A Novel Object Tracking System using GPS and GSM for Safety and Security of the Society

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Abstract

In today's modern world safety and security becomes an important societal need. Even though it spoils individual privacy for some reasons, the mentors of those individuals needs it for protecting them from hard hindrance. Object tracking system is a system that uses modern technology to track and monitor the individuals, who possesses an object with a smart card for helping the tracking system to track their movement. This system is very essential in various applications like vehicle monitoring, child and women safety, police for monitoring criminals and for many business applications to avoid theft. There are several tracking mechanisms used for developing this system. Each system had its own merits and demerits in spite of its design complexity and cost. In this paper, we made an extensive survey of all the mechanisms involved for tracking the objects along with their applications.

Keywords: *Tracking System, GPS, GSM.*

I. INTRODUCTION

In our modern society people are not in an organized manner and we are living dangerously with people who may create harmful problems like harassment, abuse, violence etc. The safety and security of individuals becomes a great threat nowadays. It creates vital demand for safety and security of individuals. This motivates researchers to think about some new modern technologies that can facilitate the demand of every individual.

The advancements in communication technology empower tracking systems to play a crucial role in safety and security of each individual in the society. In general the name tracking system is used in several applications like motion tracking system for video, audio tracking system, data tracking system, object tracking system. In this paper our focus is on object tracking systems. Object tracking system is a system to track and monitor the movement of an object or person, who have smart card along with them, and by reporting their location information in a timely ordered sequence. This system can be easily implemented for the persons who are really in demand. This system is very useful for parents who allow their children for schools or their daughters to work in a working environment. It

is also helpful for policeman to track and monitor the criminal activities of the criminals.

In this paper we are developing a tracking system for helping the parents, who are in a worrying mind, about their wards safety return to home from their school, college, office etc. The general block diagram of object tracking system is show in Fig. 1.1. The block diagram contains four main blocks such as tracking method, object to track, centralized server and user.
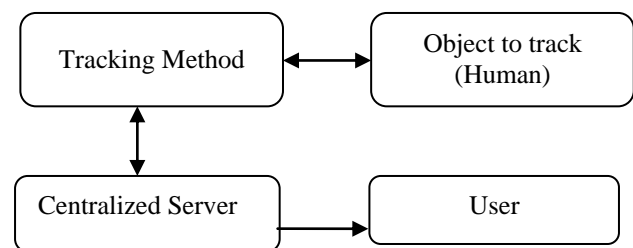

Fig.1.1. General Block Diagram of Object Tracking System

The block diagram shows the general working model of tracking system. The object to track is to be identified using a smart card that holds information like user identity and location. The object may be a human or any moving particle. The smart card will always connect with the tracking module and it will share the location information to the tracking device. The smart card may be a SIM card or other cards.

Researchers have come across plenty of tracking methods for the tracking system. Few are as follows RFID, Cell-phone triangular, GPS and GSM. The choice of using particular system depends on the application, we are working with and the cost factor involved for it. In this paper we are using a hybrid model by combining GPS and GSM technology. The detailed discussion about the model is in chapter 3.

Each tracking system needs a centralized server for collecting, storing and sending data from tracking method to the user. Centralized server will act as an automated engine for managing data. The information collected by the tracking method will be

transferred to the user. The centralized server will act as an intelligent system during the course of communication with the user. The detailed intelligent model is discussed in chapter 3.

The user will be the parents in our case. They can know about their wards movement at any point of time. If there is any unusual movement happens the parents may get alert messages.

This paper is organized as follows, chapter 2 brief about various mechanisms proposed by different authors on tracking system. The proposed methodology is discussed in chapter 3. In last chapter we shown the results obtained and the scope for future enhancements.

II. RELATED WORKS

In this chapter, we had discussed about various methodologies proposed by various researchers on tracking system.

Rita H. Pawade et al (2015) had proposed Android Based Children Tracking System. This system contains GPS and GSM which helps to send a message or call to recipient. The parents fix the range of the ARM Controller. If the children cross the limit of the range the controller intimates to their parents. They used two properties in their proposed system that is GSM and GPS.

UfoarohS. U et al (2015) had proposed Heartbeat Monitoring and Alert System Using GSM Technology. In their paper they had used two properties that is Sensor and Buzzer. Sensor is used to track the heartbeat whether the heartbeat is working normally. If not so, the sensor is intimate to the buzzer. The Buzzer alerts the person by alarm sound.

Avein J et al (2015) had proposed Human Securing using GPS System. This system contains GPS, GSM, GIS and GPRS. GPRS (General Packet Radio Service) is used to send a MMS, SMS and E-mail via internet. In this technology, if the person gives a missed call to the receiver it directly connects from the satellite.GIS (Geographic Information System) permit to collect a large amount of information which will be connected to the geographical location. The digital map and GIS allow the user to visit the activities of the person in accurate and time manner. GIS connected with several technologies like remote sensor, GPS, enterprise applications and communication. This paper results is when the person moved out from the fixed area the receiver gets the alert message.

A.Santhiya et al (2016) had presented Android Based Women Tracking System Using GPS and GSM system. This system includes GPS and GSM which identify the location and send a alert message to a parents. A women will have a panic button in their ID card when they working in a company. If a women is at under risk she can press a panic button it alerts the nearby people.

Abhishek S. Parab et al (2015) had implemented Home Security System using GSM module and Microcontroller. This system enables relay and magnet to tracks the stranger with the help of sensors and send a message to the owner of the home. Here the relay and magnet are attached to the door it indicates yellow and red light. The yellow light indicates there is no risk. The red light indicates danger.

