Offline GPS Tracking System

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Abstract - **Location-based services are increasingly popular. Smart devices embedded with GPS receiver are widely utilized in vehicle tracking, enforcement and person monitoring. To provide real-time data collecting and analyzing, a backend server is important A portable application can fill in as a client customer for getting to area information and far off. In this project, we describe the design and implementation of a system providing real time positioning and tracking service. Our framework comprises of three sections: GPS beacon, backend worker and portable application. The rapidly evolving wireless communications environment, where the quality are constantly created and modified and has given rise to the mixing of GPS (Global Positioning System) and GSM (Global System for Mobile Communication). This coordination has been broadly applied in numerous controls including Intelligent Transportation System (ITS) and Logistic Management to help the clients to find their vehicles distantly. With the emergence of latest technology and innovations, people are searching smarter ways to protect/monitor their properties. In agreement to that, at present GPS based global positioning framework is as often as possible utilized in vehicle following, youngsters/pet following, any close to home effects following, etc. A mobile app is made for displaying data and controlling device remotely. Data accessing is done by calling REST API and remote control is sent to device by SMS. Our device has been integrated in walking stick as a real-world product.**

Index Terms - **Android Application, Arduino UNO, NEO-6M, SIM900A, etc.**

I.INTRODUCTION

In this day and age, vehicle global positioning framework is one of the main frameworks which is generally utilized by drivers and the greater part of the vehicle proprietors. The guides given to the driver is the key weapon, which assumes a most significant part in this field. At the point when huge article or vehicles were a victory over the ground, the proprietor enterprises regularly thought that it was dangerous to monitor what was going on. It is a worry to have a vehicles global positioning framework concerning the better execution of a vehicle, just as for security. Generally, in all global positioning frameworks, web and outer information workers are utilized as an essential prerequisite. Henceforth, this prompts a contributing of a lot of cash into the framework. So, in this paper, a review is finished by intending to lesser costs in global positioning frameworks. There is a prerequisite of some kind of framework to figure out where each item was at some random time and for how long it voyaged. GSM and GPS assembled global positioning framework will offer viable, constant vehicle area, and report the area of the vehicle GPS-GSM based global positioning framework will illuminate where the vehicle is without the assistance of worldwide. This study discovered GPS framework can notice the vehicle exercises constantly and permit proprietor or outsider to see the situation of the vehicle. This framework empowers the proprietors who have vehicles to notice and track the vehicle and can have the option to discover vehicle development.

The global positioning framework work in a limit of the little urban areas, ruler places, towns and works capability in zones where there is no web. Global positioning frameworks are broadly used to watch out for the moving items. In India public transportation vehicles are the essential method of transportation. The public transportation vehicles are consistently weak focuses for different wrongdoings. It is needed to screen such introverted exercises. It very well may be finished by utilizing reconnaissance frameworks, for example, worldwide situating framework. GPS framework can notice the vehicle exercises 24 seven. The greater part of the vehicle applications is created by utilizing GPS innovation. GPS innovation is generally used to confirm the status of a moving item on which GPS beneficiary is mounted. This paper gives an answer for following and checking the public transportation vehicles utilizing GPS innovation. Having laid out the issue and our inspiration for taking care of the issue, we now portray our objectives as

following. We intend to utilize gasification in the wellbeing frameworks what's more, study its effect on the client's inspiration and long-haul commitment. For this, we propose a versatile application, Smart Fit that advances actual exercises by checking client's means and changing over these means into action length. To make brilliant fit connecting with and a wellspring of inspiration for clients, gasification is fused in it.

II. PROPOSED SYSTEM

The GPS GSM based framework consolidates GPS and GSM advances. It is broadly utilized in numerous applications and a large number of clients are profited by its regular. The item is for the most part planned to expand the security and wellbeing among the transportation frameworks. This vehicle-GPS beacon can be introduced in any vehicle to forestall burglaries or to screen the course of the vehicle. At whatever point a vehicle is taken or is lost, the gadget will send the directions of scopes and longitudes that will assist with finding the vehicle on clients portable. The global positioning framework covers the greater part of the thruways, significant urban areas, towns and the vast majority of the open towns and works effectively in zones with better portable availability. This paper clarifies an inserted framework, which is utilized to know the area of the vehicle utilizing the well-known and promptly accessible advances like the Global Positioning System (GPS) and Global System for portable correspondence (GSM). The principle highlight of our plan is that it proposed to utilize an advancement board, which will have GPS and GSM module not as an isolated module but rather firmly connected with a microcontroller as in Tanoti's Gboard Pro GSM/GPRS SIM900 Development Board ATmega328 Microchip. The upside of utilizing that advancement board is that it will diminish the size of entire framework and it will decrease the force misfortune as far as warmth through outer wirings utilized for the association of GPS and GSM module with the microcontroller. Alongside that, it will likewise build the sturdiness of the whole framework. The ATMega328 microcontroller will give the interfacing to different equipment peripherals. To know the area of vehicle, the portable client has to tap on the Track area button in the android application. The message will be naturally shipped off the SIM present in the GSM module present in the gadget. The

framework will react by sending the directions (detected by the GPS module) of the vehicle on the enrolled portable client and these directions will be plotted on the guide. The GPS GSM based framework consolidates GPS and GSM advances. It is broadly utilized in numerous applications and a large number of clients are profited regular. The item is for the most part planned to expand the security and wellbeing among the transportation frameworks. This vehicle-GPS beacon can be introduced in any vehicle to forestall burglaries or to screen the course of the vehicle. At whatever point a vehicle is taken or is lost, the gadget will send the directions of scopes and longitudes that will assist with finding the vehicle on clients portable.

