

A Predictive Controller for Mobile/Laptop Tracking and Security

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ABSTRACT: A Predictive Controller for Mobile/Laptop Tracking and Security is an android cum laptop application that enables the paired users to get information about the others device's location. This application comes to use when the device gets lost, when the person become missing or in any other cases to track the device. This application uses GPS module to track the device, it is linked with Google map to retrieve the correct location. Even if the device gets formatted, it could be tracked since a separate GSM module is attached to the device as an external hardware equipment. GPS navigation systems uses the Global Positioning System to determine the precise location of the device to which it is attached and to record the position of the asset at regular intervals. The recorded location data can be stored within the navigational unit, or it may be transmitted to a central data base, or internet-connected computer, or to the user mobile using a GSM modem embedded in the unit.

KEYWORDS: GPS Module, Google map, GSM Module, GSM Modem.

I. INTRODUCTION

An asset can be defined as something that has a potential or an actual value to an organization. When these assets are managed well (using asset management systems), it can among other things lead to improved financial performance and managed risk. ISO has developed a standard (ISO 55001:2014) to regulate their implementation as Asset Management Systems are of much importance [1]. People throughout the world are increasingly becoming mobile; they use mobile devices such as laptops, smartphones and tablets to do their work at the office, at home, and while travelling [2]. This is resulted to the as anytime, anywhere information workers - those who use three or more devices, working from multiple locations, and use many apps [3]. Consequently, the traditional asset management, security and tracking systems have to be redesigned to nurture for this as well as for bringing your own device (BYOD) concept. The meantime, the availability of these devices has led to an increase in their (devices) loss through theft. The main objective of this research was to prove that a real-life application built over microcontroller and intelligently integrated wireless sensors, GSM Module, GPS Module, Cloud and mobile phones, can be used to dispel laptop and mobile theft. GPS navigation systems uses the Global Positioning System to determine the precise location of a vehicle, person, or other asset to which it is attached and to record the position of the asset at regular intervals. GPS navigation systems are commonly used by fleet operators for fleet management functions such as routing, dispatch, on-board information and security. Other applications include monitoring driving behaviour, such as an employer of an employee, or a parent with a teen driver. GPS navigation systems are also popular in consumer vehicles. The recorded location data can be stored within the navigational unit, or it may be transmitted to a central data base, or internet-connected computer, or to the user mobile using a GSM modem embedded in the unit.

GPS navigation systems have brought this technology to the day-to-day life of the common man. Today GPS fitted cars; ambulances, fleets and police vehicles are common sights on the roads of developed countries. The system is an

electronic device installed in a laptop or phone to enable the owner or a third party to be aware of the device's position. Global Positioning System (GPS) modules offer accurate positioning of the laptop. Communications component such as cellular or satellite transmitters too, are included in the system so as to send the device's location to a remote user. Positioning information can be viewed using specialized software, which is done using android.

II. RELATED WORK

Using GSM/GPS Technologies a Smart Real-Time Healthcare Monitoring and Tracking System was proposed. The system will track, trace, monitor patients and facilitate taking care of their health; so efficient medical services could be provided at appropriate time. By using specific sensors, the data will be captured and compared with a configurable threshold via microcontroller which is defined by a specialized doctor who follows the patient; in any case of emergency a short message service (SMS) will be sent to the Doctor's mobile number along with the measured values through GSM module. Furthermore, the GPS provides the position information of the monitored person who is under surveillance all the time. Utilizing the available services of GSM and GPS technologies to build a smart health monitoring system can improve and enhance the real time monitoring, where: GSM services are used for global communications anytime and anywhere, GPS technology is applied for outdoor positioning [4]. A Vehicle Anti-theft Tracking System was proposed Based on Internet of Things. This system is controlled by an RFID module to switch on and off. When the car is stolen, the vibration sensors and pyroelectric infrared sensors mounted inside the vehicle are triggered, and GSM module will send the location information obtained by GPS module to the owner's mobile phone, thus owners can check the position of the vehicle with an android software developed by the team. This system uses android mobile phones as mobile terminal, which is more convenient and flexible than other kinds of like products since the owner can check and track the position of the car immediately with android mobile phone application once the car is stolen [7].

III. DESIGN

Tracker is a hardware based android project that enables tracking the smart devices back when lost. The android application receives the location information from the GSM/GPS module, which is used to track the device back.

