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Study on Effective GPS-GPRS Based Object Tracking System Using RFID

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Abstract – The purpose of tracking it to determine its current GPS location in the real time, the system use Global System for Mobile communication (GSM) network as a medium to send the information to a monitoring station in two way: the first way by using Short Messaging Service (SMS) while the second way use General Packet Radio Service (GPRS).The tracking system consist of two general units, the first unit is Vehicle unit and the second is the Monitoring unit. The main components in vehicle unit is the microcontroller which is the main part to control all operation in the vehicle starting with read GPS information and the vehicle status ending with sending the collected information to the monitoring unit through the wireless GSM, the second important component is the IC which is a GSM modem, the PIC interface to GM862-GPS serially via RS232 interface protocol, so the PIC inquire GPS information from GM and command the GM to send the information to the monitor.

Keywords: GPS, Mobile, Microcontroller

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1. INTRODUCTION

The ability to decisively recognize a vehicle's range and its status is the rule goal of vehicle following framework. These frameworks are executed using a couple cross breed techniques that include: remote correspondence, land arranging and embedded applications. The vehicle following frameworks are planned to help organizations with endless number of cars and a couple utilize purposes. This new innovation is famously known as GPS-GSM Based Vehicle Tracking System. It made various supernatural occurrences in the security of the vehicle. This hardware is fitted on to the vehicle in such a path, to the point that it is not recognizable to anyone. Vehicle taking after system principal indicate is offer Security to all vehicles. The GPS are exceptionally significant now a day, this structure enables the proprietor to watch and track vehicle and find vehicle improvement. Right when extensive challenge or vehicles were spread out over ground, the proprietor associations every now and again believed that it was difficult to screen what was going on. The system uses geographic position and time information from the Global Positioning Satellites. The system has an "On-Board Module" which stays in the vehicle to be taken after. It can give tele-checking and organization system for between urban ranges transportation vehicles, for instance, taxis and transports. In the midst of vehicle development, its continuous parameters, for instance, territory are represented by SMS message. The system misuses remote development in giving successful Management transportation engine. The usage of GSM and GPS advancements allows the system to track vehicle and surrenders the most and coming information about nonstop Trips. This structure finds its application logically development Surveillance. This wander fuses distinctive segments like Ingenuity, straight imposition of plan and straightforward use. It is completely fused so that once it is executed in all vehicles, then it is definitely not hard to track vehicle at whatever time. It has longer life, straightforward operations, basic foundation, cleaned framework, and straightforward and utilizes execution. It diminishes unapproved vehicle use.

Programmed Vehicle Location (AVL) is an impelled method used to track and screen any remote vehicle outfitted with an item unit that gets and trades movements through GPS satellite. AVL is a mix of Global Positioning System (GPS) and Geographic Information System (GIS) that gives genuine geographic consistent position of each vehicle. The entire transmission instrument of AVL setup depends on upon GPS satellite, a beneficiary on the vehicle, a radio structure and PC based after programming for dispatch. The radio correspondence structure is generally the same as cell phone orchestrate. The two most customary AVL systems take after GPS based and Signpost based. The Signpost-based AVL structure was used before however with the change

of present day satellites GPS used development is more used now. For the applications which require continuous zone information of the vehicle, Automatic Vehicle Location structure is used that can transmit the territory information dynamically. Continuous vehicular after structure joins a hardware device presented in the vehicle (In-Vehicle Unit) and a remote Tracking server. The information is transmitted to following server using RF transmitter if the detachment between takings after separates and vehicle to be track is less. Taking after server moreover has RF authority that gets vehicle region information and stores this information in database. Geolocation, position zone and radiolocation are terms that are extensively used today to demonstrate the ability to choose the range of a MS. Territory normally recommends the bearings of the MS that may be in a couple of estimations, and generally consolidate information, for instance, the degree and longitude where the MS is found. Vehicle GPS reference point is an outside geolocation application in which vehicle can be discovered using GPS while going all over the place. At first vehicle following frameworks made for task force organization were idle after system. In inactive after structure a hardware contraption presented in the vehicle store GPS zone, speed, heading and a trigger event, for instance, key on/off, door open/close. Right when vehicle returns to a specific range device is ousted and data downloaded to PC. Isolates structures similarly included auto download sort that trade data by method for remote download however the system was not consistent. Inert structures weren't useful to track customer's vehicle for theft balancing activity. Progressing taking after structure was required that can transmit the assembled information about the vehicle after standard between times or could transmit the information when required by checking station. Dynamic structures were made that transmit vehicle's data consistently by method for cell or satellite frameworks to a remote PC or server cultivate. Various vehicle systems that are being utilized now days are some sort of Automatic Vehicle Location (AVL). It is a thought for choosing the geographic territory of a vehicle and transmitting this information to a remotely discovered server. The territory is settled using GPS and transmission instrument could be a satellite, terrestrial radio or cell relationship from the vehicle to a radio beneficiary, satellite or near to cell tower. Diverse decisions for choosing certified range, for example in circumstances where GPS edification is poor, are dead requital, i.e. inertial course or element RFID structures or pleasant RTLS systems. After catch, the accompanying data can be transmitted using any choice of telemetry or remote trades systems.GSM is the most broadly perceived used organization hence.

