Department of Science & Technology
Government of Rajasthan Jaipur
Student Project Programme (2023)

Project Name

Smart Parking system using LoRa

Arya College of Engineering & Information Technology

SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur - 302028

Submitted By Students:

Shivani Yadav (8th Sem 4th year)
Anshika Gupta (8th Sem 4th year)
Sumant Kumar (8th Sem 4th year)
Vishal Sharma (8th Sem 4th year)
Aditya Shukla (8th Sem 4th year)

Project guide:

Dr. Ashok kumar kajla
(Professor)

Form A

Form No....
(For official use only)

Application Format of Student Project Program

1. Title of the Project- **Smart Parking Using LoRa**
2. Discipline/ Subject Area**: Engineering**
3. Region (Regional Office area of jurisdiction: -Ajmer/Kota/Jodhpur/Bikaner/Udaipur):**Ajmer**
4. Designation & Address of the Person, in whose name, Demand Draft/Bankers Cheque of grant is to be sent. (Head of Institution/Director/Registrar/ Comptroller/ **Principal**/Dean) Tick the relevant)

Prof. (Dr.) Arun Kumar Arya

(Principal)

Arya College of Engineering & I.T.

SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur - 302028

5. Name & Class/Year of the Students (indicate clearly the semester in case of semester system):

S.No.	Name of the Students	Class/Year	Semester
1.	Shivani Yadav	IV	VIII
2.	Vishal Sharma	IV	VIII
3.	Aditya Shukla	IV	VIII
4.	Anshika Gupta	IV	VIII
5.	Sumant Kumar	IV	VIII

6. Whether belongs to SC/ST. (attach certified for Group Leader)

S.No.	Name of the Students	Role	Category (Gen/Sc/St)	Proof Attached (Yes/No)
1.	Shivani Yadav	Frontend developer	OBC	No
2.	Anshika Gupta	Hardware process	GENERAL	No
3.	Sumant Kumar	Cloud developer	OBC	No
4.	Vishal Sharma	Data manage and hardware process	GENERAL	No
5.	Aditya Shukla	Application developer	GENERAL	No

7. Address of the Students (Institutional & Correspondence Address with E-mail ID & Fax, Mobile No.)

a. Address of the Students:

S.No.	Name of the Students	Correspondence Address	Email	Mobile No.
1.	Shivani Yadav	212, Sirsi Road, Jaipur	shibuyadav209@gmail.com	9660008012
2.	Anshika Gupta	B-355,JantaColony, Jaipur	anshikag0810@gmail.com	8209604652
3.	Sumant Kumar	GurukulResidency, Kukas	ksumant7542@gmail.com	7542054266
4.	Vishal Sharma	Arya college of engineering and it , Jaipur	vs906000@gmail.com	8859291348
5.	Aditya Shukla	Shyam/ Nagar ,benaar road Jaipur	Adityashukla0612@gmail.com	8278658721

b. **Institutional Address:** Arya College of Engineering & I.T.

SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur – 302028

Email: principal@aryacollege.in

Fax:+91-1426-227177

Phone No: +91-141-2621967

8. Bank Account No. of one of the students of the Group**.**

S.No.	Name of the Student	Account No.	Bank and Branch	IFSC Code
1.	Aditya Shukla	8013268745	Kotak bank , sikar city	KKBK0003700

9. a) Name & Designation of the Supervisor/Guide : **Dr. Ashok kumar kajla (Professor)**

b) Institutional & Correspondence Address of the Guide with Telephone No. E-mail ID & Fax, Mobile No.

Arya College of Engineering & I.T.

SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur – 302028
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S.No.	Name of the Guide	Designation	Institutional Address	Correspondence Address	Mobile Number	E-Mail ID
1.	Dr. Ashok kumar kajla	Professor	SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur – 302028	SP-42, RIICO Industrial Area, Delhi Road, Kukas, Jaipur – 302028	9214052386	vishal500371@yahoo.co.in

10. Whether certified from Plan Department (attach document).* **Yes**

S.No.	Name of the Students	Fax. No.	Mobile Number	E-Mail ID	Signature

Signature of guide of the project

Form B

Form No....
(For official use only)

