VISVESVARAYA TECHNOLOGICAL UNIVERSITY "Janana Sangama", Belagavi-590018

Project Work Phase-2 (18CSP77)
Report on

"EV SMART CHARGING STATION"

Project Phase 2 Report submitted in partial fulfilment of the requirement for the award of the degree of

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING

Submitted by

Shruthi M	**1KG20CS100**
Vadiraj R Nadig	**1KG20CS112**
Veluru Bhanuprasad	**1KG20CS116**
Vinay A	**1KG20CS121**

Under the guidance of

Mrs.N Deepashree
Assistant Professor
Department of Computer Science & Engineering KSSEM, Bengaluru-560109

K. S. School of Engineering and Management
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
#15,Mallasandra, off. Kanakapura Road, Bengaluru – 560109

2023 – 2024

K. S. School of Engineering and Management

#15, Mallasandra, off. Kanakapura Road, Bengaluru - 560109

Department of Computer Science & Engineering

KSSEM

K S SCHOOL OF ENGINEERING AND MANAGEMENT

CERTIFICATE

Certified that the Project Work Phase-2 (18CSP77) entitled **"EV SMART CHARGING STATION"** is a bonafide work carried out by:

Shruthi M	**1KG20CS100**
Vadiraj R Nadig	**1KG20CS112**
Veluru Bhanuprasad	**1KG20CS116**
Vinay A	**1KG20CS121**

in partial fulfilment for VIII semester B.E., Project Work in the branch of Computer Science and Engineering prescribed by Visvesvaraya Technological University, Belagavi during the period of January 2024 to May 2024. It is certified that all the corrections and suggestions indicated for internal assessment have been incorporated. The Project Work Phase-2 Report has been approved as it satisfies the academic requirements in report of project work prescribed for the Bachelor of Engineering degree.

14/5/24

Signature of the Guide

Mrs.N Deepashree
Assistant Professor, CSE
K.S.S.E.M., Bengaluru.

Signature of the HOD

Dr.K VenkataRao
Professor & Head, CSE
K.S.S.E.M., Bengaluru.

HOD
Department of Computer Science Engineering
K.S School of Engineering & Management
Bangalore-560109

14/5/2

Signature of the Principal

Dr.K Rama Narasimha
Principal / Director
K.S.S.E.M., Bengaluru.

Dr. K. RAMA NARASIMHA
Principal/Director
K S School of Engineering and Management
Bengaluru - 560 109

DECLARATION

We, the undersigned students of 8th semester, Computer Science & Engineering, KSSEM, declare that our Project Work Phase-2 entitled **"EV SMART CHARGING STATION"**, is a bonafide work of our's. Our project is neither a copy nor by means a modification of any other engineering project.

We also declare that this project was not entitled for submission to any other university in the past and shall remain the only submission made and will not be submitted by us to any other university in the future.

Place:

Date :

Name	**USN**	**Signature**
Shruthi M	**1KG20CS100**	
Vadiraj R Nadig	**1KG20CS112**	
Veluru Bhanuprasad	**1KG20CS116**	
Vinay A	**1KG20CS121**	

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task will be in complete without the mention of the individuals, we are greatly indebted to, whom through guidance and providing facilities have served as a beacon of light and crowned our efforts with success.

We would like to express our gratitude to our **Management,** K.S. School of Engineering and Management, Bengaluru, for providing a very good infrastructure and all the kindness forwarded to us in carrying out this project work in college.

We would like to express our gratitude to **Dr.K.V.A. Balaji, CEO**, K.S. School of Engineering and Management, Bengaluru, for his valuable guidance.

We would like to express our gratitude to **Dr.K Rama Narasimha, Principal**, K.S.School of Engineering and Management, Bengaluru, for his valuable guidance.

We like to extend our gratitude to **Dr.K Venkata Rao**, **Professor and Head**, Department of Computer Science & Engineering, for providing a very good facilities and all the support forwarded to us in carrying out this Project Work Phase-I successfully.

We also like to thank our Project Coordinators, **Mrs.Supriya Suresh, Asst. Professor, Mrs.Meena G, Asst. Professor,** Department of Computer Science & Engineering for their help and support provided to carry out the Project Work Phase-I successfully.

Also, we are thankful to **Mrs.N Deepashree, Assistant Professor** for being our Project Guide, under whose able guidance this project work Phase-1 has been carried out successfully.

We are also thankful to the teaching and non-teaching staff of Computer Science & Engineering, KSSEM for helping us in completing the Project Work Phase-I.

Shruthi M

Vadiraj R Nadig

Veluru Bhanuprasad

Vinay A

ABSTRACT

The **EV SMART CHARGING STATION** with Internet of Things (IoT) Integration represents a transformative initiative aimed at revolutionising the landscape of EV charging infrastructure. By incorporating wireless charging pads, infrared sensors, and the ESP32 microcontroller, the project eliminates traditional cables and introduces a seamless, user-friendly charging experience. The integration of IoT through the Blynk platform enables remote monitoring and control, empowering users to manage their EV charging process efficiently.

This project not only addresses the practical challenges of EV charging but also contributes significantly to societal and environmental aspects. Its potential applications span from public charging networks to commercial EV charging infrastructure, fostering the adoption of sustainable transportation practices. With features such as smart vehicle detection, energy management, and emergency service support, the project promotes efficiency, accessibility, and resilience in the realm of electric mobility. In essence, the Wireless EV Charging Station with IoT Integration emerges as a key enabler in advancing the accessibility and sustainability of electric transportation systems.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

To overcome the demand for transportation solutions, our wireless EV charging stations with integration of IoT represent the gender intersection of latest wireless charging technology.This concept is to innovate the EV charging system by incorporating technology that will provide simple and reliable control. At the centre of the project is a wireless charging pad that get rid of the use of cables and provides contactless charging. These pads also includes IR sensors that intelligently detect the vehicle on charging pad.

A microcontroller powered by ESP32 acts as the charging station's central nervous system. It controls the input from the infrared sensor and controls the operation of the charging pad. Essentially, the ESP32 seamlessly communicates with the Blynk IoT platform, and provides users with remote monitoring and control. Through the Blynk app, users is easily able to check payment status, receive notifications and manage payments whenever and wherever they want.

In addition to the direct benefits for individual users, the potential applications of the project are also diverse. Public toll booths in cities, private toll booths in residential areas and commercial establishments such as hotels or shops can benefit from this technology. In addition, the management of the fleet of companies with electronic equipment will also benefit from an effective payment management system.

In summary, our wireless electric vehicle charging station redefines the experience of integrating smart technology. This project contributes to the transition to regular transportation by offering new useful and eco friendly solutions.

1.2 PURPOSE OF THE PROJECT

The goal of our project is to create an advanced EV station that includes a new remote charging and central control system. By eliminating the need for normal electronic devices and installing infrared sensors at the location of the vehicle. Integrating IoT capabilities through the app allows customers to filter and manage payments, providing greater flexibility. Our business is built on convenience and support and is committed to providing more choice in electric vehicles by offering userfriendly, contactless and personalised payment methods.

1.3 SCOPE OF THE PROJECT

This venture includes the planning and installation of a remote EV charging station that will coordinate with the Web of Things (IoT). Ready-made charging stations with remote charging cushions and infrared sensors are meant to completely replace the charging involvement of electric vehicles. The application areas cover several areas, counting open charging stations, private and commercial areas.

1.4 DEFINITIONS

1.4.1 Wireless Charging Pads

Latest charging pads used in wireless charging provide a solution for electronic devices without any use of cables. These pads copper wire that is wounded to distribute power. Users can easily place the device on the charging pad, and wireless technology controls the charging process. This gives an excellent experience and user satisfaction, but also offers a simple and effective way to power our daily devices.

1.4.2 Infrared Sensors

An infrared is a specialised sensor designed to identify the appearance of any entity using infrared light beyond the capability of the human eye. Sensors sense by sending infrared rays and measure its reflection and detecting the return of infrared light when ever an entity is present. This reflection allows sensor to accurately identify and record the appearance of an object

1.4.3 Microcontroller (ESP32)

Microcontroller, exemplified by the ESP32, is a compact, integrated computing device tailored for specific functions within embedded systems.The ESP32, developed by Espressif Systems, encompasses a processor (CPU), memory, input/output peripherals, and often integrates built-in features such as Wi-Fi and Bluetooth. Microcontrollers find widespread application in various electronic devices like IoT devices, sensors, and gadgets, serving to control and coordinate their functionalities. The ESP32 known for its energy efficiency, and capacity for wireless internet connectivity, positioning it as a preferred choice for a diverse array of projects demanding both computational power and wireless connectivity.

1.4.4 Blynk Platform

Blank platform is an IoT based platform streamlining the creation and management of IoT projects. Through its user-friendly mobile app, Blynk caters to individuals, hobbyists, and developers, enabling them to effortlessly build and control IoT applications without delving into extensive coding. Users leverage Blynk to establish connections between various hardware devices, including Arduino, Raspberry Pi, and ESP8266, and the cloud, facilitating remote control through smartphones or tablets. The platform distinguishes itself with a drag-and-drop interface for crafting personalised dashboards, incorporating elements like buttons, sliders, graphs, and widgets for seamless connectivity with devices that are connected. Blynk boasts compatibility with sensors, actuators, and protocols, enhancing its adaptability for various IoT applications.

