Mini Project report on

MOBILE CHARGING ON COIN INSERTION

Submitted by

ABDUL RIJAZ K R
AISWARYA JAYAKUMAR
ANOUSHKA K
JILHA

Focus on Excellence

Department of Electronics & Communication Engineering
FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY (FISAT)®
Angamaly-683577, Ernakulam

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Thiruvananthapuram-695016
Academic year 2023 - 2024

Mini Project report on

MOBILE CHARGING ON COIN INSERTION

Submitted by

ABDUL RIJAZ K R
AISWARYA JAYAKUMAR
ANOUSHKA K
JILHA

Focus on Excellence

Department of Electronics & Communication Engineering
FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY (FISAT)®
Angamaly-683577, Ernakulam

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Thiruvananthapuram-695016
Academic year 2023 - 2024

FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY (FISAT) ®

Mookkannoor(P.O), Angamaly-683577

Focus on Excellence

CERTIFICATE

This is to certify that the Mini project report titled **MOBILE CHARGING ON COIN INSERTION** submitted by **ABDUL RIJAZ K R, AIWARYA JAYAKUMAR, ANOUSHKA K , JILHA JOS**, towards partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology** in Electronics and Communication Engineering is a record of Bonafide work carried out by him/her during the academic year 2023-2024.

Project Guide

Head of the Department

Internal Examiner

External Examiner

Place: Mookkannoor
Date:

ACKNOWLEDGEMENT

We wish to extend our heartfelt gratitude to the Principal Dr. Jacob V Thomas, the Head of Department Dr. Krishnakumar S, our esteemed mentor, Ms. Manju C P, and the project coordinators Ms. Nisha and Mr. Benoy Abraham, Department of ECE for their invaluable support and guidance throughout the completion of the project.

It is with immense appreciation that we acknowledge the instrumental roles played by the Principal, Head of Department, our mentor and our project coordinators in making the project a reality. Your unwavering support has enriched our learning experience and prepared us for future challenges. We convey our gratitude for being integral parts of our academic and personal growth.

ABSTRACT

The aim of this project is to provide a solution for charging of mobile phone at public places. The person who wants to charge his mobile has to insert a coin and connect his mobile phone with the charger. Mobile phone will be charged for a particular time depending on the number of coins inserted by him. As soon as the Coin Sensor detects the coin it sends a pulse to the Microcontroller. The Microcontroller turns ON the relay (Electromechanical Switch) to provide 230V, 50Hz signal to the charging socket and the user can charge his mobile phone from the socket. The LCD (16×2) is used to display the time duration for which the user can charge his mobile phone. As the total time gets lapsed, the charging will be stopped.

LIST OF FIGURES

LIST OF TABLES

CONTENTS

Chapter 1

INTRODUCTION

In the age of digital innovation, the convergence of technology and convenience continues to redefine our everyday experiences. Introducing coin-based mobile charging, a revolutionary solution poised to reshape how we power our devices on the go. By seamlessly integrating the timeless concept of coin-operated machines with modern mobile charging capabilities, this innovative service offers unparalleled convenience and accessibility to users, ensuring they stay connected wherever they are.

This approach might be useful in areas where access to traditional charging outlets is limited, providing a convenient solution for users on the go. However, it's important to consider factors like security, maintenance, and user experience when implementing such systems.

Chapter 2

OBJECTIVE

In today's fast-paced world, where our smartphones serve as lifelines to work, entertainment, and communication, the convenience of keeping them powered up cannot be overstated. Traditional charging methods often tether us to stationary outlets or require carrying cumbersome charging cables, hindering our mobility and productivity. By introducing innovative solutions like coin-operated mobile charging, we aim to redefine convenience by offering a seamless and hassle-free way to recharge devices on the move. With this approach, users can easily top up their batteries wherever they are, freeing them from the constraints of traditional charging methods and enabling uninterrupted connectivity.

One of the primary challenges faced by many smartphone users is the lack of readily available charging facilities, especially in public spaces or during travel. This scarcity often leads to inconvenience and frustration, as users scramble to find suitable outlets or resort to carrying bulky power banks. Our project seeks to address this issue by enhancing accessibility to charging facilities through novel means such as coin-operated charging stations. By strategically placing these stations in high-traffic areas and public spaces, we aim to ensure that users have easy access to reliable charging options whenever and wherever they need them, thus empowering them to stay connected without interruptions.

