Laptop Tracking and Alert System using GPS and GSM Module

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Abstract- *In this paper we explain, the need of Organizations facing the real problem on physical, mechanism to protect their IT systems such as Laptops or notebooks and palmtaps. All IT systems, have become difficult to protect because they can easily be stolen. Not only in companies but also in universities and colleges, social places it became a major problem for students, staff and people. Even though the laptops are password protected, that type of security is not providing any kind of use in finding the laptops once they are stolen. In this paper, we are designing an anti-theft security system to track the location of the laptop.*

Key words: GPS; GSM; laptop; accelerometer; Laptop theft.

1. INTRODUCTION

All IT systems, laptops are particularly hard to protect. Laptops are mobile, easily concealable, there is a big market to sell the hardware and there can be many of them in a single building. With the increased data storage capabilities of laptops, the loss of even a single laptop can induce dramatically costs to the organization. Thus, although there can be a large number of laptops in an organization, losing even a single laptop may not be acceptable. Organizations open to the public are particularly at risk from laptop theft. Hospitals and universities, for example, accept hundreds of people that can wander in the premises every day points out that 46% of data breaches occur in institutions open to the public: education, health care and the government. Laptops containing sensitive medical or academic data become highly vulnerable in these environments. The problem security professional's face is how to protect the laptops in such open organizations.

The LAPTOP Tracking System is developed by exploring the applications of various state-of-the-art technologies to overcome the problems of laptop theft. This is a effective and efficient system in order to enhance the laptop security. This system is based on the Data Logging System. The Data Logging System consists of four different elements. They are

• Measuring the laptop parameters such as position, time, and velocity and so on by the help of sensors. The sensor in this system is GPS sensor.

• Recording the obtained parameters by the temporary logger unit.

Microcontroller acts as temporary logger unit.

• Uploading / accessing the recorded data. The process involved is called telemetry which is performed by GPRS

Finally, analysis and presentation of recorded data through internet or through the response to the SMS request by the owner.

2. OBJECTIVES

The main objective of the project is foremost building a laptop tracking device that would be used in a real world. The device could be used for wide purposes such as tracking, navigation, fleet and traffic management etc. Also the project helps us to get more familiar with existing GPS and GSM/GPRS networks. So far we have only been able to view the theoretical side of the system but after the project completion we are sure to get familiar with practical side of it. The GPS and GSM/GPRS services have not been fully exploited yet. Therefore we wish to build a base upon which more advanced application of the laptop tracking systems are built in future. Therefore we can say that our project is both research and application based. To be more specific the objectives of the project can be listed as follows.

• To implement a data logging system, which can be used for telemetry

• To show how systems can be combined for the purpose of telemetry.

• To shed light about how new technologies can be exploited for the benefit of human beings.

To understand in detail the electronics behind the GPS and GSM/GPRS
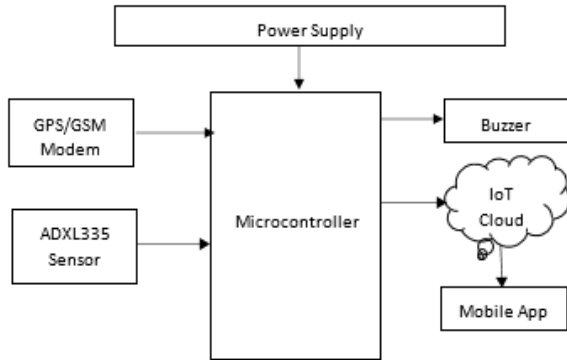
3. BLOCK DIAGRAM

Fig-1: Proposed Block Diagram

4. METHODOLOGY

The proposed system of Real Time Tracking and Alert System for Laptop through Implementation of GPS, GSM, Motion Sensor and Cloud Services for Anti-theft Purposes tries to track the stolen laptop by eliminating all those disadvantages that is prevalent in modern day laptop tracking software. At first, the laptop tracking and alarm module that is embedded in the laptop will be connected to a mobile application the accelerometer as it is capable of measuring motion changes in all three axes (A, B, C). Now if somebody conspires to steal the laptop, conspirer would definitely try to pick it up, the laptop makes the movement and thus in the process the accelerometer is triggered.
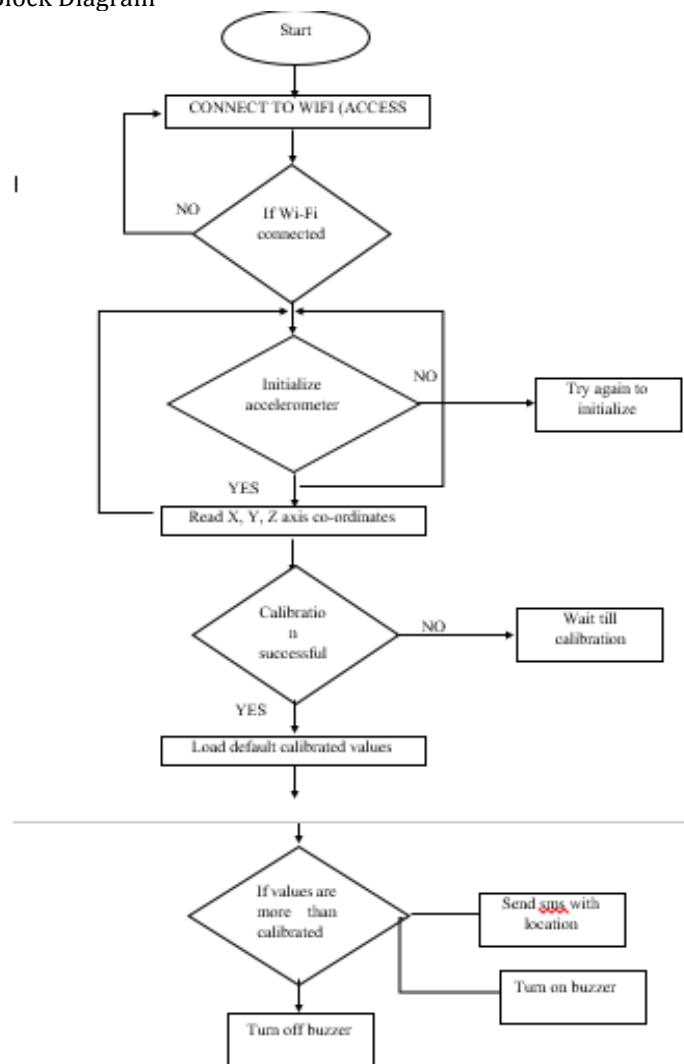