CHAPTER 2

LITERATURE SURVEY

2.1 Charging Station of Electric Vehicle Based on IoT: A Review (2022)

Mahmood H. Qahtan, Emad A. Mohammed, Ahmed J. Ali

The proposed model addresses the simplicity of EV use by integrating efficient parking and charging solutions. It emphasises the importance of managing free parking slots and pricing schedules, essential in preliminary designs and feasibility studies. Unlike previous systems limited to specific vehicle types, the suggested model caters to all, responding to high demand for parking and charging for electric vehicles. Key components include customer manager, vehicle manager, map manager, and lot manager, all operating on the Java Platform and Enterprise Edition (Java EE) for robust software support. Security is prioritised with the utilisation of user IDs for both reservation and billing processes.

Another approach involved a tracking system utilising GPS technology to offer precise vehicle location information. This comprehensive system, consisting of GPS, Raspberry Pi, and a web application, not only tracks the vehicle but also notifies users of the estimated time of arrival and distance to be covered.

In summary, the proposed model seeks to simplify EV usage by integrating efficient charging and parking solutions. Through smartphone reservations and a well-designed system, it caters to the specific needs of EV users, ensuring a seamless experience. Additionally, complementary efforts in mobile applications and tracking systems contribute to enhancing the overall convenience and functionality of EV infrastructure.

2.2 Smart Electric Vehicle Charging System (July 2011)

Joao C. Ferreira, Vítor Monteiro, Joao L. Afonso, Alberto Silva Member

This project aims to extend the realm of computer science work, covering software development, Web 2.0, geographic information systems, mobile computation, and wireless communication, to the emerging domain of Smart Grids and Electric Vehicles (EV). As Electrical Markets become more intricate, users involved in EV charging processes require assistance, particularly through mobile devices. In response, our paper outlines proposals for conceiving and developing a mobile application and an integrated system to guide users in EV charging or discharging procedures and EM participation.

The key components of the envisioned system, named the Smart EV Charging System (illustrated in Figure 2), comprise a Central Repository storing information about user energy consumption, production, energy sources, prices, and weather data; a Weather module acquiring information through a web robot; a Movements Tracking application leveraging GPS functionality; a Simulation Tool based on Netlog; a Charging Device managing EV battery charging or discharging; and a Mobile Application designed for devices like PDAs or iPhones to facilitate control information exchange for EV battery charging. These modules, detailed in subsequent sections, collectively form a comprehensive solution catering to the evolving landscape of Smart Grids and Electric .

Electrical Markets, introducing deregulation to optimise energy prices. Integration of mobile applications enhances user connectivity, and a Central Information Repository, utilising Data Mining, assists in smart EV charging while considering electrical network limitations. A simulation tool is incorporated to identify overloaded electrical distribution lines and simulate various scenarios. The system also benefits energy producers by enabling them to align production with consumer consumption needs.

In the EV Charging System, mobile applications play a important role in user interaction and connectivity. The Central Information Repository, powered by Data Mining, helps program and assist smart EV charging while considering electrical network limitations. The application of AI in this system is promising, storing data and knowledge information for the benefit of consumers and producers. Mobile devices and applications provide easy access to information, streamlining the charging process for increased efficiency.

2.3 Smart EV Charging: A Global Review of Promising Practices (8 November 2019)

Julia Hildermeier , Christos Kolokathis , Jan Rosenow , Michael Hogan, Catharina Wiese and Andreas Jahn

Recent studies emphasise the advantages of strategic EV integration, asserting that EV charging can enhance renewable energy utilisation, optimise existing network infrastructure, reduce EV operating costs, and diminish the necessity for new investments. A growing body of literature, spanning various research efforts, delves into the costs and benefits associated with EV grid integration. Consensus among studies, conducted by stakeholders and researchers alike, suggests that the grid can effectively handle the anticipated surge in electric vehicles, provided that charging is effectively managed. This involves incentivising users to shift their vehicle charging to off-peak hours, thereby enhancing the efficiency of existing grid assets. The European Association of the Electricity Industry further posits that smart charging has the potential to elevate grid utilisation rates.

The project highlights that the beneficial implementation of EVs into the power grid is not merely a theoretical possibility but is actively underway. It underscores the crucial role of utilising existing tools, such as intelligent technologies and integrated planning, to support the ongoing transition to electric transport. The study proposes a comprehensive definition of beneficial EV grid integration and smart charging, providing guidance for policymakers aiming to reduce emissions in both the transport and energy sectors. Without collaborative efforts, resulting in avoidable costs for drivers, electricity consumers, and the public sector. This scenario could impede the essential goals of reducing carbon emissions and air pollution in the continually expanding transport sector.

2.4 Joint Planning of Smart EV Charging Stations and DGs in Eco-Friendly Remote Hybrid Microgrids (September 2019)

Mostafa F. Shaaban , Sayed Mohamed , Muhammad Ismail, Khalid A. Qaraqe and Erchin Serpedin

The existing literature primarily delves into the operational facets of Electric Vehicles. Studies such as and examine the impact of electric vehicle charging on regional power generation and electric transmission systems, respectively. and explore coordinated charging for parked and mobile EVs, while investigate schemes considering distribution transformer limits. Price control and demand-side management mechanisms, introduced in literature, aim to meet micro grid supply capacity amid EV charging requests. Notably, proposes an energy management framework utilising dynamic pricing to maximise profits.Ancillary services, specifically reactive power support, are explored in through coordinated EV charging to bolster the grid during voltage sags. Furthermore, investigates the interplay between frequency regulation and EV penetration levels, aiming to minimise frequency deviation through a coordinated power control scheme.

This research contributes to existing literature by proposing a unified planning algorithm for electric vehicle stations and DGs within remote micro-grids. The algorithm takes into account environmental and economic considerations, encompassing both capital and operational expenditures as well as emissions of greenhouse gas. It meticulously addresses operational feasibility by considering power balance, stability, and reserve margin constraints. The proposed algorithm adeptly handles this intricate planning problem, utilising a genetic algorithm in the outer sub-problem to allocate and size DGs and charging stations. Simultaneously, an inner sub-problem ensures that planning decisions adhere to micro-grid technical constraints. Through iterative solutions, the algorithm generates an optimal Pareto frontier that effectively captures the trade-off between conflicting objectives.

Simulation studies validate the performance of the planning algorithm, showcasing its efficacy in delivering a compromise solution for conflicting objectives. The algorithm's adept balancing of economic considerations, environmental impact, and micro-grid technical constraints establishes it as a valuable tool for planning EV charging stations in remote micro grids.

CHAPTER 3

PROBLEM IDENTIFICATION

3.1 PROBLEM STATEMENT

The focal point of the project is to tackle the demand for EV charging solutions that are efficient and user-friendly. Conventional charging stations typically come with unwieldy cables and offer limited user control. Our objective is to confront these issues by developing a Wireless EV Charging Station equipped with intelligent features. We aspire to eradicate the inconvenience associated with cables, elevate user convenience, and deliver a charging experience that is seamless. Furthermore, we strive to facilitate remote monitor and control IoT platform, thereby enhancing the accessibility and efficiency of EV charging for users.

3.2 PROJECT SCOPE

The scope of our project extends beyond just improving the charging process. We're looking into making electric vehicle (EV) charging smarter and more adaptable. This means exploring how our wireless charging and smart control features can be applied in various settings, from public charging stations to private homes and commercial spaces. Additionally, we are considering ways to integrate renewable sources energy and optimise energy use. By addressing these factors, our project aims to improve the environment for greater awareness and effective practices in popularising e-mobility.

CHAPTER 4

GOALS AND OBJECTIVES

4.1 PROJECT GOALS

The goal is to make Electric Vehicle (EV) charging easier and smarter. We want to implement a Wireless Charging Station for Ev’s that won't use any cables, allowing users to charge their vehicles effortlessly. The goal is to enhance user convenience and provide a seamless experience. Additionally, we aim to incorporate smart features, like infrared sensors, to detect when a vehicle is on charging pad for automatic charging. The use of the IoT will enable users to check and control the process remotely through a user-friendly app. In simple terms, we're striving to make EV charging more accessible, efficient, and user-friendly

4.2 PROJECT OBJECTIVES

The main objectives of this EV SMART CHARGING STATION are:

- To integrate wireless charging.
- To acquire full control of EV charging station.
- To detect the vehicles on the charging station/Pad.

CHAPTER 5

SYSTEM REQUIREMENTS SPECIFICATION

5.1 SOFTWARE REQUIREMENT ANALYSIS

A software requirements definition is an abstract description of the services, which the system should provide, and the constraints under which the system must operate. It should only specify only the external behaviour of system.