In addition to convenience and accessibility, our project is also driven by a commitment to promoting sustainability and energy efficiency. Traditional charging methods often rely on grid electricity, which can contribute to environmental degradation and strain on energy resources. By leveraging innovative technologies and renewable energy sources, such as solar power or kinetic energy, our coin-operated charging stations aim to minimize environmental impact while maximizing efficiency.

At the heart of our project is a commitment to delivering an exceptional user experience that prioritizes simplicity, reliability, and convenience. From the intuitive design of our coin-operated charging stations to the seamless integration of payment options and real-time monitoring capabilities, every aspect of our solution is carefully crafted to enhance user satisfaction and engagement.

Chapter 3

LITRATURE RIVIEW

In this paper [1] proposed system represents an innovative approach to addressing the ubiquitous issue of mobile phone battery drain by offering users a streamlined and readily available charging solution. In today's fast-paced world, where reliance on smartphones is ever-increasing, the inconvenience of running out of battery power at critical moments is a common frustration. Whether it's during a commute, a busy day at work, or while traveling, the need for a convenient charging option is paramount. The Smart Charging Vending Machine emerges as a practical response to this need, leveraging solar power to ensure sustainability and accessibility. By operating on a coin-based system, users are empowered with a straightforward method to initiate the charging process, eliminating the complexities often associated with traditional charging methods. This user-friendly interface, coupled with the machine's ability to cater to diverse charging needs, positions it as a versatile solution capable of meeting the demands of modern lifestyles. From urban settings to remote areas, the Smart Charging Vending Machine offers a reliable and efficient way to keep mobile devices powered up, thereby enhancing productivity, connectivity, and overall user satisfaction.

This literature review of paper [2] delves into a solution aimed at alleviating the inconvenience associated with charging mobile phones with low battery levels while on the move, thereby obviating the need to return home or to the office for charging. The proposed methodology revolves around a self-supporting casing featuring a coin slot, a telephone storage compartment, and a telephone mounting holder equipped with a charging electrode. A crucial element of the design is a key locking system that secures the compartment door, alongside a quick charging circuit to facilitate efficient charging. Control mechanisms, activated by the key lock, govern the charging duration based on the amount of coins inserted. Additionally, the inclusion of a charging display lamp serves to notify others of the ongoing charging process. This proposed mobile phone charging solution offers the inherent advantages of a self-sustaining model through its coin-operated functionality, thereby ensuring convenient charging on the go for users. However, it also presents certain drawbacks, such as dependency on the availability of coins and the potential limitation of charging time.

The main aim of this research paper [3] is to provide charger based on the coin insertion. The System works according to the code that is written in the microcontroller (ATMEGA 328) where in the code is uploaded into the Arduino. The existing system have been elaborated by the help of the IR sensor which checks if the coin is valid or not. If it is valid, send signal to the Arduino and then Arduino starts the mobile charging mechanism providing 5v power supply section to the mobile phone. This in turn is provided to the LCD display for the time duration for being done and is provided as a display for the process. When the coin is detected, the 555 timer receives a pulse, which triggers the relay and allows the cell phone to be charged, the relay will activate, allowing us to use the 230v charger to charge our phone. This new manner of offering chargeable services to the general public is described in this research. For the convenience, coin-based mobile charging stations can be erected in public places which is pretty cheap and more convenient for long-distance passengers.

Most works are done through mobile phones on daily basis - so charging is the basic requirement to operate them. Therefore, the basic idea considered in this paper [4] is to develop a system that will provide charging on coin insertion. The main aim of this research is to provide charger that is determined from current supply. The system works according to coding written according to the code that is written in the microcontroller The microcontroller activates the driver for particular time as per coin inserted and it consists of transistors that act as a switch. When the coin is detected it sends a pulse to the 555 timer which turn ON the relay that will start providing charging to the socket to charge the mobile. The relay will ON to activate the 230V charger, here they uses charger to charge their mobile phone User has to plug the mobile phone simply into one of the adapters and insert the coin, the phone will then be given a micro-pulse for charging. This research is providing unique service to the rural public and other public places.

