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Paper Authors

**G RAMA MOHAN REDDY, PARSHI VIHAR, PARIMI KARTHIK**



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## **COST EVALUATION BASED ON THE DISTANCE TRAVELLED BY THE VEHICLE IN REMOTE AREAS USING LORA**

**G RAMA MOHAN REDDY<sup>[1]</sup>, PARSHI VIHAR<sup>[2]</sup>, PARIMI KARTHIK<sup>[3]</sup>**

<sup>[1]</sup> Assistant professor, Dept. of Computer Science, Sathyabama University, Chennai, India.

<sup>[2][3]</sup> UG Student, Dept, of Computer Science, Sathyabama University, Chennai, India.

**Abstract** :Vehicle tracking is the currently biggest challenge in hill side areas, as technical support and internet services are less supported. In this case, with different issues to the former. In this article, the big ad-hoc network using Lora will be solved to the problem in remote areas, hill side areas and forests. The longitude and latitude positions on earth will be detected using the NEO-6m module and it will be updated. Due to the distance and speed of the vehicle, two types of warnings are issued, one is ordinary, when vehicle crosses the radius of 5km or if the speed of vehicle is more than 50 kph or distance greater than 10 km, emergency warning will be issued. with support of google maps and NEO-6m module. Using this data it is easy to trace the vehicle location information. Keywords - IOT, smartphone, Lora, GPS.

### **INTRODUCTION:**

Survey taken past decade has unveiled a tragic up raise of increasing moral rate due to signals problems currently the main issue to over come the situation here by invented some of the devices which works on the issues on wireless connectivity. So here we invented the a product know as IOT devices to over the situations in signals less drought areas.so here we invented the device name called as NodeMCU and NEO6M , Lora these are the main three devices which work for the sake of wire less transmission. The device works for the situations like , when there no signals to connect to particular persons is not getting connected to signals drought conditions the devices will work even if no internet or mobile signals does exits, even though it works. As it is having a antenna containing it transfers the signals to

device and share the information to another. These type of sharing the information to another and helps in finding the other side person easily using this devices. This type of device is used in hill stations because the rate of signal and communication is very drought to send and receive the signals .so we can effectively use these Lora is one of the data transmission technology in the digital system and it is low power wireless platform and long-life battery time. The wireless system uses the unlicensed range of connecting to signalsAsia: 433 MHz (ultra-high frequency).Lora Technology is the DNA (device, network, application) of the IoT. RN2903, RN2483, RFM95,RFM96W, RFM96 are the popular modules in the present market [10]. In this idea will be

developed by RFM95 module. It is the range of the ad-hoc network also increased

Specifications	NFC	RFID	Bluetooth	WiFi	LoRa
Maximum coverage Range	10cm	3m	100m	100m	15 Km
Frequency of Operation	13.56MHz	varies	2.4 GHz	2.4 GHz, 5GHz	433 Mhz
Communication	2-Ways	1-Way	2-Ways	2-Ways	2-Ways
Applications	Credit card related payments	EZ-pass tracking items	Communication b/w phone and peripherals	Wireless internet	Wireless internet

Table 1: Representation of different technology specification

**LoRa:** In the communication system, the signal will be conveying the information. The signals are flowing in frequency (F).

$$F = C / \lambda$$

Equation represents the relation between frequency, wave speed and wavelength. Here frequency is a directly proportional to wave speed and wavelength is indirectly proportional to the frequency. If wavelength is high, then the frequency is low. When wavelength is high, then signal strength is high. So signal strength is low if the frequency is high.

In these above table represents the different wireless communication modules range and frequency of operation.

### Literature Survey:

Abdullah Saudalmansouri et al. proposed a self frequency up converter magneto acoustic that converts the low-frequency motions into high-frequency acoustic signal. Direct conversion for frequency eliminates the need of the electronic and battery found in conventional tags in Magneto Acoustic Resonator for vehicle Tracking.

Hailiang Xiong et al, The robust GPS navigator is based on DR, STF. And defined to index to check whether the performance have algorithm in the unit of integration. Algorithm is based on searching an tracking of vehicle of particular navigated point to the particular location where to go and confirm the present location of the vehicle by the device. The proposed adaptive location tracker which helps in notifying the present location and help to find the exact location of the end to end user. Here we use the iot to develop the device connection environment with out failing the system to maintain the network errors no the involved in the situations which then or by facing by the user to avoid the particulate situations to avoid or facing the not the same issues by which we are inventing the device to avoid the signal problem, so that is why we are using this module system not to face any problem at the situation's ta the hill stations with failing to connection error problem to the customers or the public who are rooming here and there to there daily bases. If they

were not in the signal range then they can automatically switch to out personal device system by switching on to the system which we invented now can help in the situation in the problematic situations to over come from that type of stuck up situation's. here we use the wireless connection protocol to avoid facing the problem with network and connecting to the server and help the user to track your location's and get the help immediately is working or inventing purpose of trios idea.



Fig 1: Vehicle tracking in remote areas

The figure illustrates that searches in some places in the past and present days. The plan is applicable for that area has nocommunication. Now-a-day's, The main disadvantage is vehicle monitoring. It means, it is easy to find out the area where the vehicle is present. In this process, There is no need of owner aid infrastructure. Vehicle proprietor will be directed to the places and can search,

It is a dangerous process because the exact place he / she doesn't know. Owner can search in the doubtful areas and also with having no hope. If there is any vehicle trafficking then it is very hard to find the vehicle location for the owner. This problem not only for the vehicle but also for all the

movable objects like animals and children etc., Here the major problem is finding the object location.

### Proposed Architecture :

Mainly in working methodology has 3 level.

