

Review on Personal Tracker Systems

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Abstract— In this paper, some recent development of tracking system using GPS/GSM has been focused. The GPS and GSM are both most important technologies now a days. The information is transmitted to tracking server using GSM/GPRS modem on GSM network by using SMS with tracking server through GPRS. Tracking server also has GSM/GPRS modem that receives person's location information via GSM network and stores this information in database. This system contains single-board embedded system that is equipped with GPS and GSM modems along with ARM processor will be installed with the person. While moving object motion, its location can be reported by SMS message. A software package is developed to read, process, analyse and store the incoming SMS messages. The use of GSM and GPS technologies allows the system to track object and provides the most up-to-date information about ongoing trips. Recently numbers of GPS technologies are available for person tracker. Some approximate study of research work done on tracking system has been explained.

Keywords— GPS, GSM, Mobile Base Station.

I. INTRODUCTION

Tracking system is used for searching person or object at static or dynamic format. Tracking system transmits the information of the any moving object to the base station. There are many types of tracking system available that are in use now a days, such as vehicle tracking, trains tracking, etc. Vehicle tracking can track their exact location of vehicle using GSM and GPS technology and it will be up to date to base station. Recently one of the most important tracking system is train tacking system. In this case trains exact location are important for their safety that will be part of a signaling system. Now a days there are some developments in train tracking system, such as satellites, GPS and also inbuilt radio systems and signals of satellite which are accessible by using this technologies that information will be sent to their traffic station that access to managing and position all railway line availability from a base station. GPS/GSM-based tracking system is a system that makes use of the Global Positioning System (GPS) to determine the precise location of a vehicle to which it is attached. Proposed design is cost-effective, reliable and has the function of accurate tracking [1, 2]. Global System for Mobile (GSM) and GPS based tracking system will provide effective, real time vehicle location report. A GPSGSM based tracking system gives all the specifications about the location of a vehicle. The system utilizes geographic position and time information from the Global Positioning Satellites [3, 4][5]. In [6], the hardware and software of the GPS and GSM network were developed. The proposed

GPS/GSM based System has the two parts, first is a mobile unit and another is controlling station. The system processes, interfaces, connections, data transmission and reception of data among the mobile unit and control stations are working successfully. These results are compatible with GPS technologies. In wireless data transporting, GSM and SMS technology is a common feature with all mobile network service providers [7]-[8]. Utilization of SMS technology has become popular because it is low cost, suitable and accessible way of transferring and receiving data with high reliability [9][10]. Cost Effective GPS-GPRS Based Object Tracking System was discussed by Khondker [11], which works using GPRS. However, a complete embedded system implementation of GPS-GSM Based Tracking System using SMS was reported by Abid and Ravi [12]. Baburao was discussed GSM and GPS Based Vehicle Location and Tracking System, which makes use of existing GSM networks and GPS technology [13]. Hsiao and Chang developed analytical model to analyse the optimal location update strategy with the objective of minimum total cost [14][15]. GPS/GSM is one of the most important system, which integrates both GSM and GPS technology.

II. TRACKING SYSTEM

The solution propose here combination of mobile computing, Global System for Mobile Communication (GSM), Global Positioning System (GPS), Geographical Information System (GIS) technologies and software to provide persons tracking and management system to upgrade the existing service. The architecture as illustrated in Figure below.

Two technologies General Packet Radio Service (GPRS) and Global Positioning System (GPS). This system allows person's location using a mobile phone which is enabled with an internal GPRS receiver and GPRS transmitter. Also there are number of tracking devices available so that person can track from his own location via particular applications such as navigation. GPS functionally has now started to move into mobile phones, GPS has application on land, at sea & air. And because of GPS we can track location from our mobile particular base station. Also GPS offer cost saving & incredible accuracy. The solution is that one single person can be used mobile's IMEI (International mobile equipment Identity) number which will be sent along with co-ordinates. And person's position will be saved in his mobile's object database for tracking and his locations which will be created at

our mobile base station so that through this database, mobile base station can get his current mobile location.

