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Tracking Women During Threat Using GPS and GSM Module

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***Abstract:** During a threat, tracking men/women from any location at any time is considered as extremely beneficial. Using the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) technology, a real-time Google map and Arduino based tracking system is implemented. Geographic coordinates are provided by the GPS module periodically. When a person's location is transmitted, the GSM module sends the latitude and longitude of that location to their cell phone. Finally, a cell phone shows the place's name and location via Google map. This would enable owners/users to monitor moving people/vehicles using their cell phones. This research presents experimental results in order to demonstrate the system's feasibility and effectiveness. In spite of GPS technology's excellent accuracy, it's not always applicable due to technical restrictions, for instance limiting participants' views of the satellites when using public transportation, which is crucial. However, GSM is less accurate in terms of spatial accuracy. Incorporating both technologies could be the key to tracking individual's geographical information (origin, route, destination) in a more comprehensive way. Transportation research can be supported by both kinds of tracking technologies in numerous ways. A GPS/GSM system can be used to track women or children 24/7 respectively to interview them on site in real time. This system may also be employed on vehicles in order to prevent theft. This tracking system works for both business owners and individuals wanting to keep track of their fleets or to keep track of expensive assets in the field without having to be there physically. The vehicle's location (Latitude and Longitude) is communicated continuously from a remote location by means of a GSM modem. The GSM modem automatically returns a real-time latitude and longitude coordinates as a response to that particular mobile phone when a request by the user reaches the number in the GSM modem. On demand, this system will continuously monitor the status of a vehicle in motion.*

I. INTRODUCTION

Delhi was the first city to introduce tracking systems for women after the 2014 disaster. Families wanted to know where their daughters or children were at all times. The technology developing at a rapid pace these days, however, has led to an automation of tracking and displaying a person's location in real-time. In this paper, a tracking system utilizing GPS, GSM, and GPRS technologies for women (or small kids) will be examined. The smartphone is also used for tracking and notifying the live location of loved ones and rescuing them with the help of cops. With smartphones, a variety of applications can be accessed effortlessly to meet the demands of many users. However, we will not have our smartphones with us at all times. Suppose his/her smart phone gets stolen and then he/she gets kidnapped, we will be able to locate their location using the GPS/GPRS/GSM technology present in the bag. Typically, GSM and SMS technology is used for transmission of a person's location to someone who demands it over wireless networks. Increasingly, people are opting to use SMS technology because it is relatively inexpensive.

II. LITERATURE SURVEY

In 1999, British technology pioneer Kevin Ashton coined the term "Internet of Things" (IoT) to illustrate the concept of connecting physical objects to the internet through sensors. With the aim of counting and tracking goods and products without human involvement, Ashton created the term to illustrate the power of tying Radio Frequency Identification (RFID) tags [13]. Internet-connected objects, devices, sensors, have a variety of computing functions and Internet connectivity. It is popularly known as the Internet of Things in these modern days. Even though the term "Internet of Things" is relatively new, the concept of monitoring and controlling devices with computers and networks has existed for decades. It was possible to remotely monitor electrical grid meters over telephone lines by the late 1970s. Due to the rapid development of wireless technologies, Enterprise and industrial companies began to deploy "machine-to-machine" (M2M) solutions to monitor and control equipment in the 1990s. Nevertheless, the majority of conventional M2M solutions relied on closed purpose-built networks and customized protocols, instead of the Internet Protocol ("IP")-based networks and standards that are ubiquitous today. During an Internet conference in 1990, an IP–enabled toaster was showcased that could be powered on and off by internet connections.

Over the next few years, IP capability was given to a soda machine operated at Carnegie Mellon University in the US and a coffee machine installed in the Trojan Room of Cambridge University which stayed connected online until 2001. Research and development of "smart object networks" formed a basis for today's Internet of Things.