Chapter 4

BLOCK DIAGRAM

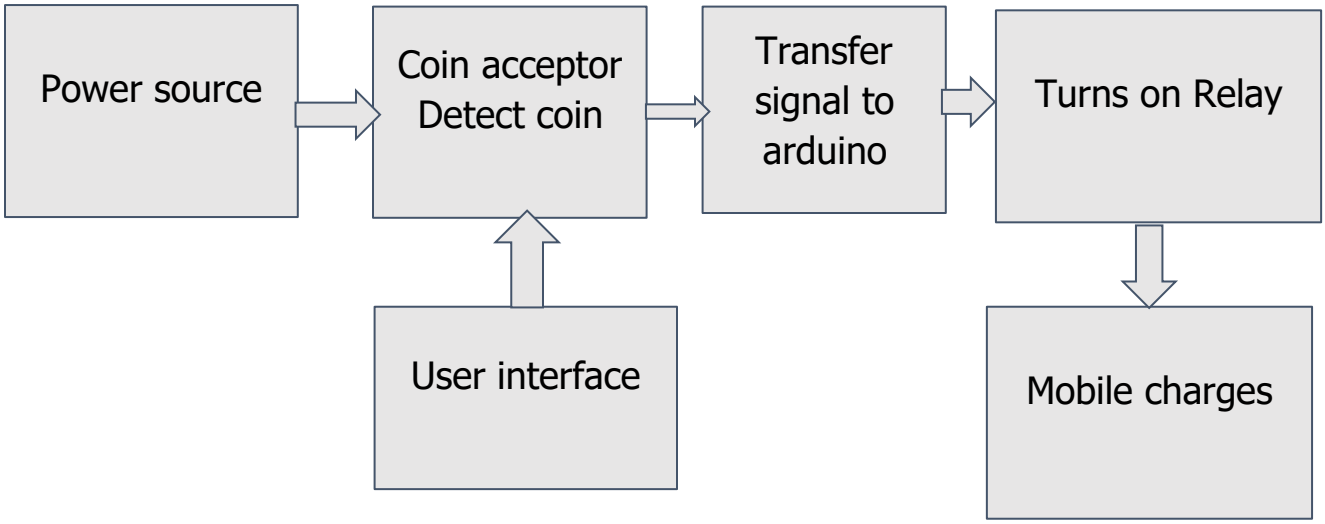

Figure 3.1

Coin based mobile charging system typically involves a system where user can insert coins to charge their mobile devices. On turning on the power source, the coin acceptor enables and it checks if the coin inserted is valid or not. On detecting a valid coin, a signal is being transmitted to the Arduino UNO, which in turn turns ON the relay module. This initiates the charging of the mobile phones. At the same instant, the LCD display is turned ON and it displays the left over charging time.

Chapter 5

COMPONENTS SPECIFICATION

MULTI-COIN-ACCEPTOR

The system of this product is multi-coin intelligent coinage system, which can set up to 9 different materials and sizes of coins. The thickness diameter and fall time of the coins are used by the sensors in this coin acceptor to identify them. Once the coins have been sampled, the serial output of the coin acceptor to find out value of each coin as it is inserted.