2. REVIEW OF LITERATURE

Sharanpreet Kaur, Dr. Dheerendra Singh:A GPS-GSM based vehicle tracking system is a device installed in a vehicle to enable the owner to track the vehicle location.GPS-GSM Based Vehicle Tracking System which created many wonders in the security of the vehicle. The system usesgeographic position and time information from the Global Positioning Satellites. The system has an "On-Board Module"which resides in the vehicle to be tracked. The use of GSM and GPS technologies allows the system to track object andprovides the most up-to-date information about ongoing trips. It can provide real time control. This system finds itsapplication in real time traffic surveillance. During object motion, its Location can be reported by SMS message.

Ambade Shruti Dinkar and S.A Shaikh: “Surveillance system using phone line for security and tracking”. Based on the above statement, it is targeted that this project will serve as good indication of how important it is to curb car theft in the country.Surveillance is specified to car alarm system and the means of sending the data to the owner of the vehicleusing SMS when the alarm is triggered. Due to the inefficient conventional car security system, thepossibility of the car can be stolen is high. The main reason is that the alarm is limited to the audible distance.

Nilesh Manganakar, Nikhil Pawar, Prathamesh Pulaskar: Due to the high cost of time several methods are proposed to reduce the wastageof time on the bus station or waiting for thebus for more time is not preferred. So, werequire one tracking system to track the complete Transport System, every GPS tracking system is a common approach to getvehicle location information in real-time.

K. P. Kamble: It is amazing to know how simple ideas can give a whole new dimension to the tracking and navigationindustry and smart vehicle tracking system is used for tracking the vehicles. You can optimize driverroutes, save petrol or gas and time, reduce theft and control the vehicle functions.

3. EMBEDDED GPS-GSM BASED REAL TIME VEHICLE TRACKING SYSTEM

With the fast advancement of innovation the need emerges to build up a data framework which can be utilized as a part of developing a framework takes a shot at a wide land territory depends mostly on GPS, such frameworks can be valuable for some application, for example, following frameworks, pursuing frameworks, hostile to burglary frameworks, and activity checking frameworks. Envision if all vehicles on the planet gave GPS-GSM framework and all of utilizations said above c incorporated in one colossal framework what will be the advantages that can be acquired from such frameworks? Obviously there is a considerable measure of helpful data can be gathered and transmitted by means of a wide remote medium .The main wide geological one as of now introduced framework in Iraq is the versatile systems in this way we can utilize it in our proposed framework. Following framework is so imperative application for administrative associations and expansive privately owned businesses, for example,

the service of Oil to track the way of the tankers of petroleum items and the service of wellbeing to track the emergency vehicle vehicles.

A few looks into had been done rely on upon GPS to foresee the items area however the contrast between them is the way the GPS data gathered and transmitted to the screen/control unit. A large portion of specialists had gone toward the utilization of inserted framework that can work remain solitary, this implanted framework is fundamentally relies on upon a microcontroller as framework center, for example, AT8951 from Atmel (Joshi and Mahajan, 2014)., LPC21x8 from ARM (Khedher, 2011)- (Nagaraja *et. al.,* 2009), ATMEGA-16 from AVR (Shaikh and Kate, 2012), and PIC18fxxxx from Microchip (Hu et. al., 2012) - (Ibrahim and Victor, 2012).