- 1) End devicelevel
- 2) Lora gatewaylevel
- 3) Network serverlevel

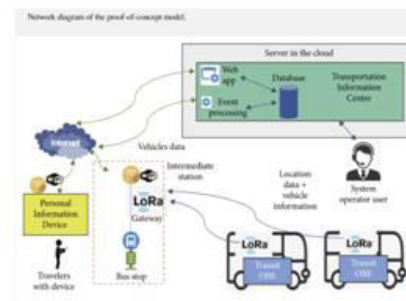


Fig 2: Network architecture of LoRA

The Lora network architecture has mainly end device, Lora gateway and network server are the main key roles in the communication. The LoRa gateway is used for interaction between an end device and network server. The minimum radius of the LoRa signal range is 10 K.M (10000 m). This is very useful for long-range communication. In the above figure, dotted lines are representation for Lora signal communication. Solid lines are other than Lora communication like WiFi, ZigBeer Ethernet etc., for providing the internet connection to Lora gateway.

**LoRa network consists of several elements. Endpoints:** The endpoints are the elements of the Lora network where the sensing or control is undertaken. They are normally remotely located. Examples, sensors, tracking devices, etc.



**LoRa gateway:**The gateway receives the communications from the Lora endpoints and then transfers them onto the backhaul system. This part of the Lora network can be Ethernet, cellular or any other telecommunications link wired or wireless. The gateways are connected to the network server using standard IP connections. On this way the data uses a standard protocol but it can be connected to any telecommunications network, whether public or private. In view of the similarity of a Lora network to that of a cellular one, Lora WAN gateways may often be co- located with a cellular base station. In this way, they can use spare capacity on the backhaulnetwork.

**Lora Network Server:**The Lora manages the signal system as part of how it is working and eliminating the unnecessary actions which were not needed to solve the situations of how to do the actions based on the functionality needed. Here we do have a security checkup system, which and were it checks for the and sends the ACKs to the particular gateways, schedule s the acknowledgement. By this way we can deploy and connected and make it very easy for deploying and connecting to the particular connections needed to deployment a Lora Network.

**Remote computer:** Computers which are operated based on the arises situations and takes the efficient decisions according to the situation held at the remote areas. The major problems and signals from the nodes are controlled by these computers. It just acts as the automatic responsive system in the areas

where the no need of manual responsive system by people.

The vehicle can be attached with GPS tracker, so that it is easy to find the vehicle and movable objects. It plays the important role in the process. By this the objects can be tracked easily. The end connected devices can be tracked by the system which was attached by the GPS tracker.

### Implementation:

Neo6m module connected with the antenna is used for the signal processing system. Node mcu can be connected to the system and the power supply is provided to it for the processing of the signal establishment. Now Lora sender is connected with node mcu. This connection setup is placed within the vehicle.



Fig 3: NEO-6m node.

With the support of the GPS navigation system Arduino board will send the data to

cloud with help MQTT protocol. Lora technology is the help to provide the internet to the Arduino. In this process, Lora gateway will help the process. If the vehicle will cross the ( $r \geq 5$ ) 5 K.M radius owner will get the notification and location of the vehicle. it is just like an alert message. If the animal cross the ( $r \geq 10$ ) 10 K.M mobile get the red alert notification. If the speed of the vehicle is  $>50$ KMPH owner will get the notification. The way of the vehicle will be updated into the cloud. For checking to update and tracking the vehicle location specially develop the one android application. With help of the IFTTT and ad fruit smart mobile is connected to thecloud.



Fig 4: Work Flow Proposed Method.

End connected devices are connected to the gateway. Equation (2) represent the relation between distance, speed and velocity. The connected system is placed along with the vehicle. Lora receiver receives the signal from the sender which is connected to the setup and place along with the vehicle. The GPS helps the sender to transmit the correct signals to the receiver.

One chip placed along with the sender side. By the help of the chip and using IP, device can be traced. System which helped to

process the requests are connected to the server side to track and trace the vehicle.

```
float a = pow(sin((end_lat-start_lat)/2), 2) +
cos(start_lat) * cos(end_lat) *
pow(sin((end_long-start_long)/2), 2);
float answer = radius_of_earth * 2 *
atan2(sqrt(a), sqrt(1-a));
```

The above code gives the distance between two locations and finds the exact center of locations.

### Results and discussions:

In this below figure 5 shows location details of the different vehicles. By using these details easy to track the vehicles.. Google maps Is helpful for visible appearance. In this, technology, it is very useful for farmer and cattle business persons.

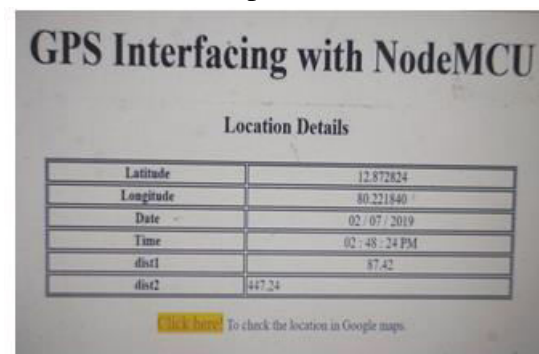


Fig 5: Distance between gateway and vehicles

Fig 5 shows output representation of the navigation system.

### Conclusion:

A GPS tracker will be fixed in a vehicle which helps to find the vehicle. By using that tag, it is easy to tracks the vehicle located direction and travelling direction with the help of Lora technology. Lora is the new technology in the communication system. Arduino chip is useful to provide the

internet to navigation. cloud storage is the help to share the information with the smart mobile. This technology is very useful to provide the vehicle security and easy to find out the vehicle location. The device feature is not only for tracking the vehicle but also can be fixed to animals for vaccination tracking presently, where the moving objects or animals were present even , we can trace them often.

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