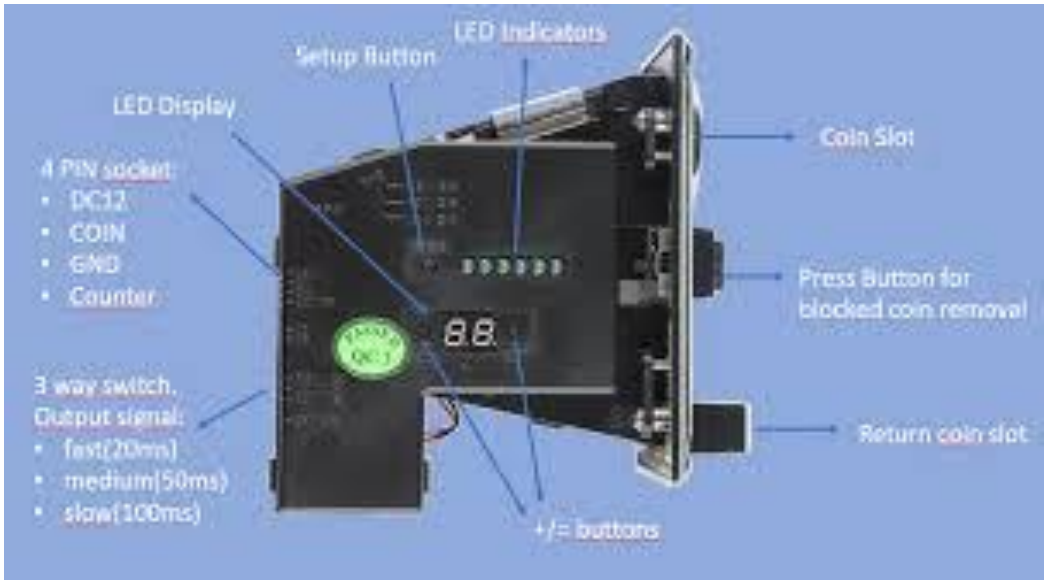

Figure 3.2

Figure 3.3

ARDUINO UNO

It is a open source microcontroller board based on the micro-chip ATmega 328 P microcontroller. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, and a reset button. It's widely used for prototyping and DIY electronics projects due to its simplicity and versatility.

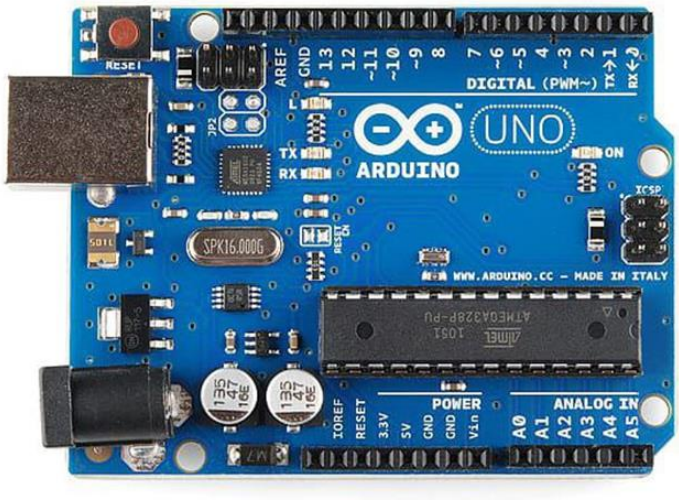

Figure 3.4

RELAY 12V

A 12V relay is an electromechanical switch that operates using a 12-volt power supply.
It consists of a coil that, when energized with 12 volts, generates a magnetic field, causing a movable armature to switch the relay contacts between open and closed positions.

Figure 3.5

16X2 LCD

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

Figure 3.6

I2C INTERFACE

The I2C (Inter-Integrated Circuit) interface is a synchronous, serial communication protocol used to connect multiple peripheral devices to a microcontroller or other master device.

Synchronous Communication: I2C is a synchronous protocol, meaning that data is transferred between devices in synchronization with a shared clock signal.

Master-Slave Architecture: In an I2C system, there is typically one master device (e.g., a microcontroller) that initiates communication and one or more slave devices (e.g., sensors, displays) that respond to commands from the master.

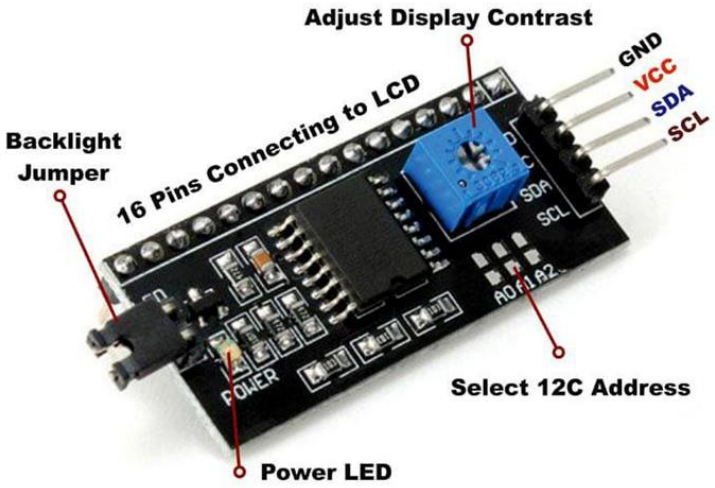
Adjust Display Contrast
GND
VCC
SDA
SCL
Backlight
Jumper
16 Pins Connecting to LCD
SDA
SCL
POWER
Select 12C Address
Power LED

Figure 3.7

Chapter 6

SOFTWARE SPECIFICATION

Arduino IDE

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. The Arduino Integrated Development Environment - or Arduino Software (IDE) - connects to the Arduino boards to upload programs and communicate with them.