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III. SYSTEM ARCHITECTURE

Target Initialization: - Users can have one of three goals:

1. Controller can get the region through GPS and boat off GSM.
2. GSM sends the live region to supported customer through SMS.
3. At any rate one User can get to the live region through our application

The route in to this issue is using heartbeat technique to keep the affiliation alive after a TCP affiliation has been set up from device to the specialist. Contraption should confer signs regularly to keep affiliation alive, preventing fundamental association establishment from recuperating inert resources. These signs can be either region data, which gives persistent after, or just whitespaces, keeping GPS module rest what's more, restricting battery use. The option vacillates each case in turn case. Controller can get the region through GPS and boat off GSM. GSM sends the live region to endorsed customer through SMS.

TRACKING DEVICE

Target device: Our GPS guide facilitates SIM808 cell module. GSM/GPRS and GPS are facilitated in a SMT pack. TCP/IP stack is furthermore consolidated in this SIM808 module. WT51F516 fills in as a microcontroller. There is a portable stick equipped with our contraption. Screen and control center are not ready for restricting size and power usage. A splendid walking stick outfitted with our contraption our device will make and move region data at times. Region message conveyed over TCP is a progression of ASCII characters, getting done with CRLF for laying out. Each message is made out of a couple of fields. Coming up next is a delineation of the space message. Design of this space message is addressed in Table I. Each region message is astoundingly distinguished by the mix of IMEI and timestamps. IMEI is the uncommon identifier of a GPS reference point. Region district code (LAC) and GSM cell id (CID) are used for an aide arranging system. Right when GPS signals are not available, these two fields alongside versatile country code (MCC), compact association code (MNC) and got signal strength marker (RSSI) are used for evaluating position at a lower accuracy. Orders from adaptable application are sent clearly to contraption through SMS. To hinder faking SMS from threatening customers, our devices will address laborer for the authenticity of the SMS' moving toward number. The construction of inquiry message is depicted in table II. Here is a representation of request message.

BACK END

Our backend specialist will assemble region data; store this data for getting too besides, and further separating. Subsequent to getting a region message, specialist will initially check whether region data in this message is generous. If the longitude field or extent of field in region message from contraption is invalid, laborer will measure device region through signal-based station arranging. By following the space of the nearest cell tower from region domain code, GSM cell id, and registering the detachment to the phone tower from RSSI, laborer can evaluate the device region. In our structure, specialist directly uses the tracker API gave by a guide rather than figuring without any planning. This region data will be separate to show their lower precision prior to putting away. Workers also give a RESTful API to adaptable application what's more, web organization. Peaceful is a designing style for building applications. Serene API is the most renowned interface using HTTP requesting to GET, POST, PUT and DELETE data from laborer. Getting to region data is by sending a GET sales to the going with.

MOBILE APP

A versatile application is worked for getting to area information, showing track on a guide furthermore, and controlling gadgets distantly through SMS and worker side API. In the accompanying part, we will preclude the execution detail of versatile application and portray the cycle of controller specially. Controller is refined on portable application by sending SMS furthermore, calling worker side API. To begin with, prior to sending order to gadget, the application ought to first educate the worker of the activity. On the off chance that the wellspring of order has been approved, the worker will replay with an affirmation and record the activity for the approval in next step. In the wake of tolerating affirmation from Worker, application will send order in SMS to gadget. Then, application will ask the worker for the activity result. On gadget side, after getting a SMS, gadget will interface to worker and approve the approaching number of the SMS. On the off chance that this order passes approval, the gadget will execute the order and

