



GPS LOCATION TRANSMISSION USING IOT AND MULTIPLE COMMUNICATION TECHNIQUES

Asst Prof. SUNEETHA S¹, MANI VENKAT B², KAVITHA T³,

DORABABU B⁴, MANGESH M⁵

¹Asst Prof, ²Student(20551A0406), ³Student(20551A0452), ⁴Student(20551A0407), ⁵Student(20551A0434),

ELECTRONICS AND COMMUNICATION ENGINEERING,

GODAVARI INSTITUTE OF ENGINEERING AND TECHNOLOGY(AUTONOMOUS),
RAJAHMAHENDRAVARAM

Abstract: A multi-communication tracker is proposed to address limitations of conventional GPS devices in areas with poor GPRS signal. This tracker integrates GPS for location reporting, GPRS for data transmission, LoRa for long-range communication, and IoT for storing previous locations. LoRa, with a range of 20 km, enables communication with any device set to the same frequency, enhancing the chances of receiving help in remote locations. In scenarios where GPRS signals are unavailable, users can still communicate via LoRa. Additionally, IoT capabilities store users' previous locations, aiding rescuers in tracking their movements. The tracker will send data when vibration sensor and accelerometer sensor values are changed as per the instruction given. Furthermore, a camera module is considered to provide visual evidence of incidents. This comprehensive approach aims to enable individuals in distress to communicate effectively and receive timely assistance, particularly in rural or mountainous areas with limited connectivity.

Keywords: GPS Location, LoRa Communication, GPRS Communication, IoT, ESP32 Cam.

I. INTRODUCTION

A. GPS AND GPRS:

GPS tracking is becoming a basic safety feature now a days to all the people from old age to adults to infants, there are a wide availability of trackers in the market. The idea is to make a new device which makes use of different communications and provide safety to the user at any cost. In this device GPS module and GSM module are being used, the microcontroller will be taking the position of victim with the help of GPS and will be sent to others using GSM. Dechamma K et al. [1] in 2022 has made a tracker by using the GSM and GPS module.

B. LoRa for alerts:

The alert will be sent to other people by both GSM and LoRa. Here the LoRa plays a key role when the user is not in a place of satellite coverage, here LoRa transmitter sends the distress signals to the LoRa receiver and can make others aware that the user is in danger. This can play a crucial role when the victim is in rural areas and the people in house can get the alert quick. Shreya G. Zadel et al. [9] used LoRa WAN for location sharing.

C. IoT for location saving:

When there is no signal, even getting gps location will be difficult. So, when alert is sent to others even with LoRa though the exact location is not shared by GSM then with help of IoT one can check the previous locations of the person and can go for help. This will further help in tracking of old patients and kids to check where they are going. Pratik Kanani et al. [5] has implemented a tracker for patients.

2)LITERATURE SURVEY:

Dechamma A K et al. [1] in 2022 has proposed a safety device for women equipped with GPS tracking and alerting system. This device ensures the safety of women by providing real time location tracking and instant alerts when necessary.

Sashank Narain et al. [2] in 2019 has proposed a system ensuring the safety and protection of on-road location tracking systems using GPS/INS technology. The project aims to implement security measures to protect it from potential threats.

Bernard Akindade Adaramola et al. [3] in 2020 has proposed a system for vehicle tracking guided by GPS and GSM technology Implementing a guided system for efficient monitoring and location tracking of vehicles. A vibration sensor present in system it detects if accidents happen and send text message to the user. Rajvardhan Rishi et al. [4] in 2020 has proposed a messaging system that operates automatically to track vehicles and detect accidents. An automatic messaging system for vehicle tracking and accident detection was implemented where the messaging system will play a significant role in the field of road accidents. For the sake of accident detection project uses accelerometer sensor.

Pratik Kanani et al. [5] in 2020 has proposed a real-time location tracker for critically ill patients in healthcare, utilizing Arduino, GPS Neo6m, and GSM Sim800L modules for continuous monitoring and immediate intervention in emergencies.

Patil, Bhavana et al. [6] in 2018 has proposed an Arduino-based smart car monitoring system is designed for efficient vehicle tracking. This system integrates advanced technology to provide comprehensive vehicle management solutions.