5.1.1 SOFTWARE REQUIREMENTS

- Coding
- Arduino IDE
- Easy EDA
- Blynk app

5.2 HARDWARE REQUIREMENT ANALYSIS

Hardware Requirements Analysis is required to define and analyse a set of functional, operational, performance, interface, quality factors, and design, criticality and test requirements

5.2.1 SOFTWARE REQUIREMENTS

- Arduino nano(ESP32)
- Winding wire
- LCD
- Capacitor
- Diode
- MOSFET
- Voltage regulator
- Loadwire
- Ribbon wire
- Resistor

CHAPTER 6

METHODOLOGY

To achieve the objectives of this project, we are using following methodologies:

- The wireless charging uses the principle of electromagnetic induction. When an electric current is passed through wounded coil it creates a magnetic field, which causes another electric current to be created in the induction coil of a nearby device which are portable .
- Blynk App is used to gain full control over the smart EV charging station to the owner. It is achieved by connecting the microcontroller(ESP32) to the Blynk App through API Integration and Programming the ESP32.
- Infrared sensor(IR sensors) are placed in every charging station/charging pad to detect the vehicle and send information to the microcontroller(ESP32) then which send this information to the Blynk App(ie:owner).

CHAPTER 7

DESIGN (Sequence Diagram)

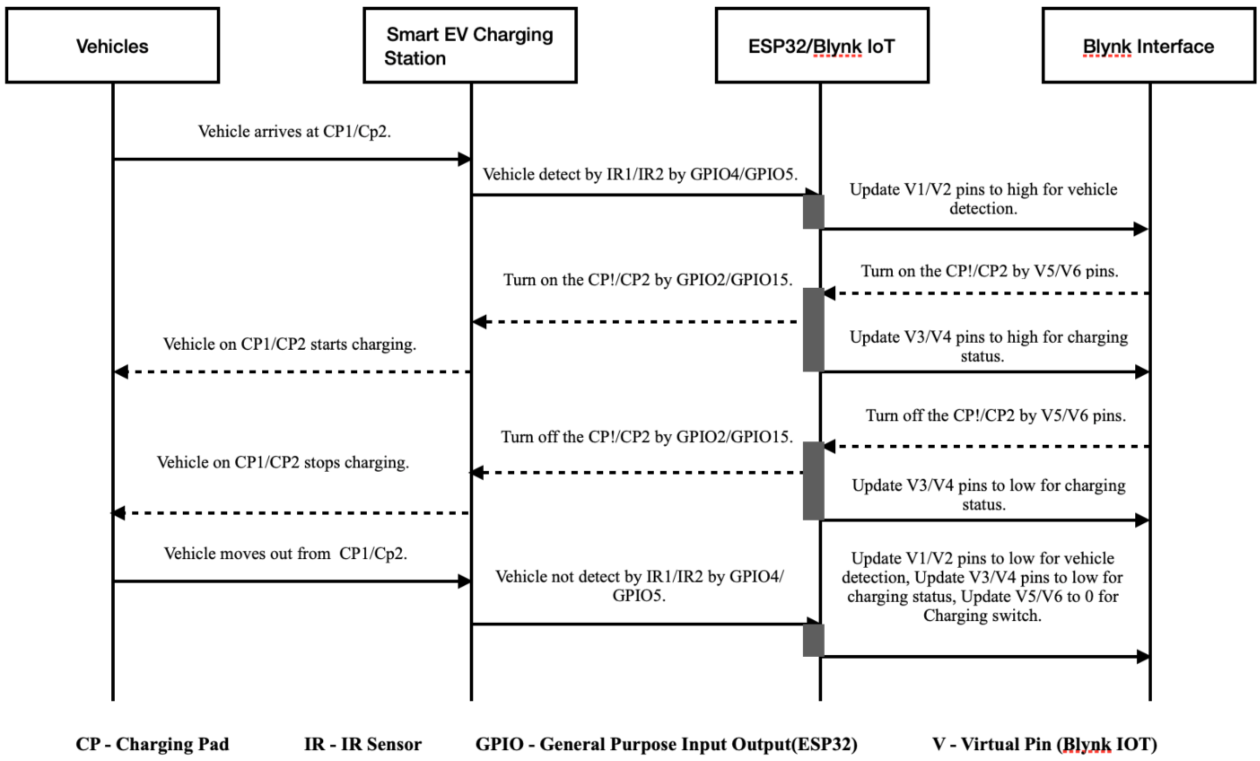


Fig 7.1 : Sequence Diagram Of EV Smart Charging Station

CHAPTER 8

IMPLEMENTATION

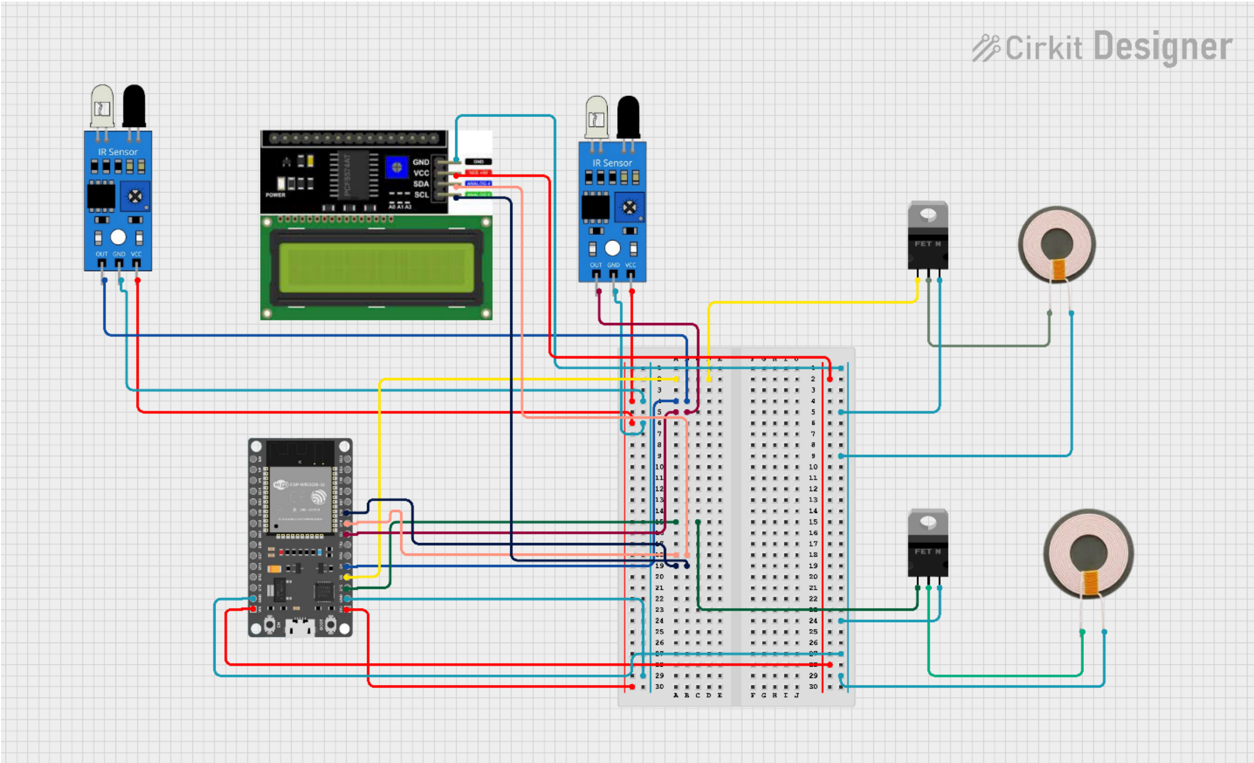


Fig 8.1: Circuit Diagram

```
#define BLYNK_TEMPLATE_ID "TMPL34l1hxf5-"
#define BLYNK_TEMPLATE_NAME "smart EV"
#define BLYNK_AUTH_TOKEN "O2yO9-4TaDwHBD7s-vRSpsS1BiKvKEvP"
#include <WiFi.h>
#include <BlynkSimpleEsp32.h>
#include <Wire.h>  // Include the Wire library for I2C communication
#include <LiquidCrystal_I2C.h>

char ssid[] = "Chinnu";
```

```
char pass[] = "Chinnu123";
char auth[] = "O2yO9-4TaDwHBD7s-vRSpsS1BiKvKEvP"; //your Blynk authentication token
bool chargingPad1SwitchState = false;
bool chargingPad2SwitchState = false;

const int irSensorPin1 = 4; // IR sensor for charging pad 1
const int irSensorPin2 = 5; // IR sensor for charging pad 2
const int chargingControlPin1 = 2; // Control pin for charging pad 1
const int chargingControlPin2 = 15; // Control pin for charging pad 2

bool vehicleDetected1 = false; // Variable to track if vehicle is detected by sensor 1
bool vehicleDetected2 = false; // Variable to track if vehicle is detected by sensor 2
bool chargingPad1Active = false; // Variable to track if charging pad 1 is active
bool chargingPad2Active = false; // Variable to track if charging pad 2 is active

LiquidCrystal_I2C lcd(0x27,16,2);

void setup() {
 Serial.begin(115200);
  Wire.begin(18,19);//18(SDA) 19(SCL)
  lcd.init();
  lcd.backlight();  // Turn on the backlight
  Serial.begin(9600);
  lcd.setCursor(0, 0);
  lcd.print("EV SMART"); // Display project name*/
  lcd.setCursor(0, 1);
  lcd.print("CHARGING STATION"); // Display project name*/

  pinMode(irSensorPin1, INPUT);
  pinMode(irSensorPin2, INPUT);
```

```
  pinMode(chargingControlPin1, OUTPUT);
  pinMode(chargingControlPin2, OUTPUT);
  digitalWrite(chargingControlPin1, LOW);
  digitalWrite(chargingControlPin2, LOW);

  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED) {
    delay(1000);
  }

  Blynk.begin(auth,ssid,pass);

  // Attach the LCD widget to a virtual pin (V0) in the Blynk app
  //Blynk.virtualWrite(V0, "EV Charging Status");

  // Attach LED widgets to virtual pins (V1 and V2) to indicate IR sensor status
  Blynk.virtualWrite(V1, LOW); // Initialize LED for Charging Pad 1 (IR sensor 1) to OFF
  Blynk.virtualWrite(V2, LOW); // Initialize LED for Charging Pad 2 (IR sensor 2) to OFF

  // Attach LED widgets to virtual pins (V3 and V4) to indicate Charging status
  Blynk.virtualWrite(V3, LOW); // Initialize LED for Charging Pad 1 (IR sensor 1) to OFF
  //Blynk.virtualWrite(V4, LOW); // Initialize LED for Charging Pad 2 (IR sensor 2) to OFF

  // Attach Switch widgets to virtual pins (V5 and V6) to control charging pads
  Blynk.virtualWrite(V5, 0); // Initialize Switch for Charging Pad 1 to OFF
  Blynk.virtualWrite(V6, 0); // Initialize Switch for Charging Pad 2 to OFF
}

void loop() {
  // Check for Charging Pad 1
```

```
if (digitalRead(irSensorPin1) == HIGH) {