afterward illuminate the worker of the activity result, which will be gotten back to application in next step. On the off chance that order falls flat in approval, it will be dropped by gadget. On the off chance that a break happens, either in light of the fact that the gadget can't get to Internet, or due to the dormancy of SMS, application will be recognized about the blunder. A few advancements can be applied to our framework. To begin with, we accept that GPRS are consistently accessible and all area information are sent over GPRS. In any case, this isn't in every case valid. At the point when gadgets can't get to Internet, area information can be sent through SMS. Application first demands area through SMS, at that point gadget answers with its present position. To forestall from answering information to an unapproved client, gadget should just answer approaching SMS from an approved number. Since GPRS network isn't accessible, approved number should be put away in gadget's memory ahead of time. The cycle of setting approved number to gadget can be a similar cycle as depicted. When GPRS is accessible. Another worry is the expense of SMS. Sending SMS for each control order can be uneconomical. Utilizing TCP association with send order message can significantly bring down the cost. In our unique plan, gadget will close TCP association in the wake of sending area information to worker. In this manner, the worker can't send any message to gadget once the association is shut.
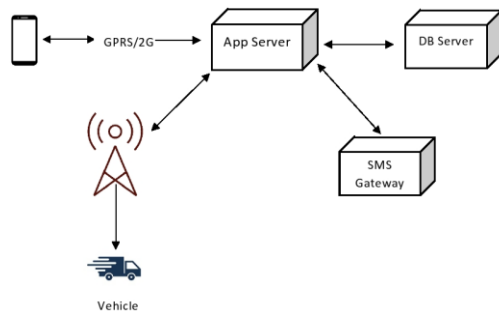

FIG 1: Architecture Diagram

IV. DEVICES USED

ARDUINO UNO: The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software. The Uno board is the first in a series of USB-based Arduino boards; it and version 1.0 of the Arduino IDE were the reference versions of Arduino, which have now evolved to newer releases. The ATmega328 on the board comes preprogrammed with a bootloader that allows uploading new code to it without the use of an external hardware programmer. While the Uno communicates using the original STK500 protocol, it differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it uses the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

GPS: GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the earth, with exact UTC time (Universal Time Coordinated). GPS module is the main component in our vehicle tracking system project. This device receives the coordinates from the satellite for each and every second, with time and date. GPS module sends the data related to tracking position in real time and it sends so many data in NMEA format.

SIM 900: SIM900 GSM/GPRS shield is a GSM modem, which can be integrated into a great number of IoT projects. You can use this shield to accomplish almost anything a normal cell phone can; SMS text messages, Make or receive phone calls, connecting to internet through GPRS, TCP/IP, and more! To top it off, the shield supports quad-band GSM/GPRS network, meaning it works pretty much anywhere in the world. The SIM900 shield packs a surprising number of features into its little frame.
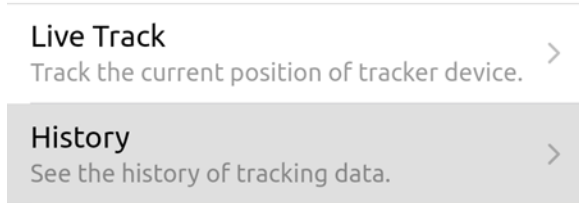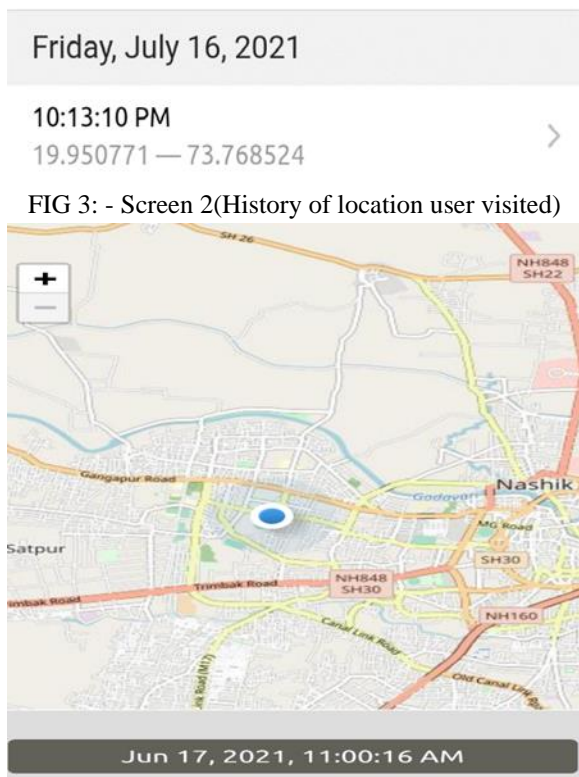
V. RESULT

Off - Track

Live Track
Track the current position of tracker device. ›

History
See the history of tracking data. ›

FIG 2: - Screen 1

Tracking History

Friday, July 16, 2021

10:13:10 PM
19.950771 — 73.768524 ›

FIG 3: - Screen 2(History of location user visited)

Jun 17, 2021, 11:00:16 AM

FIG 4: - Screen 3(Live location of user)

VI. CONCLUSION

The point of the paper is to give an outline of vehicle global positioning framework. This framework used to follow the vehicle by utilizing Offline GPS which is one of the greatest innovative progressions to follow the exercises of the vehicle. This framework can be utilized in the two instances of individual just as business reason to improve security also, security. This innovation can likewise assist with progressing the arrangement of transportation and can be utilized in numerous associations for security reason and following reason. This framework permits associations to follow their vehicles and to get the specific area of the vehicle.

VII. ACKNOWLEDGEMENT

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