Hannah A. S. Adjei et al. [7] in 2022 has proposed a tracking system utilizing Bluetooth and Arduino for device monitoring. The system enables precise tracking and management of devices through innovative technology integration.

Musonda Mwango et al. [8] in 2023 has developed a vehicle tracking system that utilizes RFID technology for enhanced monitoring. This system facilitates effective tracking and administration of vehicles by integrating cutting-edge RFID technology.

Ms. Shreya G. Zadelet al. [9] in 2020 has proposed a system which utilizes LoRaWAN technology for implementing a tracking system. Employing LoRaWAN's capabilities to track and monitor various assets or devices. Enhancing tracking efficiency and reliability through the integration of LoRaWAN technology.

S Garla Ramesh et al. [10] in 2021 has developed a GPS location tracker using NodeMCU and a GPS module for IoT applications. Here GPS plays a vital role both in allowing the user and also the service provider to track the taxi.

3)EXISTING SYSTEM:

In today's market a different range of tracking devices are available those are GPS (global positioning system), Bluetooth, RFID (Radio Frequency Identification), QR codes. GPS is a system of navigation satellites circling Earth. One will where they are because the GPS constantly sends out signals. Garla Ramesh et al. [10] in 2021 has proposed A GPS location tracker utilizing NodeMCU and a GPS module is designed for Internet of Things (IoT) applications. This system combines the NodeMCU microcontroller board with a GPS module to create a compact and efficient tracking solution. Bluetooth: uses Bluetooth low energy (BLE) to connect with our phone. This is mostly used in air tags with which one can track things nearby us. Hannah A. S et al. [7] in 2020 has proposed a Bluetooth-based tracking system with Arduino for device monitoring. Utilizing Arduino's capabilities, this system enables real-time tracking of devices via Bluetooth technology. RFID: works via radio waves. It works by uploading an RFID tag with data and attaching it to a related entity. Musonda Mwango et al. [8] in 2023 has proposed Designing a vehicle tracking system incorporating RFID technology. Utilizing RFID technology for efficient vehicle monitoring and tracking. QR Codes have to scan them for the location purpose, mostly used in asset tracking.

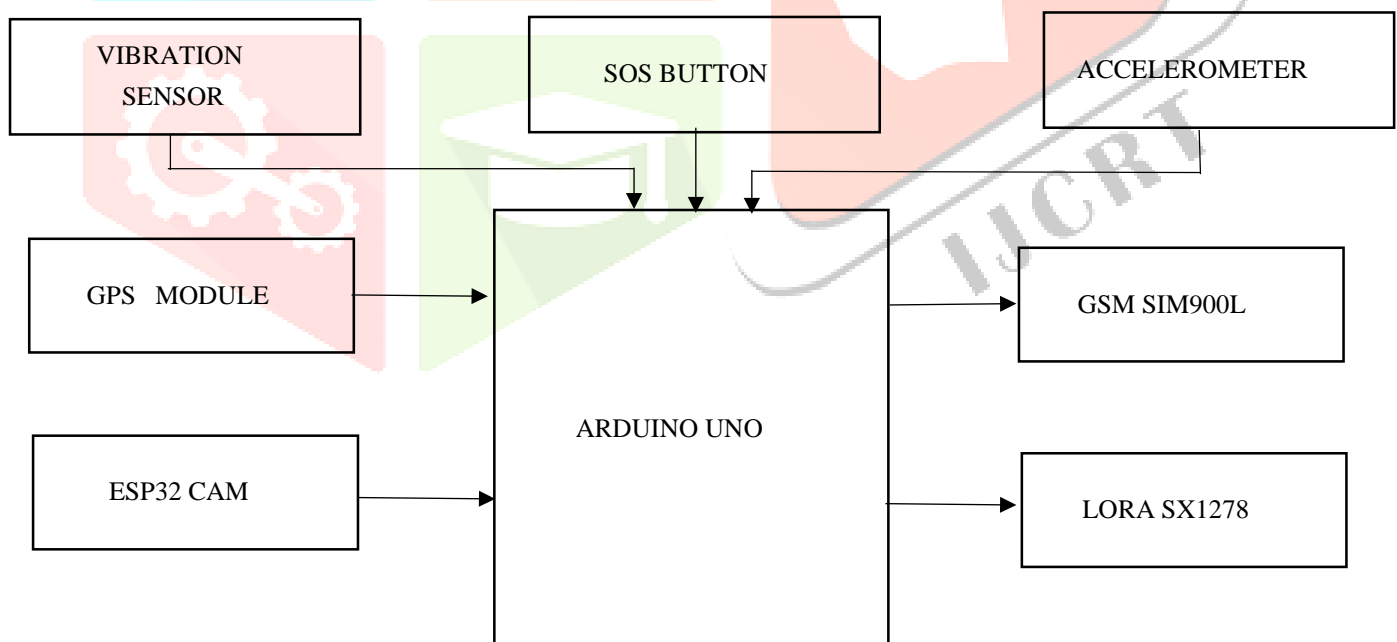
In this tracking methods GPS is the most effective and accurate one when compared to others. So, most of the trackers use GPS for location finding. And then based on the usage the GPS location is transmitted with a communication technique. The communication technique can be of GSM, Lora, Zigbee based on the requirements. Most used communication technique is GSM. But this has many drawbacks to it. The drawbacks are poor GPS signal reception, satellite connectivity. And even if other communication techniques are used the location is not saved in any type of memory. Ms. Shreya G. Zadelet et al. [9] in 2020 has proposed Implementing location tracking utilizing LoRa technology. Leveraging LoRa for efficient and reliable location monitoring.

