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GPS TRACKING WITH REGISTERED MOBILE NUMBER

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Abstract: The project design and implementation of a GPS (Global Positioning System) tracking system with Arduino Uno, GSM SIM900A module,GPS L89 Module were meant to send Location information in form real-time or short alerts SMSs via a pre-registered mobile number. The Arduino is the master which commands the GSM module to send SMS messages, and also communicates with GPS device for getting geographical coordinates. When started, the GPS is constantly reporting where you are-this information is sent as a Google Maps link through the GSM. The system may send regular updates, or return answers to GPS commands requesting the location details of individual units-solving their communication reliability issues plus optimizing for power and signal quality. It can be used to personal safety and asset tracking for a very low price.

I. INTRODUCTION

As we move forward into this interconnected world, the requirement to locate and track guests in real time becomes imperative for safety and security as well as logistical efficiency. Abstract-The paper designs a GPS tracking system by using the features of Arduino Uno with GSM SIM900A module and GPS L89 Module. Using the above mentioned technologies, it is able to send real time location information on SMS to a predefined mobile number. The Arduino Uno acts as the brain, directing communication between GSM and GPS modules. The communication is via GSM SIM900A module sending SMS messages containing the GPS coordinates and obtaining precise geographic location from satellite signals to GPS L89. As part of this motive, a dependable solution that can be deployed at minimum cost is needed to enable efficient tracking. Applications can range from monitoring people to ensuring their safety in critical situations (e.g. live tracking during emergencies), through asset tracking and fleet management among others. The system must use reliable synchronization, power management and error handling to provide accurate continuous positioning. Different parts of the system, flow of operation and application will be discussed in subsequent sections that stress on combining Arduino with GSM/GPS technologies for providing an efficient real time tracking mechanism.

II. LITERATURE PAPER

[1: Mohd Hakimi Bin Zohari, Mohd Fiqri Bin Mohd NazriThis research focuses on designing and developing a GPS-based vehicle tracking system that displays vehicle locations on Google Maps using Arduino MEGA, Ublox NEO-6m GPS, and SIM 900A GSM modules. The system successfully operates outdoors, with challenges in indoor accuracy due to signal obstructions.

[2] Vehicle Tracking System Using GPS/GSM/GPRS Technology. Jithin V Mohan, Minu Balan, Sharoon Thomas, Lynn Mariette MendonzaThis paper presents a vehicle tracking system that integrates GPS/GSM/GPRS technology with a smartphone application, enabling real-time location tracking. The system effectively acquires and transmits vehicle location data to a server, providing a cost-effective solution for users. Experimental results demonstrate its efficient performance in tracking vehicles anytime and anywhere.

Suggested questions

[3] GPS and Cell Phone Tracking: A Constitutional and Empirical Analysis. Marc McAllisterThis article examines the constitutional implications of GPS and cell phone tracking, analyzing societal expectations of privacy and proposing a sliding scale framework for Fourth Amendment protections based on the severity of crimes.

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III. METHODOLOGY

A. BLOCK DIAGRAM

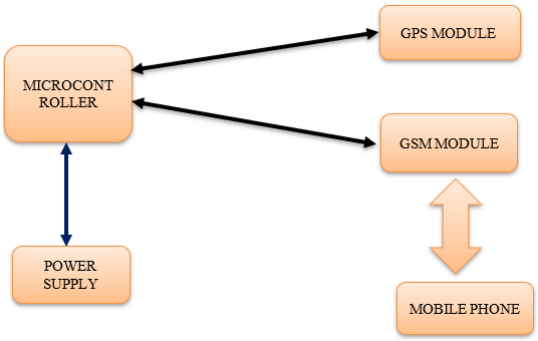

Figure 1: The above block diagram shows a GPS tracking system that entirely works on microcontrollers which are the major components forming part of this circuit. The power supply provides suitable voltage levels for the microcontroller, GPS module and GSM module. It receives location by interfacing with satellite received signals (IRNSS in our case) which it sends to the microcontroller. Then these coordinates will be processed by the microcontroller and it will send that information to a pre-registered mobile number through GSM module via SMS. SMS with GPS coordinates are sent to the mobile phone on which the system is installed for real-time location tracking of the whole irrigation setup. This architecture allows the GPS device to transmit data over GSM (an IMEI number confirms where these messages are released and received), thereby using a message for recording information on location coordinates.

B. WORKING

GPS L89 module is linked to Arduino Uno; it will be used as the GPS tracking system and uplinked with a signal satellite every time in order, to retrieve current location coordinates(latitude/longitude). These coordinates are read by the Arduino Uno from time to time, via GPS module. The SIM900A GSM module, that connects to the Arduino Uno as well, uses a sim card to connect with this system on gsm network for communication. The Arduino Uno becomes the main controller, reading GPS data which in turn gets packed into a Google Maps link with latitude and longitude coordinates as well using AT commands to interface with SIM900A module for sending an SMS message. The Arduino Uno checks the current GPS coordinates when activated, it then creates a link in Google Maps compatible form (URL:e.g.,https://maps.google.com/maps?q=,), and inseer this URL into an SMS message displaying its location. The SIM900A module then SMS this to the saved phone number for tracking location updates.