Fig-2: Flowchart of the working of the tracking module

Thus when an accelerometer is triggered, notification is sent to the owner's mobile application about the development. Now if the owner thinks that his or her laptop is under threat, using the mobile application he can trigger the alarm module in the laptop. The alarm will make loud enough noise to be audible up to a certain distance. Thus it will be very tricky and tough situation for the thief or any intruder to carry the laptop with him or her with the alarm system activated as it will alert the passer byes. Now doubts will arise that

what will happen if the owner of the laptop himself triggers the alarm when he tries to handle his or her laptop. Thus triggering the alarm will be in the hand of the owner of the laptop as he or she will be controlling the activation and deactivation of alarm remotely through the mobile application on his or her phone or tablet. The software on the smartphone app will be designed in such a way that if the laptops sensor's coordinates are outside the bounds of the user ,the user will be immediately informed along with the location. Meanwhile the owner of the laptop will also be able to keep a constant track of the location or whereabouts of his laptop through the GPS chip embedded in the laptop.

5. HARDWARE SPECIFICATION

NODEMCU

NodeMCU is an open source LUA based firmware developed for ESP8266 wifi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e. NodeMCU Development board.

NodeMCU Dev Kit/board consist of ESP8266 wifi enabled chip. The **ESP8266** is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol. For more information about ESP8266, you can refer ESP8266 WiFi Module.

There is Version2 (V2) available for NodeMCU Dev Kit i.e. NodeMCU Development Board v1.0 (Version2), which usually comes in black colored PCB.

GSM(SIM800)

SIM800 is a quad-band GSM/GPRS module designed for the global market. It works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM800 features GPRS multi-slot class 12/ class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 24*24*3mm, SIM800 can meet almost all the space requirements in users' applications, such as M2M, smart phone, PDA and other mobile devices. SIM800 has 68 SMT pads, and provides all hardware interfaces between the module and customers' boards. SIM800 is designed with power saving technique so that the current consumption is as low as 1.2mA in sleep mode. SIM800 integrates TCP/IP protocol and extended TCP/IP AT commands which are very useful for data transfer applications.

GPS

The NEO-6 module series is a family of stand-alone GPS receivers featuring the high performance u-blox 6 positioning engine. These flexible and cost effective receivers offer numerous connectivity options in a miniature 16 x 12.2 x 2.4 mm package.

ADXl345 (Accelerometer)

The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. The user selects the bandwidth of the accelerometer using the C_X, C_Y, and C_Z capacitors at the X_{OUT}, Y_{OUT}, and Z_{OUT} pins. Bandwidths can be selected to suit the application, with a range of 0.5 Hz to 1600 Hz for the X and Y axes, and a range of 0.5 Hz to 550 Hz for the Z axis.

Buzzer

A buzzer is a type of electronic device which makes a buzzing or beeping noise. Its light weight with a simple construction and typically a low cost product.

6. SOFTWARE REQUIREMENTS
* **Arduino IDE**

7. RESULTS AND DISCUSSIONS

Fig-3: Over all view of project module

The current design is an IOT application, which will continuously monitor laptop and report the status of the laptop .we can locate the laptop around the globe with microcontroller, GPS, GSM module. The laptop can be tracked even it is in OFF state.

8. CONCLUSION

Laptops are always an important asset for its owner. It contains important and vital data and information of its owner. It becomes a huge problem for the owner if his or her laptop gets stolen. Laptop tracking techniques present in the current market are inefficient and not worth the money, since they only are able to track the laptop if it is switched on and is connected to the internet. The methodology mentioned in the paper is an efficient way to track the laptop since it notifies the owner the moment anyone fiddles with the laptop. Also the laptop will be continuously tracked even if it is switched off or not connected to the internet.

9. FUTURE SCOPE

Laptops have become a valuable part of the computing scenario. The current undertakings of the research have been implemented to showcase the real time alert and tracking of stolen laptops. To make the concept more enhanced, the future scope of the project will deal with the ability of the laptop to connect automatically to the internet that will be served by the GSM module. Now the moment the thief opens the laptop and switches it on, a photo will be clicked of the thief through the web cam. Now the internet service will enable the laptop to send the photo which has been clicked to the cloud and location will be sent for the owner of the laptop to see it. The will make the tracking process of the stolen laptop more efficient and easier.

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