  Blynk.virtualWrite(V1, LOW); // Turn on LED for Charging Pad 1 in Blynk
  vehicleDetected1 = false;
  Blynk.virtualWrite(V5, 0);
  lcd.setCursor(0, 0);
  lcd.print("PAD1 NOTCHARGING");
  chargingPad1SwitchState=0;
} else {
  Blynk.virtualWrite(V1, HIGH); // Turn off LED for Charging Pad 1 in Blynk
  vehicleDetected1 = true;
}
if (chargingPad1SwitchState  && vehicleDetected1) {
  chargingPad1Active = true;
  digitalWrite(chargingControlPin1, HIGH);
  Blynk.virtualWrite(V3, HIGH); // Set charging status for pad 1 to on
  lcd.setCursor(0, 0);
  lcd.print("PAD1 CHARGING.  ");
} else {
  chargingPad1Active = false;
  digitalWrite(chargingControlPin1, LOW);
  Blynk.virtualWrite(V3, LOW); // Set charging status for pad 1 to off
  lcd.setCursor(0, 0);
  lcd.print("PAD1 NOTCHARGING");
}

// Check for Charging Pad 2
if (digitalRead(irSensorPin2) == HIGH) {
  Blynk.virtualWrite(V2, LOW); // Turn on LED for Charging Pad 2 in Blynk
  vehicleDetected2 = false;
  Blynk.virtualWrite(V6, 0);
```

```
    lcd.setCursor(0, 1);
    lcd.print("PAD2 NOTCHARGING");
    chargingPad2SwitchState=0;
  } else {
    Blynk.virtualWrite(V2, HIGH); // Turn off LED for Charging Pad 2 in Blynk
    vehicleDetected2 = true;
  }

  if (chargingPad2SwitchState && vehicleDetected2) {
    chargingPad2Active = true;
    digitalWrite(chargingControlPin2, HIGH);
    Blynk.virtualWrite(V4, HIGH); // Set charging status for pad 2 to on
    lcd.setCursor(0, 1);
    lcd.print("PAD2 CHARGING.  ");
  } else {
    chargingPad2Active = false;
    digitalWrite(chargingControlPin2, LOW);
    Blynk.virtualWrite(V4, LOW); // Set charging status for pad 2 to off
    lcd.setCursor(0, 1);
    lcd.print("PAD2 NOTCHARGING");
  }
  delay(100); // Add a small delay to prevent excessive loop iterations
}
BLYNK_WRITE(V5) {
  chargingPad1SwitchState = param.asInt(); // Store the value of the virtual pin V5
}
BLYNK_WRITE(V6) {
  chargingPad2SwitchState = param.asInt(); // Store the value of the virtual pin V6
}
```

CHAPTER 9

TESTING

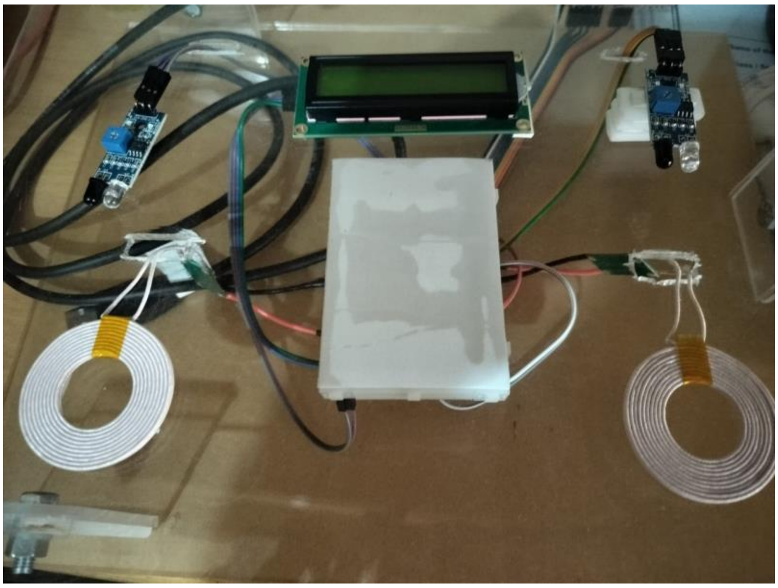


Fig 9.1 : Prototype

Fig 9.2 : Working Prototype

In our project, we conducted a series of tests to evaluate the functionality of our system. During the testing phase, we observed that the accuracy of the IR sensors was affected by various factors. The sensors were crucial for detecting the presence of vehicles at the charging pads.

Additionally, we implemented a feature where the current location of the vehicle was captured using the IR sensors and relayed to the ESP32 microcontroller. This data was then processed and sent to the Blynk app, which served as a control interface for the system. Through the Blynk app, users could monitor the vehicle's location and control the system's operation.

During the testing phase, the electromechanical components, including the IR sensors, wireless charging pads, and ESP32 microcontroller, were mounted onto the physical model. The system underwent rigorous testing to ensure its functionality and reliability.

CHAPTER 10

RESULT AND SNAPSHOTS

Introducing our Wireless EV Charging Station, reforming the way electric vehicle owners boot their rides. Our solution provides effortless and intelligent charging, seamlessly integrating into the daily usage of EV users.

Utilizing advanced infrared sensor technology, the charging process is triggered as soon as your vehicle is parked, ensuring a trouble-free experience from start to finish. But the benefit doesn't stop there. With our instinctive app, users have complete control over the charging process right at their fingertips. One can start or stop charging, check the status of vehicle's battery, or even schedule charging times.

Smart features incorporated into our charging station improves the charging process, ensuring that your vehicle receives the right amount of power without adjusting its battery life. Compatibility with a wide variety of EV models further enhances the ingenuity of our solution, serving the needs of various users in the electric vehicle community.

One can experience the future of charging with our innovative Wireless EV Charging Station. Favourable, systematic, and environment-friendly – it's the wise choice for the modern electric vehicle owner. Say farewell to cords, hurdles and hello to a new times of effortless, intelligent charging.