Across various industries, IoT applications and use cases are classified and organized according to their own taxonomies. There are a variety of ways in which IoT can be applied, including through wearable devices and home appliances. Other sectors, such as smart cities and smart homes, rely on location-based solutions. Traffic generated by Internet-connected devices will likely increase dramatically as the number of devices rises. Cisco predicts that devices other than PCs will contribute a greater share of Internet traffic than personal computers in 2019. Additionally, Cisco anticipates that machine-to-machine ("M2M") connections in home, healthcare, automotive and other IoT sectors will increase by 43% by 2019. By means of computers and smartphones, Web users are heavily engaged in downloading and producing content. It is possible that the Internet of Things will become more passive as consumers engage with objects such as automotive components, home appliances, and self-monitoring devices. These devices wirelessly communicate with each other without much human interaction or oversight. As an extension of the general-purpose nature of the Internet architecture, a "hyperconnected world" is a potential outcome as it has no technological limitations.

III. A LIST OF RELATED APPLICATIONS

A. *Live Tracking Of Vehicles With Arduino Mega*

The transportation of goods and material requires automobiles. If goods are delayed in delivery, consumers may encounter a variety of problems. Deliveries may be delayed because of incorrect route selection or more time-consuming routes. Global positioning systems (GPS) emerging as a key solution to many of these issues like managing vehicle fleets, recovering stolen vehicles, mapping and monitoring vehicles. With the use of Arduino, this paper presents a real-time GPS tracking system. A user can receive location coordinates and information stored on the SD card from the Arduino GPS-GSM shield through dialing the designated number. Vehicle security, salesman tracking, and private drivers can all benefit from this proposal.

B. *Live Vehicle Tracking And Google Maps Using Arduino*

The movement of a vehicle can be tracked at any time from any location with a vehicle tracking system. We have integrated global positioning system (GPS) and global system for mobile communication (GSM) technology into a real-time tracking system using Google maps and Arduino. Geographic coordinates are provided by the GPS module periodically. After that, the GSM module sends the vehicle's GPS coordinates to the owner/user's cell phone. Additionally, there is a display of the location on a LCD. A cell phone shows the name of the place and location via Google map. This feature allows an owner or user to monitor their moving vehicle constantly via their cell phone. The work presented here describes the experimental results of a vehicle tracking system in order to demonstrate its effectiveness and feasibility. It ensures privacy and safety at a low maintenance cost, and is user-friendly.

C. *Building A Smartphone App For Anti-Theft Vehiclle Tracking System*

Parked vehicles are more vulnerable to theft these days. The purpose of this paper is to describe a simple and cost-effective vehicle tracking system that uses the Global Positioning System (GPS) and Global System for Mobile Communications (GSM) technologies, along with a smartphone application, for tracking any mobile asset. An application on a smartphone allows users to track a stolen vehicle with the push of a button.

D. *Application Of SMS And Smartphones For Vehicle Tracking*

It has become hectic for most people to wait for buses in the current world because everyone desires to get to their destination quickly. Additionally, we are unfamiliar with the bus schedule. In this paper, a simple system that helps track real-time bus location is described in order to overcome this problem. The proposed solution incorporates GPS-based location services and SMS-based basic telephony services, which are the two most important features available across all mobile platforms nowadays. Server device's primary function is to provide the exact location of a bus to the server, or indeed to the client if the request is based on SMS. As an alternate, client devices can find bus locations via SMS or the internet. An Android application (tracks bus location) installed server's device will be placed on the vehicle of interest. Our testing has revealed that this system is more effective in many areas as compared to similar vehicle tracking systems.

E. *Object Tracking And Parameter Detecting Using Global Positioning System*

Several object tracking devices have been developed so far and are currently on the market. Although most of these systems offer tracking abilities, they have limited flexibility, and their operational costs are high. Our aim in this paper is to develop a real-time, cost-effective object tracking system that is simple to use and can be built using readily available components. A portable battery-operated object tracking system with temperature sensing has also been developed in this work.

