

Mobile Charging on Coin Insertion

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Abstract—Mobile phones have become an important part of daily life for communication and other purpose. Keeping mobile charged has become an most important need in todays life as them uses increased. This project presents a coin-based mobile charger system that allows users to charge their phones by inserting a coin. When a coin is inserted, then system provides power to the mobile for a specific period through suitable universal adapter for all mobile phones. Coin sensing is done by using sensor that is infrared or LDR sensors. This system can be uses or installed in public places like railway stations, bus stops, shopping malls, and hospitals it help to people charge their mobile phones when they can needed. The project aims to create a easy and economical key or solution for public mobile charging.

Index Terms—Arduino UNO, Coin receiver, Mobile phone, LCD display, SMPS, Relay

I. INTRODUCTION

In today's life, mobile phones are very necessary in today's life for communication, knowledge, messages and immediate needs. However, battery short coming usually leave users searching for a best way to recharge their devices, Mostly when travelling or spending time in public spaces like stations, hospitals, or shopping centers. Coin-based mobile charging systems offer a practical solution by allowing people to charge their phones for a limited time after inserting a coin, making it good way and economical to availability electricity in places where regular charging plug point are unavailable or exit.

These systems usually use simple electronics to verify coins, time management, and show status on displays or pointers. They are usually helpful in areas where power needs to be

limited, payment must be managed, or charging must be controlled or managed for safety causes.

The increase in need for public charging stations has motivated creative in coin-operated designs, including

functions such as microcontroller-based timing mechanisms, safe power regulation, and even solar-powered modules for conservation or eco-friendliness. This mixture of low cost, ease of use, and dependable result creates coin-based mobile charging systems an impressive best option for village or rural places, transfer points, and easy-to-use for company or businesses.

With additional improvement, such systems can combined digital payment methods, support multiple device types, and implement sefety details to control improper use, making them

even more adaptable and easy to use for the population rise of mobile users.

II. LITERATURE SURVEY

Delivered a coin-based mobile charging system focusing on coin detection using a support-type sensor[1]. This sensor measured the weight of a 5-rupee coin and generated a digital signal for the ADC, helping the controller determine whether the coin was real or fake. Their system also used solar energy to charge mobile batteries, switching to network power when solar energy was unavailable.

Proposed a coin-based mobile charger with solar detecting[2]. Their design highlighted solar tracking through Light Dependent

The coin-based mobile charging system works as follows:

- The user inserts a coin into the coin box. Resistors (LDRs). When sunlight power
 - The coin sensor senses the actual changed, LDR resistance various, and this input was handled by the manager. Based on the algorithm, the motor adapted the solar panel's way to increase sunlight soaking.
- features of the coin, such as size and company, to verify it.

- If the coin is acceptable, the sensor sends a signal to the microcontroller, starting the relay module. Fixed on developing battery charging control
 - The relay module enables the power using a solar charge controller[3]. The system stopped batteries from charging too much and safe them from reverse current flow during the night, thus expanding battery life and performance.
- Developed a detecting solution to verify maximum sunlight obtain throughout the supply to the charging adapter, supplying a regulated voltage (usually 5V DC) to the mobile phone for charging.
- The microcontroller runs a countdown timer to control the charging duration based on the inserted coin value.
 - The LCD display shows useful day[4]. Since the sun's direction changes from east to west, this system instantly adjusted the solar panel's direction to best energy capability,

III. MATERIALS & METHODOLOGY

3.1 Table List of Material

NO	Material Name
1	Microcontoller (e.g. Uno Arduino)
2	Coin Sensor (IR Sensor or Coin Acceptor Module)
3	LCD Display (16*2)
4	Power Supply
5	Relay Module
6	Mobile Charging Adapter/Socket
7	Buzzer (optional)
8	Buttons/Keypad (optional)

3.2 Methodology:

The coin-based mobile charging system works as follows:

- If the user inserts additional coins during charging, the microcontroller adds the corresponding charging time.
- After the timer runs out, the relay switches off, stopping the charging, and the system resets for the next user.

- Optional components like buzzers provide audio feedback, and solar panels can maintain power for the system in power-limited settings.

This design make certain controlled and paid mobile charging, useful in places like railway stations, shopping centers,

A. Flowchart

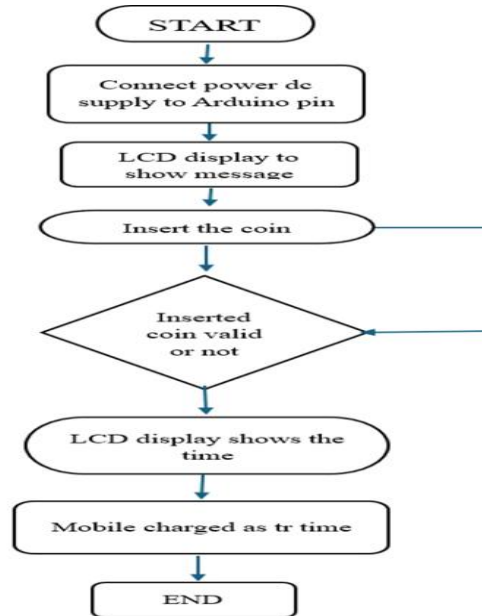


Fig. 1 Flowchart

In this flow chart we shows the flow of the mobile charging on coin insertion. Firt we can connect the power supply on the Arduino pin. Then show the message on LCD board. The message is insert coin to start charging. We use the IR sensor in coin box. Transmitter and receiver it is part of IR sensor. They sence the coin. Transmitter can transmitter the signal and receiver receive the signal in the coin box. When receiver receive the coin then command goes to microcontroller. MOSFET starts through the microcontroller. MOSFET is connected to the charger module. Charger module use for the mobile charging connection. Then we connect the mobile as per the set time period. Time period shows on LCD display. When time period goes to the zero then mobile charging can goes to discharge.