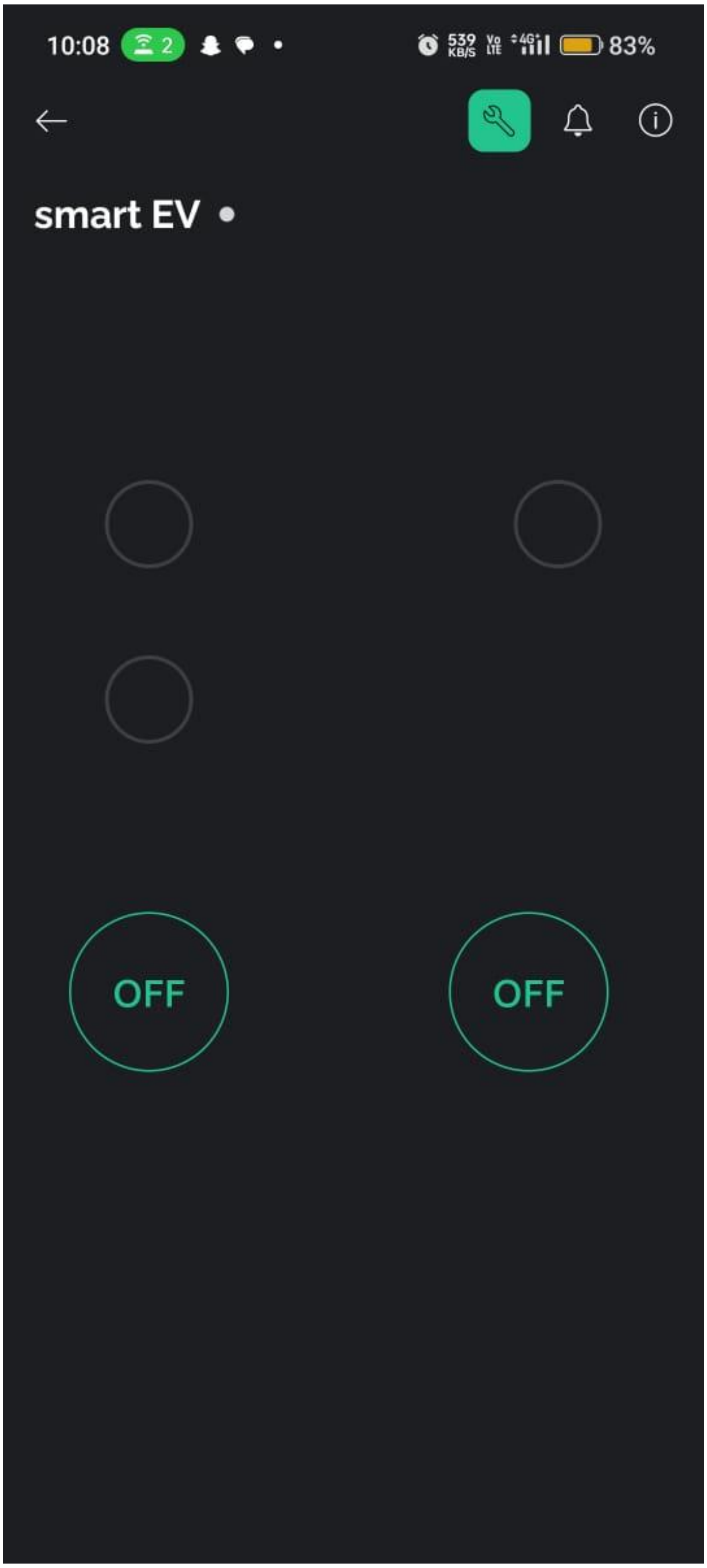


Fig 10.1 : Mobile Interface

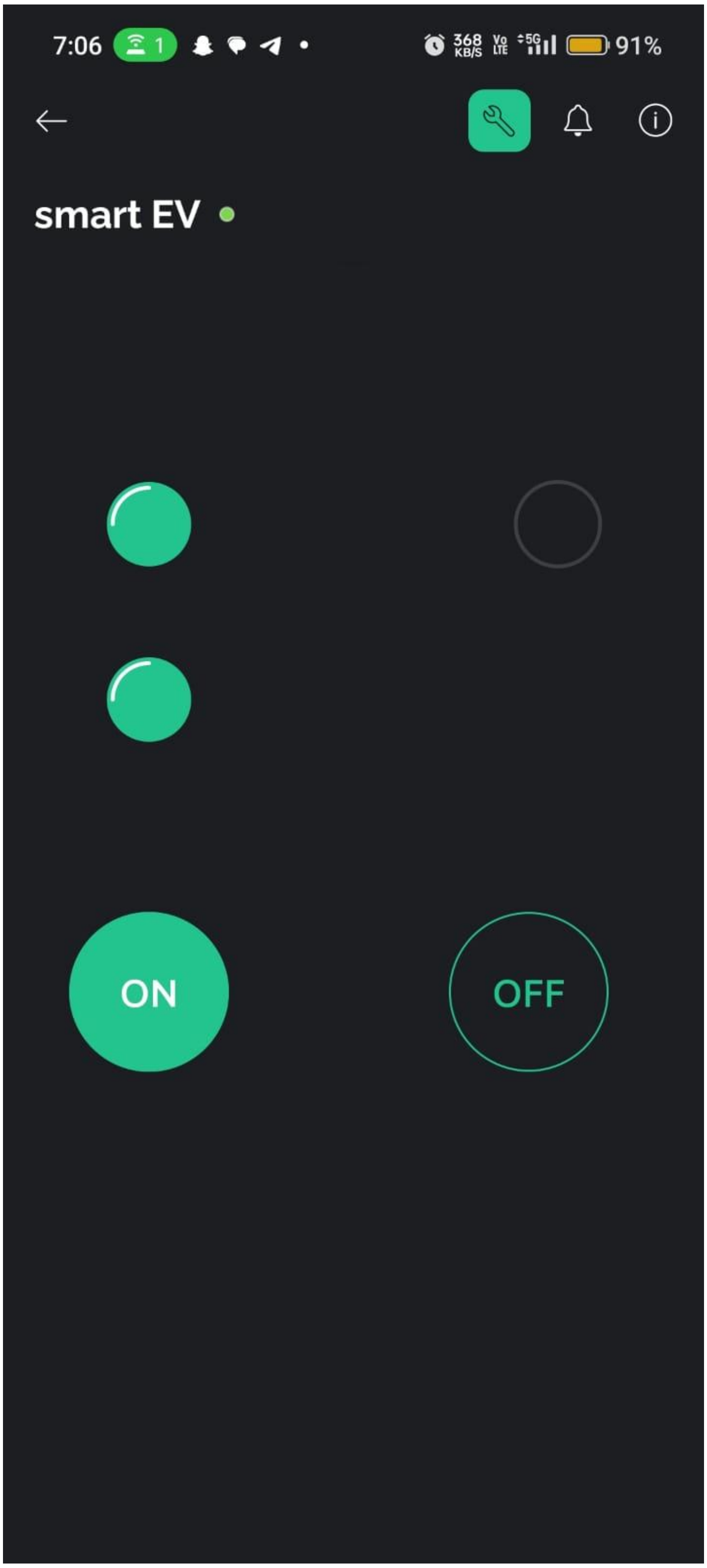


Fig 9.2 : Working Mobile Interface

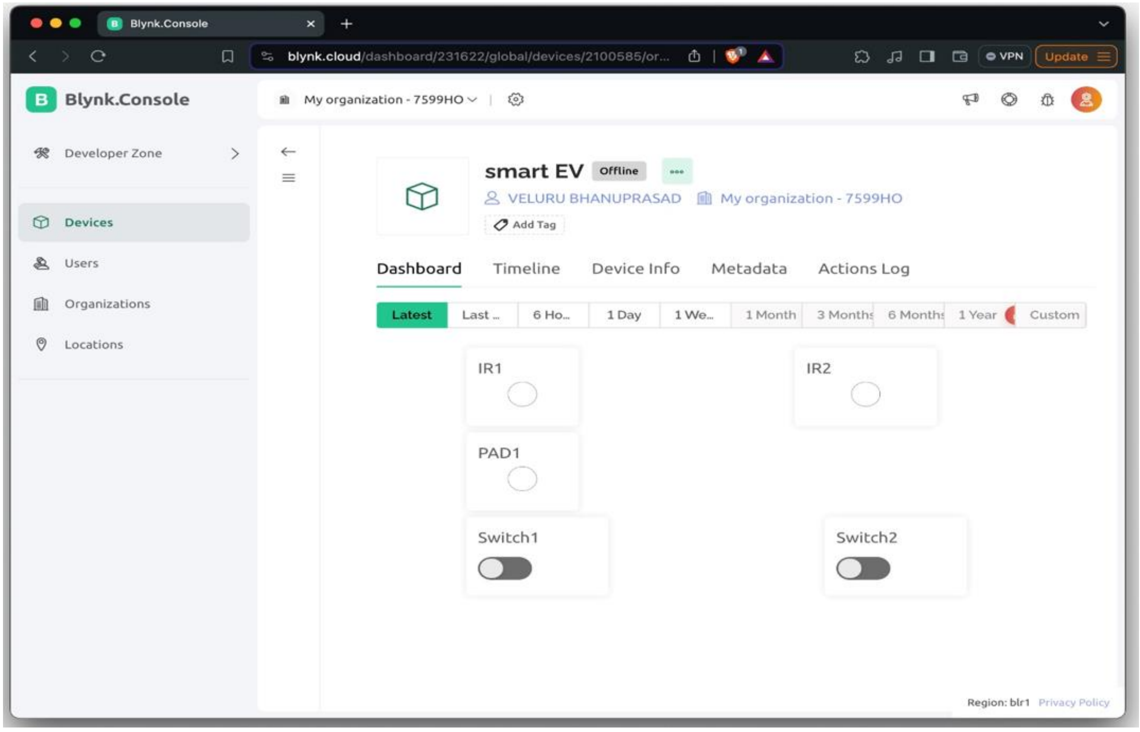


Fig 9.3: Laptop Interface

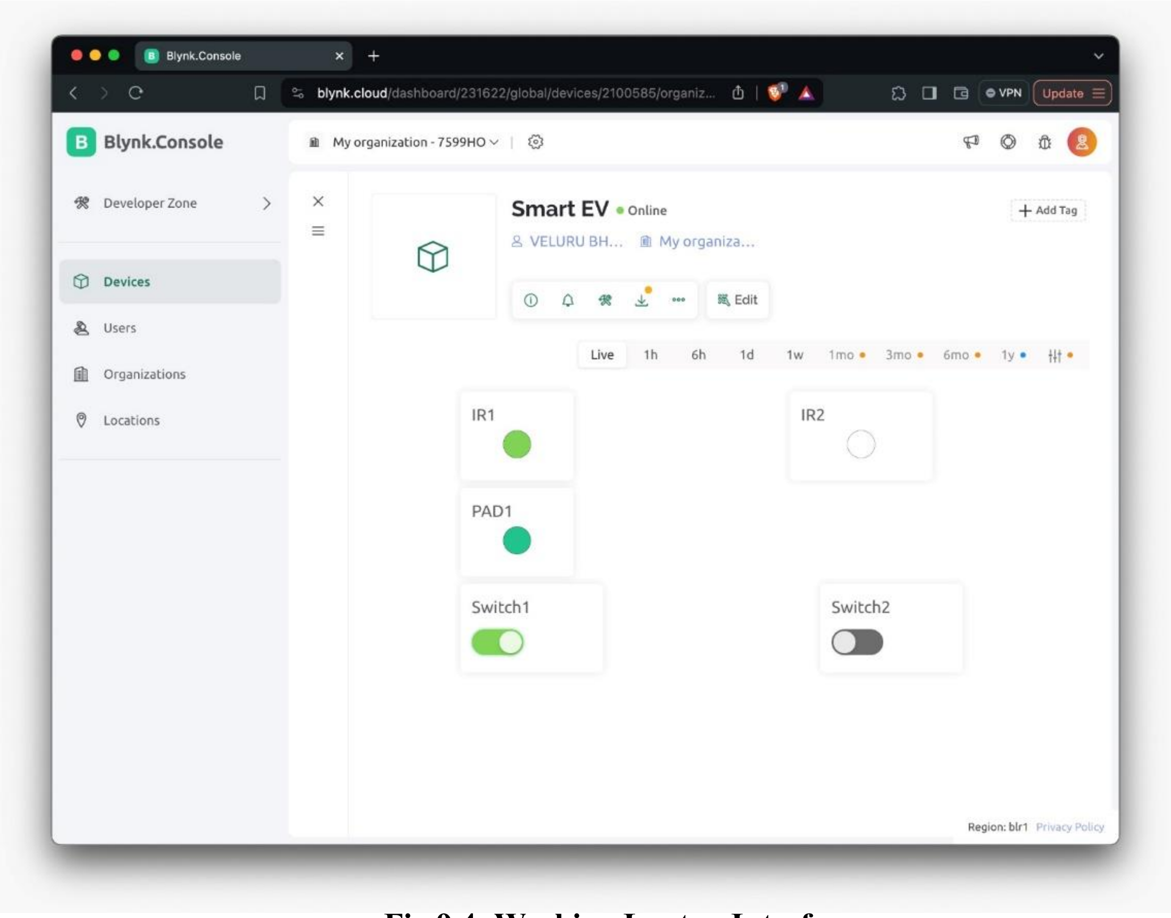


Fig 9.4: Working Laptop Interface

CHAPTER 11

APPLICATIONS

- **Remote Monitoring and Management:** The project allows users to remotely monitor and manage the EV charging station through a mobile app, providing real-time updates on charging status, vehicle presence, and control over the charging process from anywhere.

- **Public Charging Networks:**Ideal for public spaces, the Wireless EV Charging Station enhances public charging networks by providing a cable-free and user-friendly charging experience, contributing to the accessibility and adoption of electric vehicles.

- **Commercial EV Charging Infrastructure:**Businesses can deploy this technology to offer commercial EV charging services. The smart features, like wireless charging and IoT integration, enhance the charging experience for customers, contributing to sustainability initiatives and attracting environmentally conscious patrons.

- **Energy Management:**The project contributes to efficient energy management by optimising charging based on real-time vehicle presence. It allows for better utilisation of energy resources, reducing operational costs and promoting energy efficiency in EV charging.

- **Emergency Services:**For emergency services utilising electric vehicles, the ability to remotely monitor and control charging stations becomes crucial. This technology ensures reliable and prompt charging, contributing to the readiness and effectiveness of electric emergency vehicle fleets.

- **Energy Storage Integration:**The project can be integrated with energy storage systems, allowing for the efficient use of stored energy during demand and emergencies. This feature contributes to grid stability and resilience, providing an added layer of reliability to the EV charging infrastructure.

CHAPTER 12

CONCLUSION AND FUTURE WORK

12.1 Conclusion

Our Wireless EV Charging Station reforms the electric vehicle charging experience, offering easy and brilliant charging solutions. By flawlessly integrating with infrared sensors, the charging process launches automatically upon parking, removing the hassle of cables and providing users with exceptional convenience. Through our user-friendly app, users can remotely track and control the charging process, ensuring protected, efficiency, and compatibility with a wide variety of electric vehicle models. Furthermore, our dedication to sustainability is reflected in our incorporation with renewable energy sources, promoting environment-friendly use in transportation. With our inventive solution, users can experience appropritae, structured, and environmentally-conscious charging like never before.

12.2 Future Work