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IV. CONCEPTUALIZATION OF THE PROJECT

A. *Required Components*

1) GSM SIM900A Module
2) GPS Module – Neo 6MV2
3) Arduino
4) Push Button
5) Sim card
6) Resistor
7) Jumper Wires

B. *Power Supply*

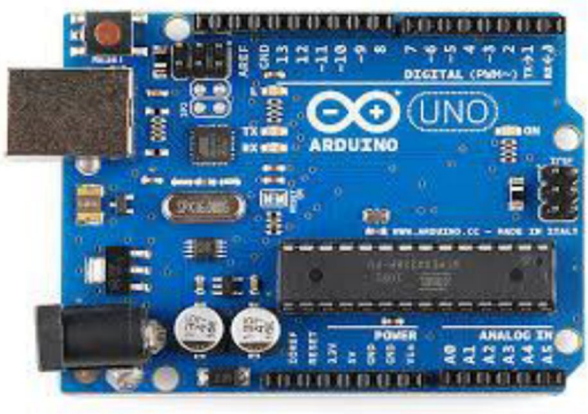
1) *SIM900A GSM Module*

The module is capable of communicating in the 900 MHz band. Mobile operators in our country are primarily using the 900 MHz band. Most U.S. mobile networks use either 850Mhz or 1900Mhz and Canada operates mainly in the 1900Mhz band. GSM is a technology that allows you to connect over various mobile networks. In order to communicate with a network operator or service provider, the GSM module which is wireless and ultracompact requires a SIM card. An integrated dual-band GSM/GPRS module can be incorporated in customer applications using the SIM900A. SIM900A can fit in almost all user applications due to its tiny dimensions of 24mmx24mmx3mm. Sim900A provides an industry-standard interface that offers voice, SMS, and Fax services on GSM/GPRS -900/1800MHz in a compact design with extremely minimal power requirements.

2) *NEO-6MV2 GPS Module*

GPS receiver modules are devices intended to receive GPS information from GPS satellites and compute the geographical position. Modules within the NEO-6 series GPS receiver utilize the high performance U-Blox 6 positioning engine. Despite their small size and compact design, these versatile receivers support numerous connectivity options and are very affordable. NEO-6 modules are suitable for mobile devices with limited power and space while meeting strict and weight budget restrictions. A Time-To-First-Fix0(TTFF) of under one second is accomplished by its 50-channel U-blox 6 positioning engine. It can run an enormous number of time and frequency simultaneously in parallel, with 2 million correlations, making it possible to find satellites very quickly. With outstanding design and technology, NEO-6 GPS receivers are able to reject jamming sources and suppress multipath effects, providing superior navigation performance in even the most adverse conditions.

C. Arduino



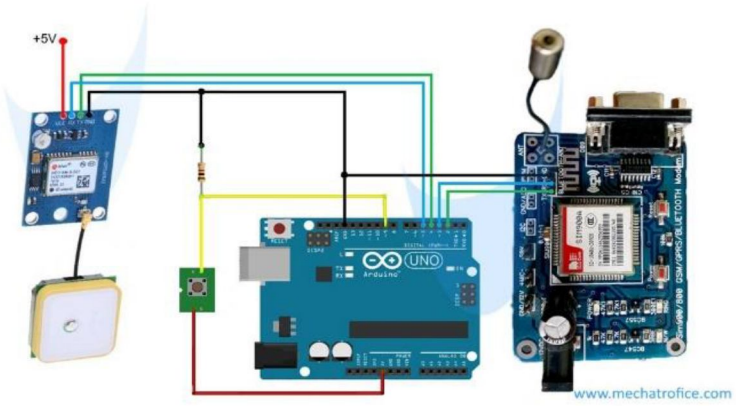
Arduino is an electronic platform which manufactures various open-source hardware and software products. Arduino products are licensed under the GNU Lesser Public General License (LGPL) or the GNU General Public License (GPL) which grants permission for anyone to manufacture and distribute Arduino boards. These boards can be purchased either preassembled or as Do it yourself (DIY) kits. Arduino develops and create various single board microcontrollers and microcontroller kits for constructing digital devices. Arduino boards are provisioned with digital and analog input/output pins that can also be connected with various breadboards and circuits. The boards attribute interfaces like serial communications including Universal serial bus (USB) in some models. Procedure oriented languages like c and c++ can be used to program microcontrollers. Arduino project contributes not only the conventional standard compiler toolchains but also an integrated development environment (IDE).