This flowchart shows how a coin based charger works from starting the device showing instructions on the LCD, accepting a coin, verifying it, providing charging time, is over.

IV. ARTICLE REVIEW TABLE

4.1 List of Articles

Author(s)	Title	Journal/Sourc e	Year	Key Features	Highlights
[1] Shaikh Mohd Shakeeb et al.	"Mobile Charging Station based on Coin Insertion System"	IRJET	2021	Uses ATmega328P microcontroller, coin acceptor for INR 5 and INR 10	System charges mobile phones at public places, sensor detects coins, LCD displays charge status
[2] Rinu Jose et al.	"Mobile Charging Using Coin Insertion"	IJSRSET	2018	Coin sensor Detects valid coins, microcontroller controls charging, recharge timer	Suitable for public locations like railway stations, uses coin recognition and relay to activate charging
[3] Shaikh Aliza et al.	"Mobile Charging Based on Coin Insertion"	JETIR	2019	Recognizes valid coins, supplies power to mobile device, supports public places	Coin recognition with relay control, designed for airports, railway stations, malls
[4] Rutuja Deshmukh et al.	"Mobile Charging by Using Coin Insertion Module and Renewable Resource"	IRJET	2019	Coin recognition (thickness, diameter), solar energy integration, reverse countdown timer	Combines renewable energy, good for public places, Coin detection and solar energy utilization
[5] Neuro Quantology	"Mobile Charging By Using Coin Insertion Module And ..."	Neuro Quantology	2022	Coin sensor Detects valid coins based on physical parameters, microcontroller controls charging and timer	Incorporates renewable energy, suitable for emergency and public charging stations

a. MERITS

- **Cost effective and Easy to use:** These systems make available low-cost charging choice point in public places like malls, airports, and railway stations, making mobile charging easy usable to everyone, specially during emergencies or during traveling.
- **Easy to use:** The coin insertion system is simple to use and does not need difficult technology or pre setup, enabling yet non-technical users to charge their devices easily.
- **Cost-as-per-use:** Operator pay only for the specific charging time they need by inserting coins, making it a cost- effective and controlled usage system.
- **Safe Charging:** Some systems combine locking sections secured by microcontroller-operated locks, securing the safety of mobiles while charging in public station.
- **Power-saving:** Combination with renewable energy sources like solar panels in some designs advance responsible and eco-friendly charging, maximizing energy use

specially in open areas.

- **Easy Maintenance and Flexibility:** Flexible design using microcontrollers and common components leads to easy maintenance and scope for growing up the number of charging slots.
- **Business Opportunity:** The system can be deployed profitably to generate income in public places and educational institutions through charging fees and advertisements.
- **Flexible integration:** Most systems use standard USB outputs and support charging a wide range of mobile devices, making them adaptable for different users[4]

b. Demerits

- **Limited Charging Time:** Charging duration is strictly controlled by the amount of coins inserted, which means users cannot charge their device beyond the prepaid time limit. This may not be sufficient for full charging if batteries are critically low.
- **Dependency on Coin Availability:** Users must have the correct coins to use the service, which

could be inconvenient compared to free charging alternatives or power banks.

- **Security and Accessibility Issues:** The physical setup requires secure locations to avoid theft or damage, but still carries the risk of users worrying about phone safety while charging in public spots.
- **Operational Constraints:** The system relies on sensors and microcontrollers that must correctly recognize coins, and failure in detection might lead to user frustration and machine downtime.
- **Emergency Limitations:** In urgent need cases, the system is helpful but limited by coin insertion and charging time, which might be insufficient for critical battery needs on long trips or unforeseen situations.
- **Limited Payment Modes:** Most coin-based systems accept only physical coins or specific denominations, lacking integration with modern digital payment methods.
- **Operational Failures:** Sensors and microcontrollers may occasionally fail to detect or validate coins correctly, causing user frustration and downtime.
- **Security Concerns:** Phones left unattended in public charging kiosks might be vulnerable to theft or damage, despite some designs adding locking compartments.[4,6]

V. FUTURE SCOPE

The future scope of mobile charging on coin insertion includes several promising directions. This system can be expanded for widespread use in public places such as railway stations, bus stands, commercial complexes, colleges, and offices, providing an affordable and accessible charging solution for people on the go. Integration with renewable energy sources, particularly solar power, is a key advancement, improving sustainability by utilizing solar tracking subsystems to maximize energy conversion even in areas with unreliable grid power.

VI. CONCLUSION

The conclusion on mobile charging via coin insertion is that it provides a practical, economical, and accessible solution for charging mobile devices, especially in public places and emergency situations

where conventional charging options may be unavailable or limited. The system enables users to pay only for the charging time they need, offering a secure and controlled charging environment. It is particularly useful in locations like railway stations, bus stops, educational institutions, and offices by addressing the common issue of low battery during travel or daily activities.

Despite some limitations, such as dependency on coin availability, restricted charging duration, and potential security concerns, the coin insertion charging system is a valuable alternative to conventional charging methods when portability, convenience, and cost-effectiveness are priorities. Its integration with renewable energy sources like solar power further enhances sustainability and operational efficiency, making it a viable public charging solution. Overall, this system fosters greater accessibility to mobile charging in areas with limited electrical infrastructure while providing ease of use and user control over charging time.

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