Our exploration in view of PIC18f452microcontroller because of its ease and the PIC is a celebrated, known, simple to customized and work with another gadgets straightforwardly, for example, LCD, it's a solid controller even its extras is accessible, for example, its software engineer, compiler (Micro C),and test system, for example, protus (ISIS).One of the imperative thing is taking the choice about the GPS recipient and GSM modem, picking the GPS circuit isolated from the GSM circuit prompts to a genuine issues, for example, influence utilization and the need to manufacture a microcontroller that has two serial ports for every GPS and GSM this will squander time and cash, the best decision is utilizing the IC (GM862-GPS) (Kaushik *et. al.,* 2014) - (Kaur and Singh, 2015) which will beat the issues specified previously. There are two approaches to send the data's that is gathered from the vehicle unit to the observing unit, the first is by SMS/GSM (Joshi and Mahajan, 2014) - (Khedher, 2011) - (Wankhade and Dahad, 2011) - (Shaikh and Kate, 2012) - (Hu *et. al.,* 2012) - (Ibrahim and Victor, 2012) - (Nagaraja *et. al.,* 2009), and the second is by GPRS/GSM (Pethakar et. al., 2012) - (Kaushik *et. al.,* 2014) - (Rashed *et. al.,* 2014) - (Kaur and Singh, 2015). He most ideal approach to show the GPS data on the checking unit is by utilizing Google earth outline (Hu *et. al.,* 2012). - (Hu *et. al.,* 2012) - (Ibrahim and Victor, 2012) with the expectation of complimentary which add to lessen the cost of study since the GIS maps is so costly. Figure (1) shows The Proposed Block Diagram of Tracking System.

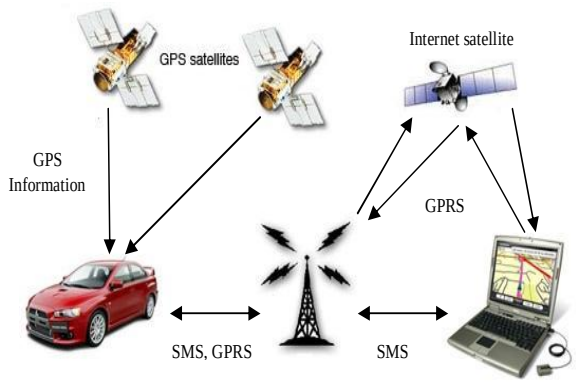

Figure 1: System to use both SMS and GPRS

4. GPS BASED AUTOMATIC VEHICLE TRACKING USING RFID

Programmed Vehicle Location (AVL) is a propelled strategy used to track and screen any remote vehicle outfitted with a product unit that gets and exchanges motions through GPS satellite. AVL is a mix of Global Positioning System (GPS) and Geographic Information System (GIS) that gives genuine geographic ongoing position of every vehicle. The whole transmission component of AVL setup relies on upon GPS satellite, a beneficiary on the vehicle, a radio framework and PC based following programming for dispatch. The radio correspondence framework is by and large the same as wireless system. The two most basic AVL frameworks resemble GPS based and Signpost based. The Signpost-based AVL framework was utilized before yet with the improvement of cutting edge satellites GPS utilized innovation is more utilized at this point. For the applications which require constant area data of the vehicle, Automatic Vehicle Location framework is utilized that can transmit the area data continuously. Continuous vehicular following framework joins an equipment gadget introduced in the vehicle (In-Vehicle Unit) and a remote Tracking server. The data is transmitted to Tracking server utilizing RF transmitter if the separation between following disjoin and vehicle to be track is less. Following server additionally has RF recipient that gets vehicle area data and stores this data in database.

PROGRAMMED VEHICLE TRACKING

This study is separated into principle five sections. In the initial segment we are examining the primary guideline of study i.e., GPS and RFID. In the second part the piece chart is clarified. Working of the study is clarified in third part with a brief clarification of

every piece. In the fourth part the last part gives the application and future perspective.

Geo-area, position area and radiolocation are terms that are broadly utilized today to demonstrate the capacity to decide the area of a MS. Area for the most part suggests the directions of the MS that might be in a few measurements, and more often than exclude data, for example, the scope and longitude where the MS is found. Vehicle GPS beacon is an open air geo-area application in which vehicle can be found utilizing GPS while going out and about. At first vehicle following frameworks created for armada administration were aloof following framework. In uninvolved following framework an equipment gadget introduced in the vehicle store GPS area, speed, heading and a trigger occasion, for example, key on/off, entryway open/shut. At the point when vehicle comes back to a particular area gadget is expelled and information downloaded to PC. Aloof frameworks likewise included auto download sort that exchange information by means of remote download yet the framework was not ongoing. (Rashed *et. al.,* 2014, Kaur, Singh, 2015).

Latent frameworks weren't valuable to track buyer's vehicle for robbery aversion. Constant following framework was required that can transmit the gathered data about the vehicle after general interims or if nothing else could transmit the data when required by observing station. Dynamic frameworks were produced that transmit vehicle's information continuously by means of cell or satellite systems to a remote PC or server farm. (Rashed *et. al.,* 2014, Kaur, Singh, 2015). Many vehicle frameworks that are being used now days are some type of Automatic Vehicle Location (AVL). It is an idea for deciding the geographic area of a vehicle and transmitting this data to a remotely found server. The area is resolved utilizing GPS and transmission system could be a satellite, earthly radio or cell association from the vehicle to a radio recipient, satellite or adjacent cell tower. Different alternatives for deciding genuine area, for instance in situations where GPS light is poor, are dead retribution, i.e. inertial route or dynamic RFID frameworks or agreeable RTLS frameworks. After catch, the following information can be transmitted utilizing any decision of telemetry or remote interchanges systems.GSM is the most widely recognized utilized administration for this reason. (Rashed *et. al.,* 2014, Kaur, Singh, 2015).

