

Smart Parking System Using LoRa

Ms.Payal Gend¹, Ms.Pallavi Mane², Ms.Vishakha Mane³, Prof.Arati Sudhakar⁴

¹⁻³Final Year student, Department of Electronics and Telecommunications Engineering, SVETI, Maharashtra, India

⁴Final Year student, Department of Electronics and Telecommunications Engineering, SVETI, Maharashtra, India

Abstract - LoRa means a simple wireless modulation system which is used in communication where very low power is required. LoRa chips in the network protocol are mainly used for long range communication purposes. The main advantages of LoRa is low power consumption and Longer ranges around about 10Km.

For this project, we are using the concept of LoRa along with IOT based smart parking module. Smart parking module includes tracking of parked slots as well as vacant slots of vehicles and their location. The main purpose of LoRa here is that it does not depend on any other network for communication. IR ultrasonic sensors are used for sensing the presence or absence vehicles.

Key Words: LoRa RA-01, Node MCU, IR ultrasonic sensors.

1. INTRODUCTION

Now a day, the number of cars in each and every area is increasing rapidly, because of which, there is a need for some kind of system for observing and tracking of the parking vehicles in particular region.

Searching out the vacant slot for parking in an urban area becomes very difficult for the people in metro cities at the peak hours in their busy schedule.

People have to check each region by driving and reaching out to correct empty parking slot, suitable for their vehicle parking. Because of which, people get frustrated, as it is waste of their time, pollution also increases and there is reasonless consumption of gas, petrol or diesel. Many times it is observed that, as driver's attention is partially in finding parking slots, there is a likelihood of causing accidents.

As LoRa uses WAN technology, it does not need many modules for operation of smart parking system. The main aim of this project is to upgrade the situation of vehicle flow in parking area. This system leads helpless people who smash the traffic rules. Therefore, this project becomes important progress which leads us to improve metro cities situation regarding parking problems.

2. Literature Survey

1. Smart parking system:

The smart parking system was published by Mr. Harshal Dhamane et.al on 7 July 2021. In this they have worked on application, which is used for the sensing of existence of parking spaces. The application updates the status of vacant slots for parking of vehicles with help of the sensors that senses the occurrence of automobile.

2. IOT based smart parking system using Node MCU.

This project was published by Tejas Pund et.al. Here Smart Parking system detects the availability of parking slots that viewed on mobiles or even to satellite navigation device so that drivers will always be aware of whether there are availability of parking slots or not.

3. IOT based smart parking system.

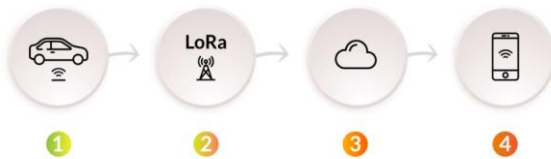
This was published by Abhirup khanna et.al, on 24 Jan-2016. The proposed smart parking system consists of an onsite deployment of an IOT module, which is used to monitor and signalize the state of availability of each single parking area and a mobile application is also provided that allows an user to check the availability of parking space and book a parking slot accordingly.

3. Objective

The main objectives of smart parking using LoRa module are:

- i) To seek out the parking slots in metro cities, this research investigates the smart parking module in busy area based on the availability of parking slots as per the requirement of driver.
- ii) To provide smart system to track vacant and non-vacant slots at parking regions like in Colleges, Malls, Offices, Hotels, etc. It simply becomes easier and thus it saves time, resources and energy.
- iii) To reduce the efforts of drivers, this module keeps the information of parking even in the absence of security person in parking area.

4. Methodology



In smart parking system using LoRa, we have used Node MCU, LoRa, ultrasonic sensors. Node MCU is basically used as a controller for communication purpose in the module.

This project is divided mainly in two sections, as:

1) Transmission side

2) Reception side

1) Transmission side: For giving input to smart parking module we have used two ultrasonic sensors for sensing the availability of parking slots for parking of vehicle.

This ultrasonic sensor will pass the signal to Node MCU and with help of LoRa module it will transmit the information to receiver.

2) Reception side: Antenna from receiver side will receives the signal and passes the information to Node MCU and with help of LoRa module it will transmit the information to receiver.

2) Reception side: Antenna from receiver side will receives the signal and passes the information to Node MCU and with use of firewall cloud it will update the information on mobile for viewing the status of availability of parking of slots.

5. Applications

The Smart Parking System designed here can be used in different parking areas such as:

1. Private parking slots
2. Hospitals
3. Shopping malls
4. Hotels
5. Public parking garages
6. Industries

6. CONCLUSIONS

In less time, looking for vacant spaces for parking vehicles in areas such as hotels, hospitals, exhibitions, cinema halls, malls, etc. Many times it becomes annoying for everyone because of the traffic which is produced by the vehicles in searching of parking slots in all the regions.

In entire world it becomes serious issue to handle the traffic due to unavailability of parking slots. Smart parking system using LoRa becomes one of the finest solutions which overcome the difficulties of traffic problems caused due to parking. This smart parking module will give the status of the vacant spaces which will sense the presence of the vehicle in a particular area.

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