Shahid A Bangali et al (2015) had presented methodology of Real Time School Bus Tracking System with Biometrics, GPS and GPRS using ARM Controller. This system includes GPS and GPRS. It is a real time services gives notification and update of a children location to parents. With the help of GPS and Biometric identification, the children are tracked continuously from source to destination.

Sumit S. Dukare et al (2015) had presented a methodology for Vehicle Tracking, Monitoring and Alerting System: A Review. This system includes
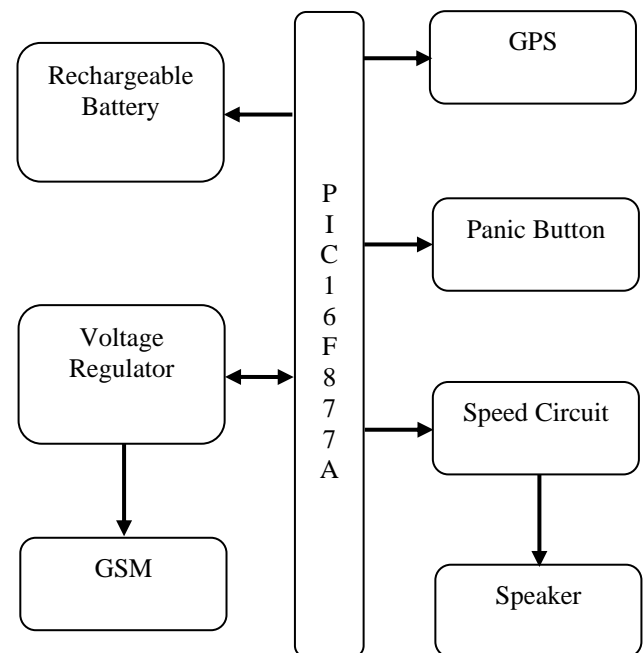

Fig: 1.2. Block Diagram of Object Tracking System using GPS and GSM

GPS, GSM and RFID. GPS and GSM track and monitor the vehicle and send the message to the owner. If the vehicle moves in a wrong direction, the passenger and the owner get the alert message. RFID is used to track the object like vehicles.

B.Hari Kumar et al (2016) had presented Vehicle Monitoring and Tracking System using GPS and GSM Technologies. This system includes GSM and GPS, it helps to monitor and track the vehicle. If the vehicle moves fast, it has a voice alert technique

that intimates to the driver in a particular area like schools, hospitals and so on.

A.Berthibella et al (2017) had Development of GPS GSM Based Tracking System with Google Map based Monitoring. This system contains GPS and GSM. It had LM35 sensor, it is also called Fire Sensor. To detect the obstacles, accidents and fire warning in their companies or industries, it gives a alert message to the owner.

Hazza Alshamisi et al (2017) had presented Real Time GPS Vehicles Tracking System. This system helps to track the vehicle to know where the vehicle is. If a customer calls a driver of the vehicle, it is automatically registered on the GSM and GPS. Customer can view the co-ordinate values where the driver's location is.

III. OBJECT TRACKING SYSTEM USING GPS AND GSM

The proposed system is more like a safety system in case of emergency. The smartcard can be fitted in any object. It is easy to integrate with more features and functions. The Panic button is held to one of the buttons. The main purpose of this system is to intimate the parents and police about the current location of the human. A GPS system is used to track and monitor the current position of the victim and a GSM modem is used to send the message to the pre defined numbers. There are several applications that can reduce the risk of human by sending SMS. The system collects and stores the information of tracked and monitored the object

A. Panic Mode Button

A button or switch that operates any of various safety systems, for use in an emergency. Hit the panic button or press the panic button informal to react to a situation by demanding emergency action; become excited panic.

B. Location Finding

Location and place are used to identify a point or an area on the Earth's surface or elsewhere. The term location generally implies a higher degree of certainty than place, the latter often indicating an entity with an ambiguous boundary, relying more on human or social attributes of place identity and sense of place than on geometry

C. Sharing Location Module

A location-based service (LBS) is the name for a general class of policies in software-level services that provide for accessing data, files, pipes, memory objects, streams and other or online services. Access policies are controlled by location data and/or time-of-day constraints, or a combination thereof. As such, a Location Based Service is an information service and has a number of uses in social networking today as information, in entertainment or

security, which is accessible with mobile devices through the mobile network and uses information on the geographical position of the mobile device.

D. Location View in Application

A mobile app or mobile application is a computer program or software application designed to run on a mobile device such as a phone/tablet or watch. Apps were originally intended for productivity assistance such as Email, calendar, and contact databases, but the public demand for apps caused rapid expansion into other areas such as mobile games, factory automation, GPS and location-based services

E. Results

Using source code the GSM modem is able to send the message to the predefined numbers. Usually we prefer for information transfer to one or two numbers. But if necessary to send the message to many numbers, it is also possible. The numbers must be stored in the program of the microcontroller and must be dumped using the kit. The only problem is that it takes time to send message if the predefined numbers are more than three. Thus in the above block diagram we are able to see the transmission of message from the GSM modem and the current location to the predefined numbers.

F. Applications of the Proposed System

• Compact in size.

• Wireless connectivity.

• Easy and fast to install.

• Easy Maintenance

• Low cost with high performance.

• Fast response.

• Environmental friendly system.

IV. CONCLUSION

Being safe and secure is the demand of the day. Our effort behind this paper is to design and fabricate a gadget which is so compact itself that provide advantage of personal security system. This design will deal with most of the critical issues faced by women and will help them to be secure. Existing systems provide the mechanism to track the vehicle but no other emergency mechanism is proposed. The proposed mechanism provides viewing the location of the victim in terms of latitude and longitude which can further be tracked using Google maps. This system helps to decrease the crime rate against women. Women's security is a critical issue in current situation. These crimes can be brought to an end with the help of real time implementation of our proposed system

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