In terms of future work, our focus lies in several key areas. First and foremost, we want to improve the user experience by improving our app's user interface and making sure it stays fluid and easy to use. To further maximize effectiveness and convenience, we also intend to investigate cutting-edge smart features like dynamic price integration and predictive charging algorithms. Furthermore, maintaining our charging station's future-proofness depends on increasing its compatibility with new electric vehicle models and cutting-edge technologies. Scalability is also important since we want to make electric vehicle charging more accessible by deploying our charging stations in more public and private spaces. Finally, by funding research and development projects to investigate novel technologies and approaches, we will be able to continuously enhance the functionality, dependability, and sustainability of our wireless EV charging system.

CHAPTER 13

CONTRIBUTION TO SOCIETY AND ENVIRONMENT

The Wireless EV Charging Station with IoT Integration significantly contributes to both society and the environment by revolutionising the way we approach electric vehicle (EV) charging. The ease of use, remote monitoring capabilities, and integration with public spaces make EV ownership more practical and appealing to a broader demographic, ultimately contributing to a more sustainable and inclusive urban environment.

In terms of environmental impact, the project goes beyond the eliminating cables by incorporating energy-efficient features and smart power management. The Wireless smart EV Charging Station optimises energy usage, reducing the carbon wastes associated with EV charging. By leveraging IoT technology, the project enables real time control and monitoring, allowing for better alignment with renewable energy sources and grid demands. This supports the transition to a more sustainable and resilient energy infrastructure. In essence, the project serves as a catalyst for positive societal and environmental change, driving the advancement of clean and sustainable transportation practices.

REFERENCES

[1]"Charging Station of Electric Vehicle Based on IoT: A Review". Open Access Library Journal, 9: e8791. (2022)

[2]"IEEE TRANSACTIONS ON SMART GRID", VOL. 10, NO. 5, SEPTEMBER 2019

[3]"Smart EV Charging: A Global Review of Promising Practices". 18 November 2019

[4]"Smart electric vehicle charging system Conference Paper". July 2011

APPENDIX – 1

DrillBit

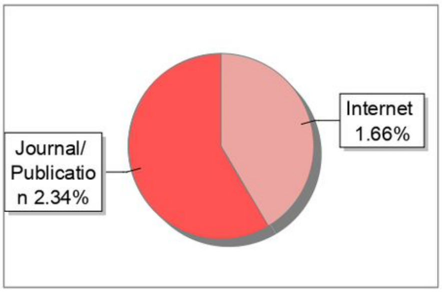
The Report is Generated by DrillBit Plagiarism Detection Software

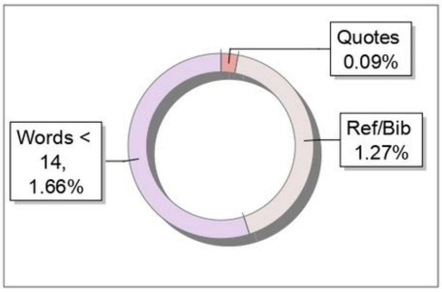
Submission Information

Author Name	Vadiraj R nadig
Title	EV SMART CHARGING STATION
Paper/Submission ID	1696338
Submitted by	supriyasuresh@kssem.edu.in
Submission Date	2024-04-25 14:03:41
Total Pages	28
Document type	Project Work

Result Information

Similarity **4 %**





Exclude Information

Quotes	Excluded
References/Bibliography	Excluded
Sources: Less than 14 Words %	Not Excluded
Excluded Source	0 %
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

A Unique QR Code use to View/Download/Share Pdf File

DrillBit

DrillBit Similarity Report

4	10	A	A-Satisfactory (0-10%) B-Upgrade (11-40%) C-Poor (41-60%) D-Unacceptable (61-100%)
SIMILARITY %	MATCHED SOURCES	GRADE	

LOCATION	MATCHED DOMAIN	%	SOURCE TYPE
1	sist.sathyabama.ac.in	1	Publication
2	www.einfochips.com	1	Internet Data
3	acs.pub.ro	<1	Publication
4	IEEE 2015 IEEE Petroleum and Chemical Industry Committee Conference by	<1	Publication
5	www.dx.doi.org	<1	Publication
6	gmatclub.com	<1	Internet Data
7	testbook.com	<1	Internet Data
8	International Survey on Bioenergy Knowledge, Perceptions, and Attitude by Pradipt-2012	<1	Publication
9	www.mdpi.com	<1	Internet Data
10	www.thomsonsautorepair.com	<1	Internet Data