GPS

Most cutting edge vehicle following frameworks utilize Global Positioning System or GPS. The Global Positioning System is a worldwide route satellite framework created by the United States Department of Defense and oversaw by the United States Air Force 50th Space Wing. Numerous frameworks additionally consolidate a correspondences segment, for example, cell or satellite transmitters to convey the vehicles area to a remote client

Working of GPS:

Worldwide Positioning System satellites transmit signs to gear on the ground. GPS collectors inactively get satellite signs; they don't transmit. GPS recipients require an unhindered perspective of the sky, so they are utilized just outside and they regularly don't perform well inside forested zones or close tall structures. GPS operations rely on upon an exceptionally exact time reference, which is given by nuclear tickers at the U.S.Naval Observatory. Each GPS satellite has atomic clocks on board.

Signals from multiple satellites are required to calculate a position

Every GPS satellite transmits information that shows its area and the present time. All GPS satellites synchronize operations so that these rehashing signs are transmitted at a similar moment. The signs, moving at the speed of light, touch base at a GPS recipient at somewhat extraordinary circumstances since a few satellites are more distant away than others. The separation to the GPS satellites can be dictated by assessing the measure of time it takes for their signs to achieve the beneficiary. At the point when the beneficiary gauges the separation to no less than four GPS satellites, it can figure its position in three measurements

Deciding Position through GPS:

A GPS beneficiary "knows" the area of the satellites, since that data is incorporated into satellite transmissions. By assessing how far away a satellite is, the collector additionally "knows" it is found some place on the surface of a nonexistent circle focused at the satellite. It then decides the sizes of a few circles, one for every satellite. The beneficiary is found where these circles meet. There are no less than 24 operational GPS satellites at all circumstances in addition to various extras. The satellites, worked by the US DoD, circle with a time of 12 hours (two circles for every day) at a stature of around 11,500 miles going at almost 2,000mph. Ground stations are utilized to accurately track every satellite's circle.

C. GPS Accuracy:

The exactness of a position decided with GPS relies on upon the kind of recipient. Most hand-held GPS units have around 10-20 meter precision. Different sorts of beneficiaries utilize a technique called Differential GPS (DGPS) to get much higher precision. DGPS requires an extra recipient settled at a known area close-by. Perceptions made by the stationary collector are utilized to right positions recorded by the moving units, creating a precision more noteworthy than 1 meter. At the point when the framework was made, timing mistakes were embedded into GPS transmissions to constrain the precision of non-military GPS beneficiaries to around 100 meters. This some portion of GPS operations,

called Selective Availability, was disposed of in May 2000.

D. Timing of flag:

All GPS satellites have a few nuclear tickers. The flag that is conveyed is an irregular grouping, every piece of which is not quite the same as each other, called pseudo-arbitrary code. This arbitrary succession is rehashed ceaselessly. All GPS recipients know this arrangement and rehash it inside. Along these lines, satellites and the collectors must be in sync. The collector grabs the satellite's transmission and thinks about the approaching sign to its own particular inward flag. By looking at how much the satellite flag is slacking, the travel time gets to be distinctly known.

CONCLUSION

The actualized following framework GPS readings are not exact so as the Google outline there is a deviation from reality around few meters because of the precision of the GPS collector and the Google earth coordination falling blunders. Blending the two mode SMS and GPRS will add to expand framework unwavering quality and accessibility, henceforth, utilizing the GPRS convention will build dependability in transmission between both units since its rely on upon the TCP convention and as we probably am aware this convention utilize an affirmation input that request retransmission if there is a blunder in the transmitted parcel. The executed framework accomplished the accessibility by utilizing a control compliment to be sent to the vehicle unit keeping in mind the end goal to switch the method for association amongst GPRS and SMS even the control order can adjust the interim between every transmission, so if GPRS not accessible or the Internet association is bad the client can change to SMS and the other way around. The framework is minimized and can undoubtedly introduced in any vehicle without seeing it yet the area of GPS and GSM radio wires ought to be picked painstakingly so as to accomplish a decent flag. The GM862-GPS is a decent case of compacting more than one gadget in one IC. Vehicle following framework improves armada administration and which thusly brings huge benefits. Better booking or course arranging can empower you handle bigger occupations stacks inside a specific time.

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