

Improving Child Security using GPS Enabled Identification Card

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The burst of insecurity in the country has brought an idea to develop a Global Positioning System (GPS) based tracking system to meet the increased quantity of security issues. In this paper, we present a system - the student Identity Card, which is GPS enabled. This ID card will be linked to a dedicated mobile i.e., parents mobile. A parent at any time, even from home or from his/her office can find their child's location. Further, this concept can also be extended to implement in the vehicles with a GPS enabled vehicle chassis for the security of vehicles and to control the vehicle's speed.

Key words: Global Positioning system, vehicle chassis.

1. INTRODUCTION

GPS tracking System is one of the most rapidly growing technologies around the world. Most developed countries have focused on the GPS technologies in resolving some of their inherent security problems. According to Michael K., McNamee A and Michael M.G. (2006), the Global Positioning System (GPS) is increasingly being adopted by private and public enterprise to track and monitor humans for location based services (LBS). A location-based service (LBS) is information or entertainment service, accessible with mobile devices through the mobile network and utilizing the ability to make use of the geographical position of the mobile device. LBS can be used in a variety of contexts, such as health, indoor object search, entertainment, work, personal life, etc. LBS include services to identify a location of a person or object, such as discovering the nearest banking cash machine or the whereabouts of a friend or employee. LBS include parcel tracking and vehicle tracking services. LBS can include mobile commerce when taking the form of coupons or advertising directed at customers based on their current location. They include personalized weather services and even location-based games. They are an example of telecommunication convergence (Wikipedia). Some of these applications include personal locators for children, the elderly or those suffering from Alzheimer's or memory loss, and the monitoring of parolees for law enforcement, security or personal protection purposes.

GPS has the ability to calculate the position, time, and velocity of any GPS receiver. It does so using a process of triangulation, which works on the premise that you can find any position if the distance from three other locations is also known.

Eric M. Conway (2008) noted that the U.S Department of Defense first launched a Global Positioning Systems (GPS) satellite in 1978 and achieved a full constellation of 24

satellites in 1994, which the U.S. government has named Navstar. Today, GPS is used for both civil and military purposes and is controlled by a joint civilian/military executive board of the U.S. Government. The system is maintained by the U.S. Air Force on behalf of all users. GPS relies on three components: a constellation of satellites (currently 27) orbiting about 20,000km (11,500 miles) above the earth's surface which transmit ranging signals on two frequencies in the microwave part of the radio spectrum, a control segment which maintains GPS through a system of ground monitor stations and satellite upload facilities, and user receivers (civil and military).

2. WHAT IS GPS

The Global Positioning System (GPS) is actually a constellation of 27 Earth-orbiting satellites (24 in operation and three extras in case one fails). The U.S. military developed and implemented this satellite network as a military navigation system, but soon opened it up to everybody else. Each of these 3,000- to 4,000-pound solar-powered satellites circles the globe at about 12,000 miles speed (19,300 km), making two complete rotations every day. The orbits are arranged so that at anytime, anywhere on Earth, there are at least four satellites "visible" in the sky.

A GPS receiver's job is to locate four or more of these satellites, figure out the distance to each, and use this information to deduce its own location. This operation is based on a simple mathematical principle called **Trilateration**.

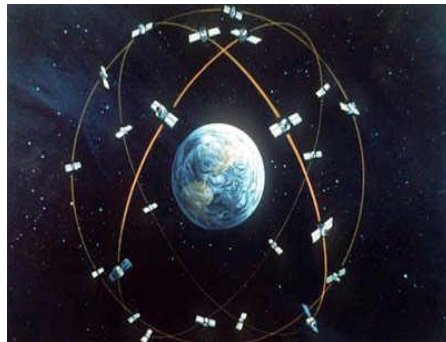


Fig. 1: GPS layout.

In order to make the simple calculation of the location, then, the GPS receiver has to know two things:

1. The location of at least three satellites above you.
2. The distance between you and each of those satellites.

3. GPS TRACKING SYSTEM UNITS

Three Types of GPS Tracking Units are there. The categories are split into how GPS

data is logged and retrieved.

3.1. Data Loggers

Data loggers are usually the most basic type of GPS tracking; a GPS data logger simply logs the position of the object at regular intervals and retains it in an internal memory. Usually, GPS loggers have flash memory on board to record data that is logged. The flash memory can then be transferred and accessed using USB or accessed on the device itself. Usually data loggers are devices used for sports and hobby activities. They might include devices that help log location for hikers, bikers and joggers.