DrillBit

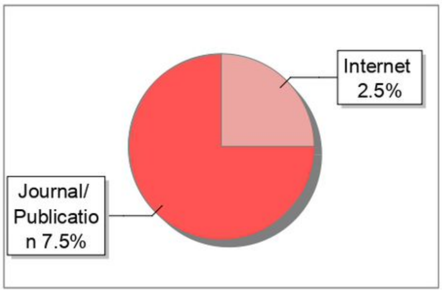
The Report is Generated by DrillBit Plagiarism Detection Software

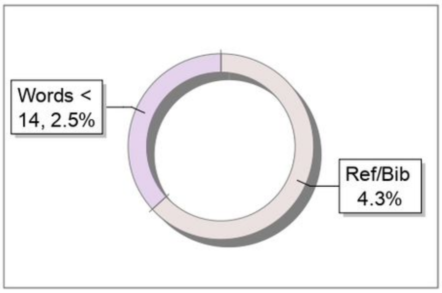
Submission Information

Author Name	Shruthi Manjunath
Title	EV SMART CHARGING STATION
Paper/Submission ID	1760021
Submitted by	supriyasuresh@kssem.edu.in
Submission Date	2024-05-07 10:27:43
Total Pages	4
Document type	Article

Result Information

Similarity **10 %**





Exclude Information

Quotes	Excluded
References/Bibliography	Excluded
Sources: Less than 14 Words %	Not Excluded
Excluded Source	**0 %**
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

A Unique QR Code use to View/Download/Share Pdf File

DrillBit

DrillBit Similarity Report

10	6	A	
SIMILARITY %	MATCHED SOURCES	GRADE	A-Satisfactory (0-10%) B-Upgrade (11-40%) C-Poor (41-60%) D-Unacceptable (61-100%)

LOCATION	MATCHED DOMAIN	%	SOURCE TYPE
1	sist.sathyabama.ac.in	4	Publication
2	isteonline.in	3	Publication
3	www.ipcc.ch	2	Publication
4	www.researchgate.net	1	Internet Data
5	eprints.undip.ac.id	1	Internet Data
6	news.utexas.edu	1	Internet Data

Journal of Emerging Technologies and Innovative Research

An International Open Access Journal Peer-reviewed, Refereed Journal

www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

N Deepashree

In recognition of the publication of the paper entitled

EV SMART CHARGING STATION

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 11 Issue 5 , May-2024 | Date of Publication: 2024-05-10

Parisa P
EDITOR

EDITOR IN CHIEF

ISSN 2349-5162

JETIR2405356 **Research Paper Weblink http://www.jetir.org/view?paper=JETIR2405356** **Registration ID : 539979**

An International Scholarly Open Access Journal, Peer-Reviewed, Refereed Journal Impact Factor Calculate by Google Scholar and Semantic Scholar | AI-Powered Research Tool, Multidisciplinary, Monthly, Multilanguage Journal Indexing in All Major Database & Metadata, Citation Generator

JETIR
Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of
Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)
Is hereby awarding this certificate to

Veluru Bhanuprasad

In recognition of the publication of the paper entitled

EV SMART CHARGING STATION

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 11 Issue 5 , May-2024 | Date of Publication: 2024-05-10

Parin P
EDITOR

EDITOR IN CHIEF

ISSN 2349-5162

JETIR2405356 **Research Paper Weblink http://www.jetir.org/view?paper=JETIR2405356** **Registration ID : 539979**

Journal of Emerging Technologies and Innovative Research

An International Open Access Journal Peer-reviewed, Refereed Journal

www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Shruthi M

In recognition of the publication of the paper entitled

EV SMART CHARGING STATION

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 11 Issue 5 , May-2024 | Date of Publication: 2024-05-10

Parin P

EDITOR

EDITOR IN CHIEF

ISSN 2349-5162

JETIR2405356 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2405356 Registration ID : 539979

An International Scholarly Open Access Journal, Peer-Reviewed, Refereed Journal Impact Factor Calculate by Google Scholar and Semantic Scholar | AI-Powered Research Tool, Multidisciplinary, Monthly, Multilanguage Journal Indexing in All Major Database & Metadata, Citation Generator

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of
Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)
Is hereby awarding this certificate to

Vadiraj R Nadig

In recognition of the publication of the paper entitled

EV SMART CHARGING STATION

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 11 Issue 5 , May-2024 | Date of Publication: 2024-05-10

EDITOR

EDITOR IN CHIEF

ISSN 2349-5162

JETIR2405356 **Research Paper Weblink http://www.jetir.org/view?paper=JETIR2405356** **Registration ID : 539979**

Journal of Emerging Technologies and Innovative Research

An International Open Access Journal Peer-reviewed, Refereed Journal

www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Vinay A

In recognition of the publication of the paper entitled

EV SMART CHARGING STATION

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 11 Issue 5 , May-2024 | Date of Publication: 2024-05-10

Parin P

EDITOR

EDITOR IN CHIEF

ISSN 2349-5162

JETIR2405356 **Research Paper Weblink http://www.jetir.org/view?paper=JETIR2405356** **Registration ID : 539979**


ATRIA INSTITUTE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
BENGALURU
Approved by AICTE New Delhi
Affiliated to VTU Belgavi
Recognized by Govt of Karnataka
Accredited by NAAC
Accredited by NBA
INSTITUTION'S INNOVATION COUNCIL
CERTIFICATE
- of Participation -
This is to certify that Mr/Ms Veluru Bhanuprasad, KS School of Engg & Management
Project Titled EV Smart Charging Station.
Has participated in STATE LEVEL PROJECT EXHIBITION- 2024 Organized by Dept. of Information Science & Engineering, Atria Institute of Technology, Bengaluru-24 on April 30th 2024.
Dr. Priti Mishra
Prof & Head
Dept of ISE,ATRIA IT.
Dr. Jyoti Metan &
Dr K S Ananda Kumar
Associate Prof,
Dept of ISE,ATIA IT.
Dr. Rajesha S
Principal,
ATRIA IT.


ATRIA INSTITUTE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
BENGALURU
Approved by AICTE New Delhi
Affiliated to VTU Belgavi
Recognized by Govt of Karnataka
Accredited by NAAC
Accredited by NBA
INSTITUTION'S INNOVATION COUNCIL
CERTIFICATE
- of Participation -
This is to certify that Mr/Ms Shruthi M, K.S. School of Engg & Management
Project Titled E.V Smart Charging Station.
Has participated in STATE LEVEL PROJECT EXHIBITION- 2024 Organized by Dept. of Information Science & Engineering, Atria Institute of Technology, Bengaluru-24 on April 30th 2024.
Dr. Priti Mishra
Prof & Head
Dept of ISE, ATRIA IT.
Dr. Jyoti Metan &
Dr K S Ananda Kumar
Associate Prof,
Dept of ISE, ATIA IT.
Dr. Rajesha S
Principal,
ATRIA IT.


ATRIA INSTITUTE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
BENGALURU
ATRIA INSTITUTE OF TECHNOLOGY
Approved by AICTE New Delhi
Affiliated to VTU Belgavi
Recognized by Govt of Karnataka
Accredited by NAAC
A++ NAAC
Accredited by NBA
INSTITUTION'S INNOVATION COUNCIL
CERTIFICATE
- of Participation -
This is to certify that Mr/Ms Vadiraj R Nadig, K.S. School of Engg & Management
Project Titled E.V Smart Charging Station.
Has participated in STATE LEVEL PROJECT EXHIBITION- 2024 Organized by Dept. of Information Science & Engineering, Atria Institute of Technology. Bengaluru-24 on April 30th 2024.
Dr. Priti Mishra
Prof & Head
Dept of ISE, ATRIA IT.
Dr. Jyoti Metan &
Dr K S Ananda Kumar
Associate Prof,
Dept of ISE, ATIA IT.
Dr. Rajesha S
Principal,
ATRIA IT.


ATRIA INSTITUTE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
BENGALURU
Approved by AICTE New Delhi
Affiliated to VTU Belgavi
Recognized by Govt of Karnataka
Accredited by NAAC
Accredited by NBA
INSTITUTION'S INNOVATION COUNCIL
CERTIFICATE
- of Participation -
This is to certify that Mr/Ms Vinay A, K S School of Engg & Management
Project Titled E V Smart Charging Station.
Has participated in STATE LEVEL PROJECT EXHIBITION- 2024 Organized by Dept. of Information Science & Engineering, Atria Institute of Technology. Bengaluru-24 on April 30th 2024.
Dr. Priti Mishra
Prof & Head
Dept of ISE,ATRIA IT.
Dr. Jyoti Metan &
Dr K S Ananda Kumar
Associate Prof,
Dept of ISE,ATIA IT.
Dr. Rajesha S
Principal,
ATRIA IT.