Title of the Project: Smart Parking Using LoRa

Project Summary

A smart parking system using LoRa (Long Range) technology is an IoT solution that enables efficient management of parking spaces by providing real-time information on parking availability. The system consists of LoRa nodes deployed at each parking space, a LoRa gateway, a cloud server, and a user interface .The LoRa nodes detect whether a vehicle is parked in a particular parking space or not and send this information to the LoRa gateway using LoRa communication technology. The gateway forwards this data to the cloud server, which processes it and updates the parking space availability status in real-time. End-users can access the parking space availability information through a web or mobile application, which allows them to reserve a parking space in advance and navigate to the reserved space using the application. The system offers several benefits, including reduced traffic congestion, improved parking efficiency, reduced fuel consumption, and improved air quality. It also provides a more convenient and seamless parking experience for end-users. The technical considerations for a smart parking system using LoRa include network coverage, power consumption, data encryption, and scalability. The LoRa nodes should be designed to consume low power to ensure a long battery life, and the data transmitted between the nodes and gateway should be encrypted to ensure data privacy and security. Overall, a smart parking system using LoRa is an innovative and efficient solution to address parking-related issues in urban areas and can lead to a more sustainable and efficient transportation system.

Technical details of the Projects:

A smart parking system using LoRa (Long Range) technology typically consists of the following components:

1. LoRa Gateway: The gateway acts as the central hub for the smart parking system. It receives and forwards data from the LoRa nodes to the cloud server. The gateway is connected to the internet using Ethernet or Wi-Fi.

2. LoRa Nodes: The nodes are deployed at each parking space and sense whether a vehicle is parked in that space or not. The nodes use LoRa technology to communicate with the gateway.

3. Cloud Server: The cloud server stores and processes the data received from the gateway. It also provides a user interface to the end-users.

4. User Interface: The user interface is accessible through a web or mobile application. It allows end-users to view the availability of parking spaces in real-time and reserve a parking space in advance.

.**Origin of the proposal:**

The growing demand for more efficient and convenient parking solutions, coupled with advances in technology, has led to the widespread adoption of smart parking systems in cities around the world. Today, smart parking systems are used in a wide range of environments, from public parking lots to private parking garages, and are designed to provide drivers with an easier, faster, and more secure parking experience.

Definition of the problem:

In recent research in metropolitan cities the parking management problem can be viewed from several angles. High vehicle density on roads. This results in annoying issue for the drivers to park their vehicles as it is very difficult to find a parking slot. The drivers usually waste time and effort in finding parking space and end up parking their vehicles finding a space on streets. In worst case, people fail to find any parking space specially during peak hours and festive seasons.

Objectives:

The main objective of smart parking system is to help the people to book their slots and park their vehicle. Park assistance is provided to find the users parked vehicle from the parking slot through the application.

Work plan in stages:

- Stage 1: Undergo the process of requirement.
- Stage 2: Undergo the process design of software.This includes front end, backend process and database process in our software.
- Stage 3: Implementation of the project will be done it is a realization of a technical specification through computer programming and deployment.
- Stage 4: The integration, testing of the outcomes of the project will be done.
- Stage 5: In this stage, we will complete project report writing.

Methodology:

In this project we are using Arduino, proximity sensor, and servo motors. One proximity sensor is used at entry and exit gate to detect the car while two Proximity sensor are used to detect the parking slot availability. Servo motors are used to open and close the gates according to the sensor value.

Organization of work Element:

We will design software and hardware of this project in our college. After that, we will manage parking system efficiently in which we can save time, fuel and also traffic in our areas.

Proposed outcome/findings:

The implementation of a smart parking system can bring many benefits, including improved efficiency, reduced traffic congestion, increased safety, and enhanced sustainability.

Increased efficiency: Smart parking systems use advanced technologies such as sensors, cameras, and data analytics to optimize parking management and improve the overall parking experience. This leads to a reduction in parking time and an increase in parking efficiency.

Reduced traffic congestion: Smart parking systems help drivers find available parking spots quickly, reducing traffic congestion caused by drivers cruising for a parking spot.

Details of facilities to be provided by the Institution:

College will provide access to development facilities and labs with all required equipment with guidance of faculty in all fields of project development. The various testing, and server set up will be provided by the college on need basis during the entire period of development of this project. Study material will be made available to us on need basis for reference purpose and for getting technical information from the college Library.

Budget Estimates: Total Budget – **Rs.24, 000/-**

Title of Equipment	Title of Equipment Cost in Indian Rupees
Software Development	Rs.7,500/- approx.
Hardware	Rs.15,000/- approx.
Project Documentation, PPT:	Rs.200/- approx.
Consumable	Rs.500/- approx.
Report writing	Rs.1,000/- approx.
Contingency & other costs	Rs.2,000/- approx.
Grand Total	**Rs.26,200/-**

Utilization of the outcome of the project:

Advanced Technology that not only provide easy access to the parking spots but also help in saving valuable resources. Also, it helps in reducing traffic congestion and hence will ease travelling for other commuters in the city.