D. Pin Configuration (Arduino on other Components)

Arduino	GPS module
3.3 V	Vin
GND	GND
Rx (pin 4)	Tx
Tx (pin 5)	Rx

Arduino	GPS module
Rx (pin 2)	Tx
Tx (pin 3)	Rx
GND	GND

E. Block Diagram



The circuit can be incorporated with various sensors that responds to particular action like heavy vibrations, flames and the devices can be made to counter spontaneously for some specific actions. For example, flame detecting sensors can be used to rescue individuals from fire accidents by sharing live location.

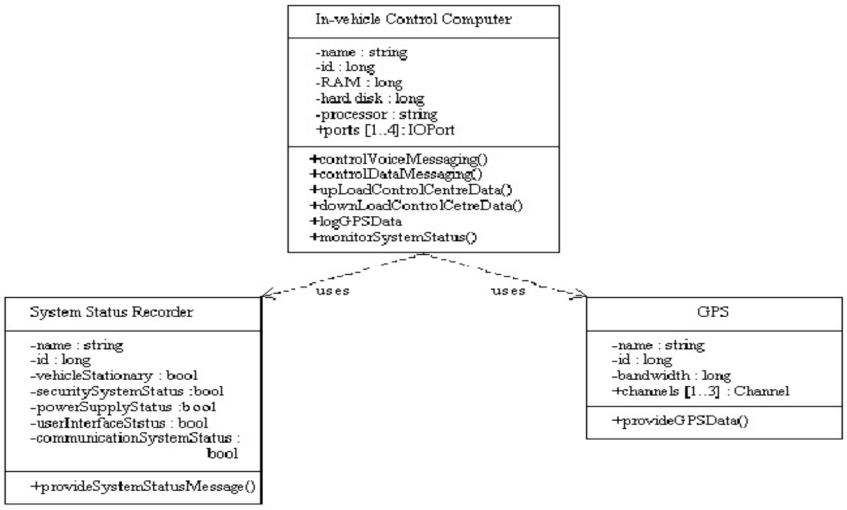
By utilising the Arduino tiny GPS library, the latitudinal and longitudinal coordinates are extracted from NMEA format text which was previously procured by the GPS receiver. Afterwards GPS module transmits SMS to the number that we have assigned in the code.

The following code is applicable to operations like device tracking, live location sharing based on Arduino and various GPS and GSM projects including vehicle tracking etc. In order to trace devices or vehicles which are in motion, the code needs to be modified. Location can be detected in fixed intervals by simply attaching time delay in code for few minutes or seconds and if condition which controls SMS operation should be removed.

F. Algorithm

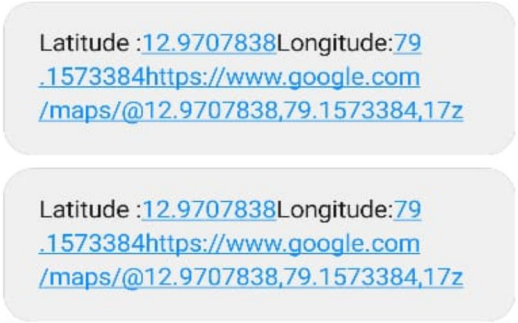
1) *Step 1:* When GPS is available, read and store GPS coordinates
2) *Step 2:* Fetch GPS Latitude and Longitudinal coordinates
3) *Step 3:* Read GSM module While push button is high (pin==9) and state==0
4) *Step 4:* In GSM, print GPS module coordinates
5) *Step 5:* To fetch coordinates, provide input number to GSM module
6) *Step 6:* Print GPS coordinates in the message
7) *Step 7:* While state==1, the message is sent to specified mobile number
8) *Step 8:* Reiterate from step 3

G. URL Diagram



V. RESULTS

It is recommended to place GPS NEO -6MV2 in an open area, where satellites can track it, since its range is low