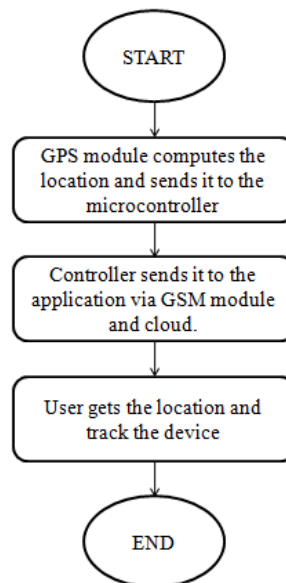


Fig 1: Basic data flow diagram

An external circuit is connected to the device for modifying the current system architecture. Here we use Arduino Nano, a microcontroller as the major part of the external device. Other components used in this section include The Global System for Mobile (GSM), The Global Positioning System (GPS) and ADXL335 (3-Axis Accelerometer)-vibration sensor.

The GSM module gets triggered when a request for the location comes to it. This can be a request from the paired android or due to the button pressed by the user. The GSM module initiates the microcontroller which in turn initiates the GPS module to capture the current location of the device.

The communication between the android application and the hardware attached to the device is done through the GSM module along with the Cloud Service. The cloud service is used to make the sending and receiving of data more live. Due to this attribute, it will not depend on the less network coverage of the area. Even if the cellular network is slow, the user can connect through WiFi which enables easy tracking. The admin is the application developer and the one who provides the buyer with the special number of the sim. It should be known only to the buyer. Whenever the device

gets lost, he/ she sends a message to that sim number which triggers the GSM module and helps in sending the location to that number.

Here an android application is developed for consumers, so that they can log-in to it and sent the particular message to the sim number provided by the administrator. Another feature is that the consumer can press a button in case of emergency situations that automatically sends the current location to paired android number which enables easy tracking.

The system consists of three modules

- Tracking Module
- Cloud and Admin Module
- Android Module

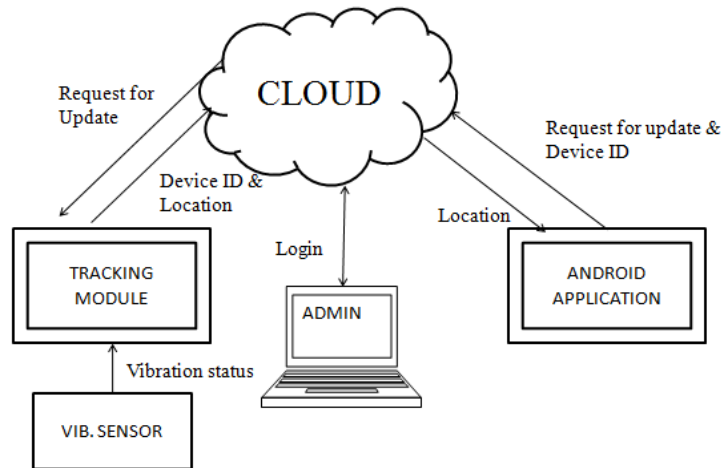


Fig 2: Basic architecture

Tracker Module

Hardware unit basically consists of an android or laptop, GSM module, GPS module, Arduino - A micro-controller and ADXL335- a vibration sensor to provide an additional feature .Here in this project we have used Arduino Nano microcontroller to decrease the space required during installation.

The Arduino Nano is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. It uses the standard USB COM drivers, and no external driver is needed. However, on Windows, an .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer

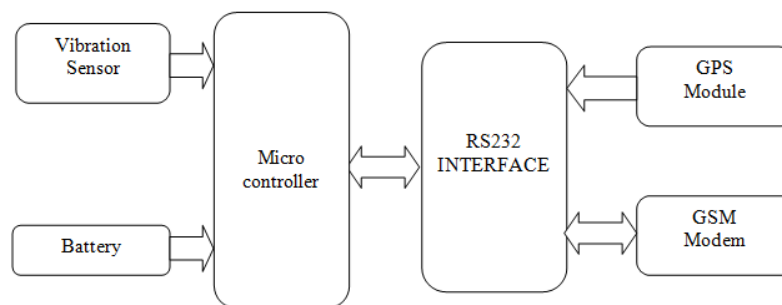


Fig 3: Hardware architecture

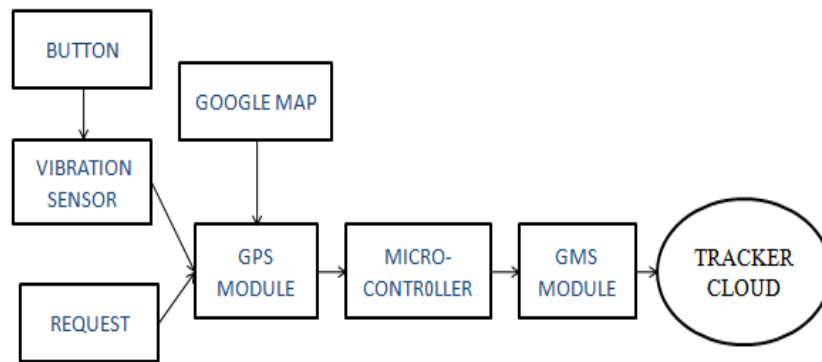


Fig 4: DFD hardware

The button is provided as an additional feature for the user to send the current location in case of any emergencies. The sensor is a polysilicon surface-micro-machined structure built on top of a silicon wafer. Polysilicon springs suspend the structure over the surface of the wafer and provide a resistance against acceleration forces. Deflection of the structure is measured using a differential capacitor that consists of independent fixed plates and plates attached to the moving mass. The fixed plates are driven by 180° out-of-phase square waves. Acceleration deflects the moving mass and unbalances the differential capacitor resulting in a sensor output whose amplitude is proportional to acceleration. Phase-sensitive demodulation techniques are then used to determine the magnitude and direction of the acceleration. In the microcontroller, programs are written in C language. The necessary information about the proceedings are given in it. When the message comes, it triggers the GSM and GPS module to send the current location. RS232 interface is provided as a safety precaution that is even if any of the chip gets burnt, it won't affect any other chip leading to a safe circuit.

Admin and Cloud Module

The application providers are the people who updates the data into the cloud and checks the new requests and clear the old ones. They log in to the cloud and makes the necessary changes required. The admin is the person who gives the sim number to the consumer and enables tracking back the device. Cloud is provided to make the transmission more live. The messages send can be sent even in the absence of network coverage due to this feature. Overwriting of information occur and the most recent location can be accessed without any difficulty.

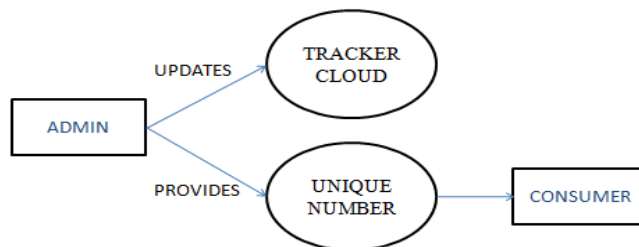


Fig 5: Admin DFD

Android Module

Consumers can login with their user-name and password .They can view the location of their lost device easily. Google map services are provided simultaneously for enabling extracting location.

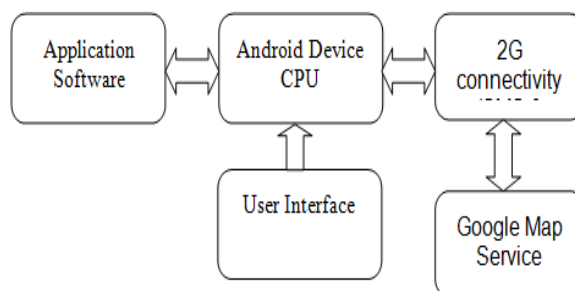


Fig 6: Android architecture

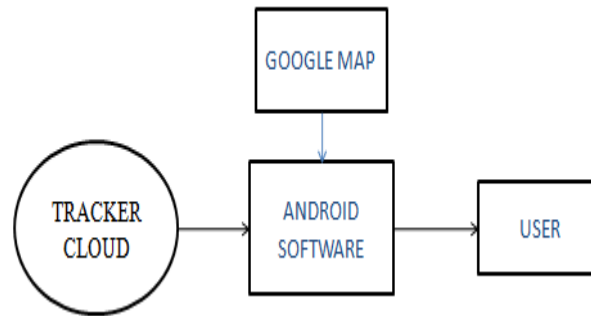


Fig 7: User DFD

IV. CONCLUSION

An application is designed which is an android cum laptop application that enables the paired users to get information about the others device's location. This application comes to use when the device gets lost, when the person become missing or in any other cases to track the device. This application uses GPS module to track the device, it is linked with Google map to retrieve the correct location. Even if the device gets formatted, it could be tracked since a separate GSM module is attached to the device as an external hardware equipment.

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