C. FLOWCHART

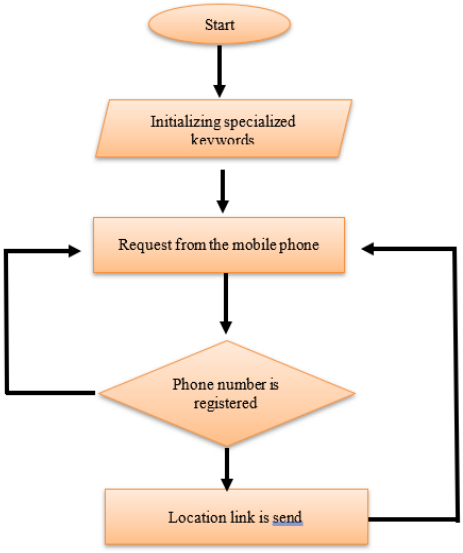

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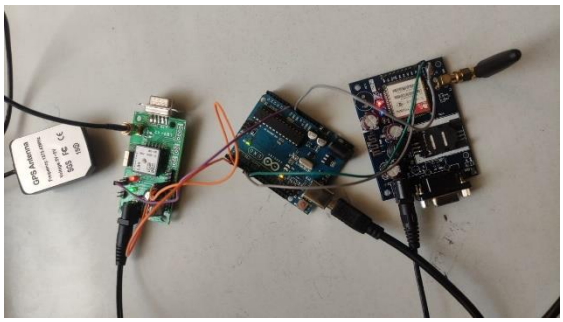
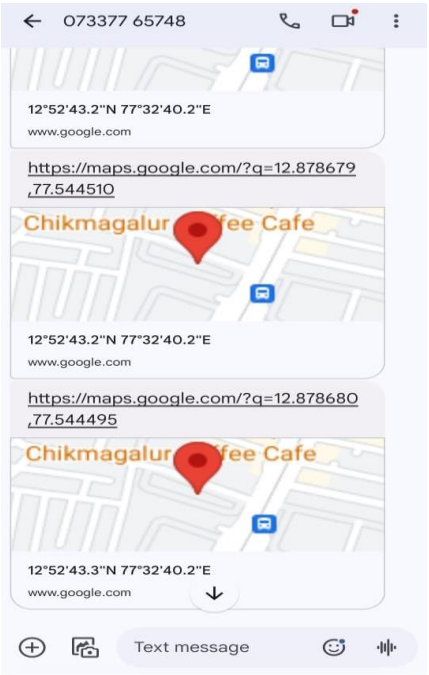
Figure 2 : This flowchart mainly illustrates the graphical and visual representation of how we can process location request to provide update in GPS tracking system. It all begins with the setting of special trigger keywords. That the system will then wait for a call from their mobile phone When it gets a request, if the recipient phone number matches any in its list of approved numbers. If its not a registered phone number the system loops back to wait for request from an authorized one. If the number is registered, it gets current GPS coordinates from this module, translates them to a Google Map link and sends that back via SMS to your phone.

IV. RESULTS

The prototype of the proposed system is shown in Figure 3.



Case 1: The GPS tracking system involves a GPS L89 module connected to an Arduino Uno to continuously receive latitude and longitude data. The Arduino Uno processes this data, constructs a Google Maps URL, and uses a SIM900A GSM module to send an SMS containing the URL to a designated phone number. This process can be triggered either by a button press or at regular intervals. As a result, the recipient receives a real-time location update in the form of a clickable Google Maps link.



Case 2: The GPS L89 module connected to the Arduino Uno continuously collects location coordinates. The SIM900A GSM module sends this data to a web server or cloud service instead of via SMS. The Arduino formats the GPS data and transmits it using HTTP requests or an API. The recipient system processes this data, potentially displaying it on a map or storing it for later use. This approach enables real-time location tracking through online services.

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V. APPLICATIONS

Vehicle Tracking and Monitoring: Fleet management companies can use this system to track vehicles in real-time, optimize routes, and enhance security.

Personal Tracker for Outdoor Activities: Outdoor enthusiasts can use this system to share their location with trusted contacts for safety during activities like hiking or cycling.

Security and Surveillance: Security agencies can deploy this system to track personnel and monitor sensitive areas for enhanced security.

Remote Monitoring and Control: This system can be used in various industries to monitor and control equipment or track assets in agriculture, construction, and environmental monitoring.

Location-Based Services (LBS): Businesses providing services like delivery, ride-sharing, or event management can use this system to offer real-time location updates to customers.

Educational Institutions:

Classroom and Lab Equipment: Assist students and staff to find a specific classroom resources or laboratory equipment.
Library Book Returns: Pointing out where to return books OR shading past due items.

REFERENCES

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