic ones. If they are matched, it takes the snapshot of the vehicle and sends to the particular mail ID[8]. Now that vehicle is found, if the authority wants to remove the saved data, he can do so. Camera is interfaced to the Raspberry Pi processor. Raspberry Pi processor stores the image data in SD Card (Hard Disk)[4].

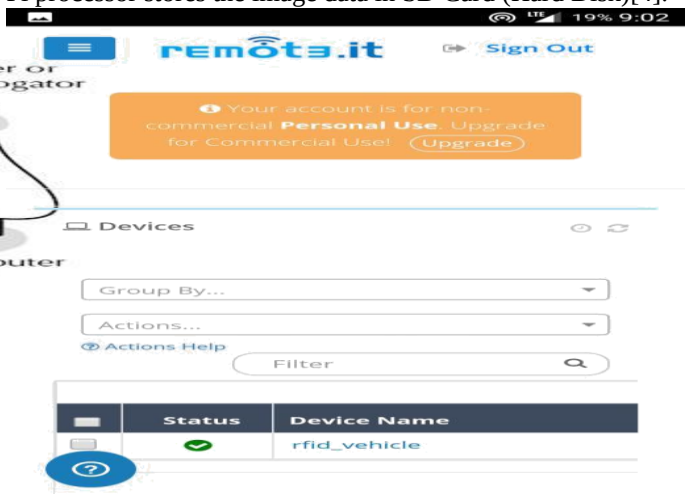

Fig 3 cloud login

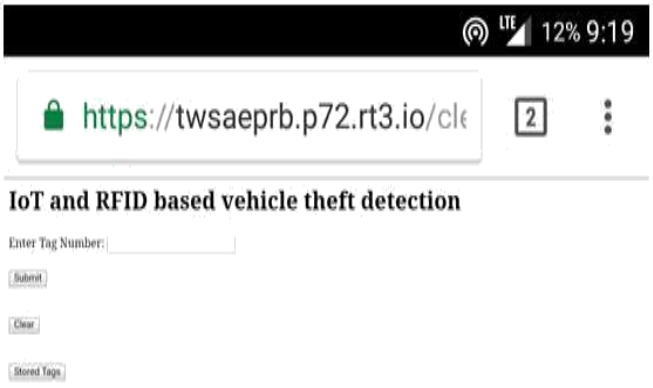

Fig 4 Registering theft vehicle

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V. RESULTS

Fig 5: Theft Detection

VI. Conclusion and Future Scope

Incorporating highlights of all the equipment parts utilized have been produced in it. Each module has been consistent out and it is carefully placed, which causative to the best working of the unit. Secondly, with the use of highly advanced IC's and with the assistance of developing innovation, the project has been successfully implemented. In this paper RFID tag is used for authentication purpose. RFID reader reads the tag values and this values are given to the Raspberry pi processor. We can enter the theft vehicle's RFID Tag details using any browser which is in turn given as input to the Raspberry Pi. The raspberry pi compares the RFID tag details that are saved already with the dynamic ones. If they are matched, it takes the snapshot of the vehicle and sends to the particular mail ID. Now that vehicle is found, if the authority wants to remove the saved data, he can do so. Camera is interfaced to the Raspberry Pi processor. Raspberry Pi processor stores the image data in SD Card (Hard Disk).This paper can be broadened utilizing high efficiency GSM module through which we can alert the user by giving SMS messages. We can also use GPS module to get exact location of the vehicle in the form of latitudes and longitudes.

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