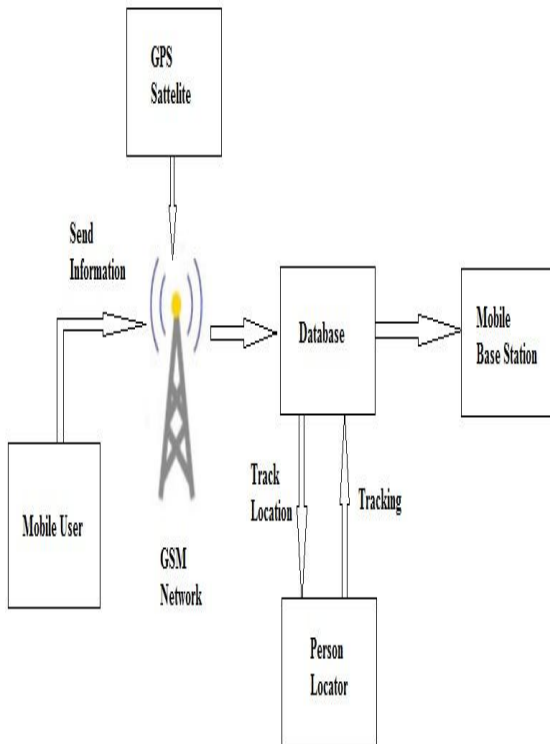


Figure 1- Architecture

The use of GSM over GPRS significantly improves the feasibility and availability of real-time positioning information received by the server is made meaningful and extremely useful for the end user through integration of Geographic Information system (GIS) technology where the end user can better organize and utilize information from a graphical view point. GPS and GSM based tracking system provide an existing object, real time persons location and informing to the base station. GSM and GPS technology based tracking system will report that where your objects or person is and where it was, how long time it was. The system uses geographic spot and time information from the GPS [12]

III. GPS TECHNOLOGY

The Global Positioning System (GPS) provides location and time information in all weather conditions, anyplace on an Earth where there is an unobstructed line of sight to four or more GPS satellites [16]. Generally for using GPS no subscription fees is required. A GPS receiver must be locked on to the signal of at least three satellites to estimate 2D position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible person through GSM technology [17].

IV. GSM TECHNOLOGY

GSM stands for Global system for mobile communication. It has been reported that GSM was developed by European Telecommunications Standards Institute (ETSI) to specify protocols for second generation (2G) digital cellular networks used by cell phones. GSM stands had been developed as an alternative for first generation (1G) analog cellular networks and mainly specified a digital, circuit-switch network most effective for whole double voice telephone. That has been extended over time to contain as a part of whole data communications, first by circuit switched transport, later packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution or EGPRS). Another improvements had made when the 3GPP developed third generation (3G) UMTS standards followed by fourth generation (4G) LTE progress standards [16].

V. SIM 300

The GSM modem is a requiring type of modem which receives a SIM cards operates on customer's mobile number beyond a network, same like mobile phone. It is cell phone in absence of display. Modem SIM 300 having three frequencies GSM/GPRS engine that works on EGSM900MHz, DCS1800MHz and PCS1900MHz frequencies. GSM Modem is RS232-logic level compatible, i.e., it takes -3v to -15v as logic high and +3v to +15 as logic low. MAX232 is used to convert TTL into RS232 logic level converter used between the microcontroller and the GSM board. The signal at pin 11 of the microcontroller is sent to the GSM modem through pin 11 of max232. This signal is received at pin2 (RX) of the GSM modem. The GSM modem transmits the signal from pin3 (TX) to the microcontroller through MAX232, which is received at pin 10 of IC1 [17] [18].

Features of GSM

1. Single supply voltage 3.2v-4.5v
2. Typical power consumption in SLEEP Mode: 2.5mA.
3. SIM300 tri-band
4. MT, MO, CB, text and PDU mode SMS storage: SIM card
5. Supported SIM Card: 1.8V, 3V

These are some of the features about GSM [18].

VI. TREND OF RESEARCH ON PERSONAL TRACKER AND BY USING GPS AND GSM TECHNOLOGY

The current trend of research related to persons tracking by using GPS/GSM technologies In the present's day context, the data available in the form of research articles and research letters relating to GPS and GSM technologies, gives an over view of personal tracking system. The following graph [Figure-2] is an approximate idea of research done on tracking system during the year 2003 to 2013, only where some of the tracking system related to personal tracker have been found.

Here the x-axis represents the years and the y-axis represents the published research works.

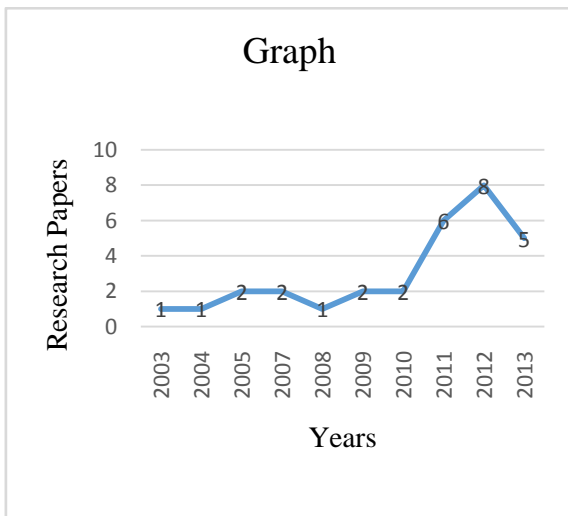


Figure-2: Line Graph of Approximate idea of research related to personal tracker using GPS and GSM technologies.

VII. CONCLUSION

Through the above article, an idea of the direction of research regarding to tracking system by using GPS and GSM technologies are studied only during the year 2003 to 2013. This study shows that, the instantaneous research on personal tracker by using GPS and GSM technologies are found to be less. It needs further research on this line.