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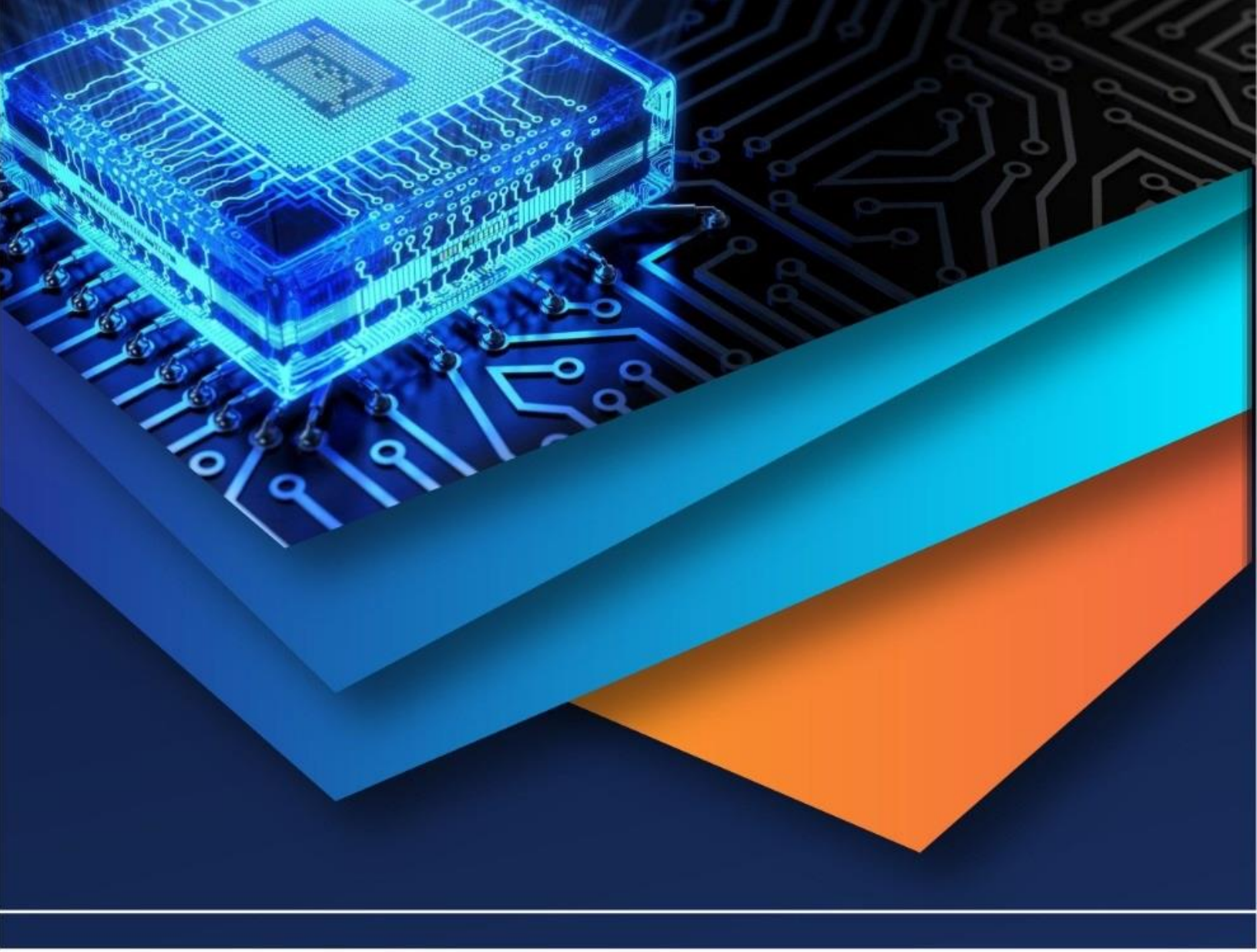
VI. CONCLUSION

The location data can be transmitted to the person's parents, friends or a guardian using vehicle tracking system designed GSM/GPS /GPRS module. we accomplished our most affordable and easily attainable project in real time stationary and moving vehicles successfully.



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