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension.ino

Figure 3.8

Chapter 7

RESULT

The coin acceptor was trained and pulses were given for 5 coins (2 sizes of 1 rupee coin , 2 rupee coin , 5 rupee coin and 10 rupee coin). Once the coin is inserted it detects if the coin is valid or not. If the inserted coin is found to be valid, a signal passed to Arduino UNO which in turn enables the relay module. On enabling the relay module the charging process initiates thereby charging the connected mobile phone. At the same time, LCD module turns on and displays the remaining time left for the completion of charging of mobile phone.

Figure 7.1
Image shows the insertion of sampled coin into the coin acceptor
also displaying the count for the same.

Figure 7.2
Image shows enabling of the relay module by the validation of coin inserted

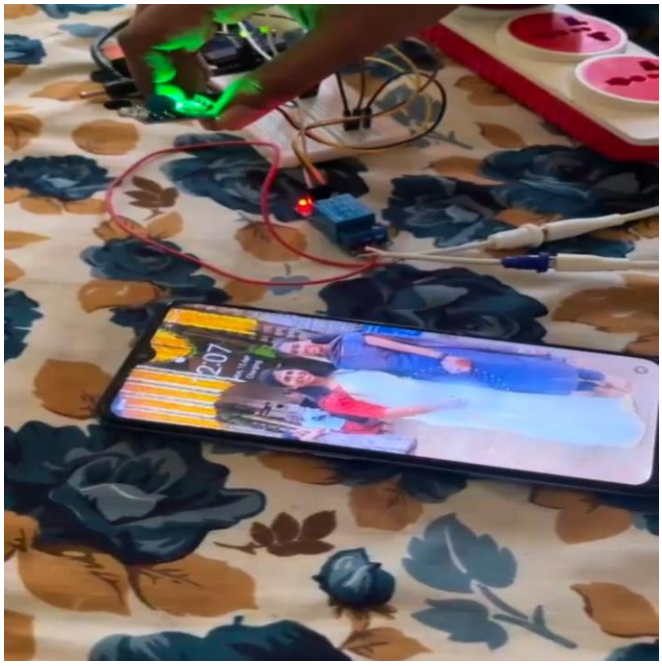

Figure 7.3
Image shows the charging of the connected mobile phone after the relay module has been enabled

Chapter 8

COST ESTIMATION

Table 8.1

COMPONENTS	COST
Arduino UNO	**600**
Coin acceptor	**1400**
Relay module	**119**
Lcd display	**200**
I2c	**50**
Cable	**150**
Power adapter	**250**
Total cost	**2769**

Chapter 9

APPLICATION

- Accessibility: Provides charging services in public places, bridging the gap where traditional outlets may be unavailable.
- Convenience: Enables users to swiftly charge their devices sans the need for personal chargers or the hassle of finding open outlets.
- Revenue Generation: Offers businesses an opportunity to boost earnings by implementing a fee-based charging service.
- Cost Recovery: Allows for the recuperation of initial setup costs over time through collected fees.
- Security: Mitigates the risk of theft or damage to personal chargers by providing a secure connection while users attend to other tasks.
- Flexibility: Empowers users to customize charging durations based on the amount of coins inserted, catering to individual needs and preferences.

Chapter 10

CONCLUSION

In conclusion, the coin-inserted mobile charging system presents a convenient and efficient solution for charging mobile devices in public spaces. By integrating coin-operated mechanisms, it offers users a straightforward method to access charging services while providing a potential revenue stream for businesses. With its user-friendly interface and accessibility, this system has the potential to enhance customer satisfaction and generate additional income. As mobile devices continue to be essential in everyday life, implementing such a system can address the growing need for convenient charging solutions in various environments.

Chapter 11

REFERENCE

[1]Nafisa Mapari and Ansari Taiba and Shaikh Azima, "*Smart Charging Vending Machine*", IEEE trans Industrial Elecronics, vol. 54 no 3, pp June 2018

[2] Katsuhiro Inoue, "*Charging power vending machine for mobile phones*", IEEE trans Communication, vol. 6 no 4, pp September 2019

[3] Dr.Jaffer Sadiq and Kasarla Deepika, "*Coin Based Mobile Charger*", IEEE trans power, vol. 10 no 5, pp August 2018

[4] Shaikh Aliza and MominTauseef, "*Mobile Charging Based On Coin Insertion",* IEEE trans power vol. 11 no 5, pp June 2019