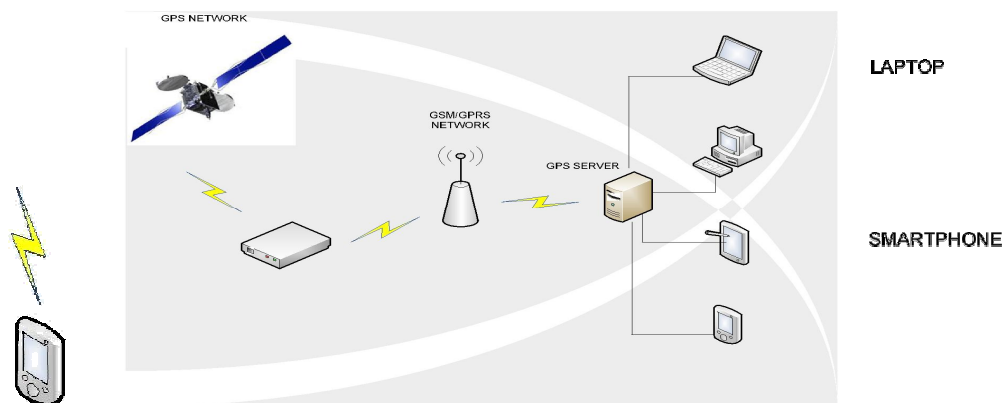
3.2. Data Pushers

Data Pushers are GPS tracking units that are mainly used for security purposes. A data pusher GPS tracking unit sends data from the device to a central database at regular intervals, updating location, direction, speed and distance. Data pushers are common in fleet control to manage trucks and other vehicles. For instance, delivery vehicles can be located instantly and their progress can be tracked. Other uses include the ability to track valuable assets. If valuable goods are being transported or even if they reside in a specific location, they can constantly be monitored to avoid theft. Data pushers are also common for espionage type tasks. It is extremely easy to watch the movements of an individual or valuable asset. This particular use of GPS tracking has become an important issue in the field of GPS tracking, because of its potential for abuse.

3.3. Data Pullers

The last category of GPS tracking units is the data puller units. These types of units push data or send data when the unit reach a specific location or at specific intervals. These GPS units are usually always on and constantly monitoring their location. Most, if not all data puller unit also allow data pushing (the ability to query a location and other data from a GPS tracking unit).

4. THE ARCHITECTURE OF A GPS TRACKING SYSTEM



5. FEATURES OF THE GPS TRACKING SYSTEM

Generally all of the GPS Tracking System has some of the common features that are listed below:-

GSM/GPRS Module - It is used to send the location to the user online. In some case, if the user wants the location through the internet then this module is very useful. By the help of the GSM/GPRS module, we can send data real time. It can be seen on the internet enabled any device as a PC, mobile phone, PDA etc.

Track Playback - Animates your driver's daily driven route so that you can follow every move. The track animation line is colour coded to indicate the speed your driver was travelling during his route.

Idle Time Report - Gives you an accurate report detailing when your driver was stopped and has left the engine running on the vehicle. This report was designed with input from our existing customers who were concerned about high fuel bills.

Track Detail - Provides you with a split screen view when reviewing your driver's route. Stop and transit times, as well as speed information, are displayed in the bottom pane. You can easily toggle between stops by clicking the stop number on the track detail pane.

Group Reporting - Allows you to set vehicles up into groups for faster and easier reporting.

Geo Fencing – It allows us to limit some region of area and if your vehicle goes beyond the boundary of that region then urgent message will be sent by the system to the manager to control the driver.

Ignition ON/OFF detection – The system can save the information about the engine that it is in working condition or stop by ignition ON/OFF detection so that the manager can know for how many times the driver stopped the fleet.

SMS / GPRS Communication - The location about the fleet or the person can be send by SMS or email by this facility.

On-Line and Off-Line tracking – Every user has different requirement and as per the requirement the data can be viewed real time or it can be saved in the unit and when the vehicle reach to its manager, manager can download data and see the route of the vehicle and every other detail that can be seen by the real time.

Buzzer for alerting the driver – Some system uses the buzzer system to alert the driver that he is going out of the boundary or the speed is very high or anything that is restricted. So that the driver is able to know that he is going wrong.

Monitoring digital events – If you need to know when a piece of machinery was turned

On/Off or when a door was Open/Shut, this system will provide you with best options.

6. PROPOSED SYSTEM

In this paper, we plan for a system that increases the child security using GPS system enabled Identification card. Now-a-days, in every school it is almost mandatory that every student should possess ID card. In this system, an ID card will be embedded with a GPS chip. To activate this GPS chip, we also embed a sensor. This sensor will pass a command to a chip that charges the battery by using the child's body temperature. As soon as battery gets charged, the GPS chip gets activated. The access to this GPS chip will be provided for the respective parents mobile. Once the GPS chip gets activated, immediately a message will be sent to the parents mobile. If the child removes the ID card from his body, the sensor will immediately send a command to stop charging the battery and also will deactivate the GPS chip.

The algorithm will be developed in such a way that before the GPS chip in the ID card gets deactivated, it first sends a message to parent mobile that is linked cell phone along with the current location of the child. A parent also can track whether his child attended the classes or skipped the school and went out of the school campus. Even the parent can track the route of the school bus that carries his/her child to school. Since, it is a GPS system we use, the speed of the school bus that is been driven also can be tracked.

On the daily newspapers or in the news channels, we see very often cases like kidnapping the employees who stay back at the offices late night. This system also can be implemented for the employees and can be tracked by the organization/company. This system makes the cops work also much easier and locate the missing child/employee within seconds and can catch the culprits before any harm is done to the kidnaped person.

This idea can also be implemented for a vehicle chassis enabled with GPS system. Any vehicle has to have a chassis. Using the GPS enabled chassis, a vehicle that is been stolen can be tracked from anywhere. Further, using the same GPS enabled chassis; if the driver crosses the speed limit, it can be controlled. When the driver crosses the speed limit, we will implement an algorithm in such a way that a warning message will be sent stating '*engine will be stopped in next 3 minutes, park the vehicle to the side of the road*'. Then a timer will be set for 10 minutes and after 3 minutes engine will stop. Again after next 7 minutes only engine will ignite. Depending on vehicle, the speed limit of that particular vehicle will be set during the registration. Using this system, major accidents can be avoided rather to do rescue operations.

7. CONCLUSION

The system we proposed in this paper will increase the child security that will be monitored by the parent. It also provides the information to the parents that their child attends the school/college regularly. The GPS enabled chassis vehicle system will cut short the traffic police work in catching the vehicles that are driven over speed. The police people need not wait on the roads with a speed detecting device and with all

difficulty. The GPS system itself will generate a report and will be sent to the police while sending warning message to the driver

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