REFERENCES

- [1] J. Cui Youjing, "Autonomous vehicle positioning with GPS in urban canyon environments," *IEEE Trans. Robotics and Automation*, vol. 19, no. 2, pp. 15-25, Singapore, Feb. 2003.
- [2] R. Bajaj, "GPS: location-tracking technology," in *Proc. IEEE International Conf. on Computer*, San Francisco, USA, Apr. 2002, vol. 35, issue 4, pp. 92-94.
- [3] Akintunde Musibau Ajagbe, Stephen Enyinnaya Eluwa, Edward Eric Duncan, Mohd Khairuddin Bin Ramli, Choi Sang Long, and Mkomange Claud Wantrudis, "The Use of Global System of Mobile Communication (GSM) Among University Students in Malaysia," *International Journal of Innovation, Management and Technology*, vol. 2, no. 6, pp. 547-588, Malaysia, Dec. 2011.
- [4] Junaid Ali, Shaib Nasim, Taha Ali, Naveed Ahmed and syed Riaz un Nabi, "Implementation of GSM based Commercial Automobile Tracker Using PIC 18F452 and Development of Google Earth Embedded Monitoring Software" in *Proc. IEEE International Conf. on Research and Development (SCOREd 2009)*, UPM Serdang, Malaysia, 16-18Nov. 2009, pp. 653-657.
- [5] Ashish Shrivastava, Noopur Sharma, Radhika Arora, Shweta Dikshit, Yamini Sharma, "GSM Enhanced GPS Based Vehicle Tracking System" 2nd National Conference in Intelligent Computing & Communication, ISBN: 9788175157538
- [6] Asaad M. J. Al-Hindawi, Ibraheem Talib, "Experimentally Evaluation of GPS/GSM Based System Design", *Journal of Electronic Systems* Volume 2 Number 2 June 2012
- [7] A. T. Hapsari, E.Y. Syamsudin, and I. Pramana, "Design of Vehicle Position Tracking System Using Short Message Services And Its Implementation on FPGA", in *Proc. Conference on Asia South Pacific Design Automation*, Shanghai, China, 2005.
- [8] X. Fan, W. Xu, H. Chen, and L. Liu, "CCSMOMS: A Composite Communication Scheme for Mobile Object Management System", in *Proc. 20th International Conference on Advanced Information Networking and Applications*, Vienna, 2006, pp. 235-239.
- [9] W. C. M. Hsiao, and S. K. J. Chang, "The Optimal Location Update Strategy of Cellular Network Based Traffic Information System", in *Proc. Intelligent Transportation Systems Conference*, Toronto, 2006, pp. 248-253.
- [10] Montaser N. Ramadan, Mohammad A. Al-Khedher, Senior Member, IACSIT, and Sharaf A. Al-Kheder "Intelligent Anti-Theft and Tracking System for Automobiles" *International Journal of Machine Learning and Computing*, Vol. 2, No. 1, February 2012
- [11] K.S. Hasan, M. Rahman, A.L. Haque, M. Abdur Rahman, T. Rahman, and M.M. Rasheed, "Cost Effective GPS-GPRS Based Object Tracking System", *International Multi Conference of Engineers and Computer Scientists (IMECS)*, Hong Kong, March 18-20, 2009.
- [12] A. Khan and R. Mishra, "GPS-GSM Based Tracking System", *International Journal of Engineering Trends and Technology*, Vol. 3, Issue 2, 2012, pp. 161-164.
- [13] B. Kodavati, V.K. Raju, S.S. Rao, A.V. Prabu T. A. Rao, and Y.V. Narayana, "GSM and GPS Based Vehicle Location and Tracking System", *International Journal of Engineering Research and Application*, Vol. 1, Issue 3, pp. 616-625
- [14] Hsiao, W.C.M. and S.K.J. Chang, "The Optimal Location Update Strategy of Cellular Network Based Traffic Information System", *Intelligent Transportation Systems Conference*, September 17- 20, 2006.
- [15] Yakubu Yakubu Musa, Jin Wang "Vehicle Tracking and Anti-theft System using GPS-GSM" *International Journal of Engineering Research & Technology (IJERT)* Vol. 1 Issue 10, December- 2012 ISSN: 2278-0181.
- [16] Using of Tracking systems for devices designing to face children Kidnapping Phenomenon (GSM -GPRS -GPS) *International Journal of Scientific and Research Publications*, Volume 3, Issue 10, October 2013 ISSN 2250-3153
- [17] R Ramani, S.Valarmathy, Dr. N.SuthanthiraVanitha, S.Selvaraju, M.Thirupathi, R.Thangam, "Vehicle Tracking and Locking System Based on GSM and GPS" *I.J. Intelligent Systems and Applications*, 2013, 09, 86-93 Published Online August 2013 in MECS DOI:0.5815/ijisa.2013.09.10
- [18] R Ramani, S.Selvaraju, S.Valarmathy, R.Thangam B.Rajasekaran, "water-level monitor for bore well and water tank based on GSM", *International Journal of engineering science and technology (IJEST)*, ISSN: 0975-5462, volume4-N0:10, october2012