4) PROPOSED SYSTEM:

In places like rural areas, mining areas where the phones won't work. Even when phones work sometimes the person may meet with accident or any other situation, where one requires help but can't assist it. So, in this system vibration sensor and accelerometer are being used to detect danger and sends alert. These sensors will detect fall based on the code dumped, both the vibration sensor and accelerometer threshold values should be changed to confirm the fall. When the fall is detected is the Arduino will access the GPS module and takes the latitude, longitude and will share it through GSM sim900l module via message and will be sent to thingspeak also, at the same time the esp32 camera streaming server will also be given in the message so that others can see the video of the victim. The esp32 cam can be used for video streaming. Even when the sos button is pressed then also the location will be shared. If the cellular signals are not present, then LoRa will help in sending the alert. The transmitter LoRa module will radiate the signal and when the receiver LoRa module receives the signal it will sound the buzzer. As discussed, when network coverage is not present to know the location, this project is included with IoT, which helps to save the location details of previous places. When people are in panic situation or in danger situation and wants to communicate with others can make use of this tracker.

5) BLOCK DIAGRAM:

A) TRANSMISSION SIDE:



B) RECIEVER SIDE:



6) RESULT:

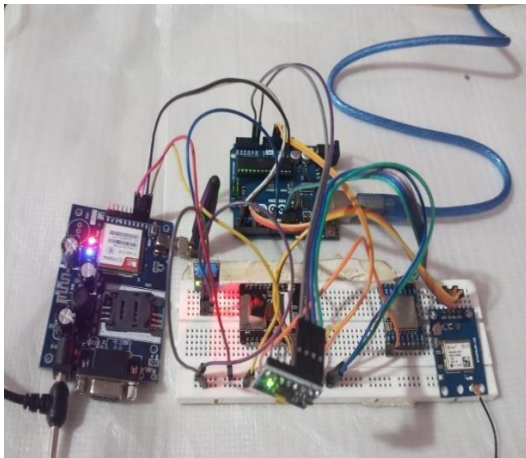


Fig.1: EXPERIMENTAL SETUP FOR TRACKER



Fig.2: MESSAGE RECEIVED

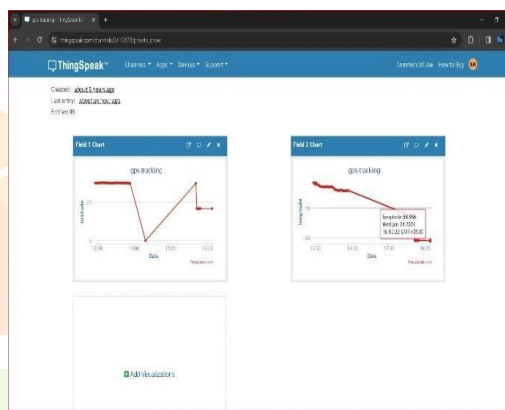
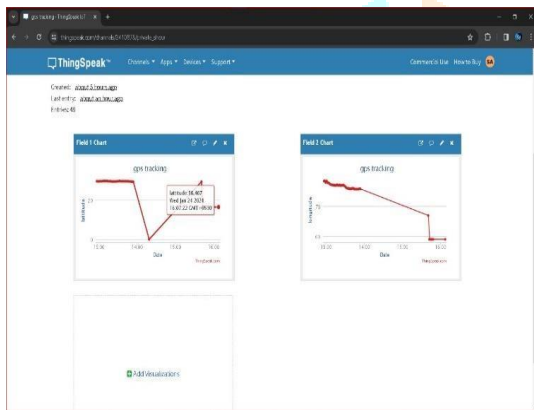


Fig.3 & 4: LATITUDE AND LONGITUDE VALUES SAVED IN THINGSPEAK IOT

7) CONCLUSION:

Nowadays the safety of an individual is getting very difficult, the risks are increasing day by day. The risks can be of natural cause or due to human errors. To get saved from all these while moving alone one needs a tracker. This multi communication tracker will help in tracking the victim's life and even if any harm is done, they will have a proof by the help esp32 cam. The enhancement to the GPS GSM tracker has been done by adding LoRa to it. The main aim of the idea is to save the life of a human