APPENDIX - 2

© 2024 JETIR May 2024, Volume 11, Issue 5 www.jetir.org (ISSN-2349-5162)

JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

EV SMART CHARGING STATION

[1]N Deepashree, [2]Shruthi M, [3]Vadiraj R Nadig, [4]Veluru Bhanuprasad
[5]Vinay A
[1]Assistant Professor, [2,3,4,5]Student
[1,2,3,4,5]Computer Science and Engineering,
[1,2,3,4,5]KS School Of Engineering And Management, Bangalore, India

Abstract : As electric vehicles become more popular, reliable charging stations are necessary. Integrating IoT technology into these stations improves capableness. IoT allows stations to communicate with each other, adjust charging rates based on real-time data, and identify high-demand areas. This optimizes energy use and planning maintenance. It also offers customized services and new business models for Electric Vehicle charging. Overall, Internet Of Things integration\ increases the dependability and efficiency of Electric Vehicle charging infrastructure, holding up the shift to maintainable transportation.

IndexTerms - **Wireless charging Pads, Infrared(IR)Sensors, Microcontroller(ESP32), Blynk IoT Platform.**

1.INTRODUCTION

Our wireless Electric Vehicle stations, coupled with IoT integration, epitomize the cutting edge of wireless technology. This innovative approach aims to change charging systems by integrating technology that ensures simplicity and reliability. At the heart of this initiative lies a wireless charging pad, eliminating the need for cumbersome cables and enabling contactless charging. These pads are integrated with IR sensors that detect vehicles on the charging pad. An ESP32-powered microcontroller serves as the controller of the charging station, overseeing input from the infrared sensors and managing the operation of the charging pad. Continues communication between the ESP32 and the Blynk IoT platform empowers users with remote monitoring and control capabilities. Beyond individual users, the project holds diverse potential applications, benefiting public toll booths in urban areas, private toll booths in residential neighbor's, and commercial establishments such as hotels or shops

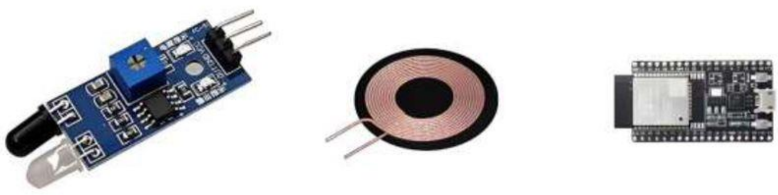


Fig 1: IR Sensor, Wireless Coil, ESP32 Microcontroller.

2.LITERATURE SURVEY

2.1 : Charging Station of Electric Vehicle Based on IoT: A Review

Currently, humans are grappling with the dual challenges of fuel scarcity and environmental pollution, necessitating a shift towards electric vehicles to mitigate both issues. However, the adoption of EVs remains hindered by the scarcity of charging infrastructure and their high initial costs. This paper examines significant research on IoT-enabled charging stations and the charging technologies employed therein, conducting an analysis between them. It also explores the energy sources powering these stations, which may vary from renewable to non-renewable. The integration of IoT technology streamlines the process for users, eliminating the search for charging stations manually. Through mobile app, users can get the locate charging stations, facilitating their placement in public areas and parking lots, thereby promoting the EV transition.

© 2024 JETIR May 2024, Volume 11, Issue 5 www.jetir.org (ISSN-2349-5162)

2.2 : Smart Electric Vehicle Charging System

This study introduces a system design aimed at facilitating procedures of charging EVs through intelligent processes. Recognising the limitations of the absence of smart meters and the power distribution network, the charging of EV needs to be balanced. This involves leveraging past experiences, weather data got by data mining, and simulation techniques. Additionally, a smart phone app has been designed to assist EV drivers in navigating these processes and facilitating information exchange. The proposed system incorporates Vehicle-to-Grid (V2G) technology to establish connections between Electric Vehicles and eco friendly sources with Smart Grids (SG). Furthermore, it explores the emerging concept of Electrical Markets, characterised by the deregulation of electricity production and consumption, with the aim to optimise the commercialization of electrical energy.

2.3 : Smart EV Charging: A Global Review of Promising Practices

The change to electric transportation across Europe marks the early stages of a transformative shift that holds the promise of significantly reducing emissions in both the transportation and energy sectors, with broader societal benefits. Research supporting this study indicates that the optimal integration of EVs into the power grid can yield the greatest value by aligning charging with the needs of system, while ensuring affordability and meeting consumers' mobility requirements. While much research focuses on modelling the costs of integration in various scenarios, there's a gap in examining existing successful practices driven by current policy tools. This study undertakes a qualitative review of policies for EV grid integration in both EU and U.S. markets.

2.4 : Joint Planning of Smart EV Charging Stations and DGs in Eco-Friendly Remote Hybrid Microgrids

A highly efficient planning algorithm designed for placement of smart electric vehicle charging stations in remote communities. The algorithm addresses the challenge of balancing the supply and demand of regular loads and EV charging by jointly allocating and sizing a set of distributed generators (DGs) alongside the EV charging stations. It aims to minimise both deployment and operation costs, and also reduction of emissions of greenhouse gas, while adhering to micro-grid technical constraints. This is accomplished through an iterative process involving a multi-objective mixed integer nonlinear program. In the outer sub-problem, a non-dominated sorting genetic algorithm is employed to determine the optimal locations and sizes of the DG units and charging stations. Subsequently, an inner sub-problem ensures the smart, reliable, and eco-friendly operation of the micro-grid by solving a nonlinear scheduling problem. The proposed algorithm yields a Pareto frontier that illustrates the tradeoff between the conflicting planning objectives. Simulation studies are conducted to evaluate the performance of the proposed planning algorithm and derive a compromise planning solution.

3. PROPOSED SYSTEM :

3.2. Problem Statement.

The focal point of the project is to tackle the demand for EV charging solutions that are efficient and user-friendly. Conventional charging stations typically come with unwieldy cables and offer limited user control. Our objective is to confront these issues by developing a Wireless EV Charging Station equipped with intelligent features. We aspire to eradicate the inconvenience associated with cables, elevate user convenience, and deliver a charging experience that is seamless.

3.2. High Level Design

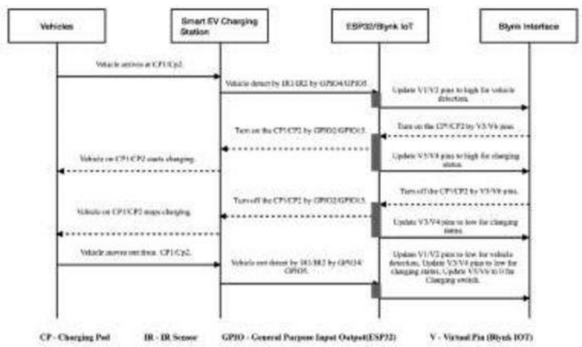


Fig 2: High Level Design.

4. RESULTS AND DISCUSSION :

The implementation of our wireless EV charging stations, coupled with IoT integration, marks a significant advancement in the field of electric vehicle technology. The integration of Lot represents the latest evolution in wireless charging, promising simplicity, reliability, and contactless convenience for users. The key features of our charging stations include wireless charging pads equipped

© 2024 JETIR May 2024, Volume 11, Issue 5 www.jetir.org (ISSN-2349-5162)

with IR sensors for intelligent vehicle detection and a microcontroller powered by ESP32, acting as the central nervous system for seamless operation. The integration with the Blynk IoT platform enables remote monitoring and control for users via the Blynk app. Users can conveniently check payment status, receive notifications, and manage payments from anywhere, enhancing the overall user experience.

5.CONCLUSION :

In conclusion, our wireless electric vehicle charging station project embodies a significant leap forward in the realm of sustainable transportation solutions. By integrating cutting-edge technology such as IoT and wireless charging pads with intelligent features like remote monitoring capabilities sensors and we have redefined the EV charging experience. The culmination of our efforts not only addresses the current demand for transportation solutions but also lays the groundwork for a more sustainable future. Our charging stations offer a range of benefits, including convenience, reliability, and environmental friendliness, making them an attractive option for individual users and various stakeholders such as public toll booths, residential areas, and commercial establishments. Moving forward, we remain committed to further enhancing the accessibility and usability of electric vehicles through continuous innovation and user-centric design. By providing advanced features like remote charging and centralized control systems, we aim to streamline the EV charging process and accelerate the transition to cleaner transportation alternatives. Ultimately, our project signifies a step towards a more sustainable and eco-friendly transportation ecosystem. With a focus on convenience, support, we are dedicated to empowering users and contributing to a greener future for transportation worldwide.

6.ACKNOWLEDGMENT

We are grateful to Mrs. N Deepashree, Assistant Professor, for serving as our project guide and for her capable leadership in making this project work a success

REFERENCES :

[1] "Charging Station of Electric Vehicle Based on IoT: A Review". Open Access Library Journal, 9: e8791. (2022)

[2] "IEEE TRANSACTIONS ON SMART GRID", VOL. 10, NO. 5, SEPTEMBER 2019.

[3] "Smart EV Charging: A Global Review of Promising Practices". 18 November 2019.

[4] "Smart electric vehicle charging system Conference Paper". July 2011