8) FUTURE SCOPE:

The future of GPS location transmission using IoT and multiple communication techniques will have a very high usage. Further advancements can be done by adding other communication techniques like radio communication and satellite communication etc. Robust security measures and interoperable standards will safeguard data integrity and promote seamless integration. Even the trackers in future will be more accurate, less time taking, low power using.

9) REFERENCES:

1. Dechamma A K, Swathi, Chaithali, Harshitha K, Prof. Yogesh N, “Women Safety Device with Gps Tracking and Alerting System”, IJCRT ISSN:2320-2882, Volume 10, Issue 7 July 2022.
2. Sashank Narain, Aanjhan Ranganathan, Guevara Noubir, “Security of GPS/INS based On-road Location Tracking Systems”, 2019 IEEE Symposium on Security and Privacy.
3. Bernard Akindade Adaramola, Ayodeji Olalekan Salau, Favour Oluwatobi Adetunji, Olatomide Gbenga Fadodun, “GPS GSM Guided System for Vehicle Tracking”, ICCAKM DOI:10.1109/ICCAKM46823.2020.9051533
4. Rajvardhan Rishi, Sofiya Yede, Keshav Kunal, Nutan V. Bansode, “Automatic Messaging System for Vehicle Tracking and Accident Detection”, ICESC 2020 DOI:10.1109/ICESC48915.2020.9155836.
5. Pratik Kanani, Mamta Padole, “Real-time Location Tracker for Critical Health Patient using Arduino”, ICICCS 2020 DOI:10.1109/ICICCS48265.2020.9121128.
6. Hannah A. S. Adjei, Francis K. Oduro-Gyimah, Mr. Tan Shunhua, George K. Agordzo, Manasah Musariri, “Developing a Bluetooth Based Tracking System for Tracking Devices Using Arduino”, ICCCS October 2020.
7. Musonda Mwango, Evaristo Musonda, “Designing A Vehicle Tracking System Using RFID Technology”, IRJMETS Volume:05/Issue:02/February-2023.
8. Ms. Shreya G. Zade, Mr. Anukesh A. Ambatkar, Ms. Prachi J. Bhagat, Mr. Vinod B. Ambatkar, Ms. Komal A. Korde, Prof. Kirti B. Nagne , “Tracking System Using Lorawan Technology”, IRJET e-ISSN:2395-0056 Volume:07 Issue:12/Dec 2020.
9. Garla Ramesh, “IoT Based GPS Location Tracker Using NodeMCU and GPS Module”, IJSART Volume 7 Issue 5-May 2021.
10. Prof. Bhavana Patil, Harsh Amrite, Kailas Gaikwad, Jagdish Dighe, Sumit Hirlekar, “Smart Car Monitoring System Using Arduino”, IRJET e-ISSN: 2395-0056 Volume:05 Issue:03/Mar-2018.

