IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.066 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 11, Issue 5, May 2024

DOI: 10.17148/IARJSET.2024.11592

Portable coin/smartcard driven chargers for electronics devices

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Abstract: In today's rapidly advancing technological landscape, the ubiquitous presence of mobile devices has become a defining characteristic of modern society. From smartphones to tablets, laptops to wearable gadgets, these devices have seamlessly integrated into both personal and professional spheres, driving the need for efficient and accessible charging solutions. Traditional reliance on fixed charging stations or wall outlets often proves inconvenient, particularly in public spaces, outdoor events, or during travel where access to power sources may be limited. Moreover, the rise of smart technologies and cashless transactions has spurred the exploration of innovative charging solutions that cater to evolving preferences and requirements.

In response to these challenges, the Coin and Smart Card-Based Mobile Charging System emerges as a pioneering endeavor ,leveraging microcontroller technology, sensor systems, and RFID authentication to revolutionize the way electronic devices are powered. This abstract provides a comprehensive overview of the system's objectives, significance, and anticipated contributions to the realm of mobile charging technology.

I. INTRODUCTION

The proliferation of mobile devices in today's technologically driven world has fundamentally transformed the way we live, work, and interact with the world around us. From smartphones that keep us connected to the internet and each other, to tablets and laptops that enable productivity on the go, to wearable gadgets that monitor our health and fitness, these devices have become indispensable tools in our daily lives. However, as our dependency on these devices continues to escalate, so too does the need for efficient and accessible charging solutions.

Traditional methods of charging, such as fixed charging stations or wall outlets, often fall short in meeting the demands of today's mobile lifestyle. In public spaces, outdoor events, or during travel, access to power sources may be limited or non-existent, posing a significant inconvenience to users. Moreover, the advent of smart technologies and cashless transactions has ushered in a new era of convenience and accessibility, prompting the exploration of innovative charging solutions that align with these evolving preferences and requirements.

In response to these challenges, the Coin and Smart Card-Based Mobile Charging System emerges as a pioneering endeavor aimed at revolutionizing the way electronic devices are powered. By harnessing the power of microcontroller technology, sensor systems, and RFID authentication, this project seeks to offer a versatile and user-friendly alternative to traditional charging methods. The integration of coin-operated and RFID-enabled functionalities not only facilitates seamless payment and user authentication but also ensures compatibility with diverse user preferences and technological ecosystems

Through this introduction, we aim to provide a comprehensive overview of the Coin and Smart Card-Based Mobile Charging System, outlining its objectives, significance, and anticipated contributions to the realm of mobile charging technology. Subsequent sections will delve deeper into the system's functionalities, implementation, and potential applications, offering readers a thorough understanding of its innovative capabilities and potential impact.

II. PROBLEMSTATEMENT

In response to these challenges, the Coin and Smart Card-Based Mobile Charging System emerges as a pioneering endeavor aimed at revolutionizing the way electronic devices are powered. By harnessing the power of microcontroller technology, sensor systems, and RFID authentication, this project seeks to offer a versatile and user-friendly alternative to traditional charging methods. The integration of coin-operated and RFID-enabled functionalities not only facilitates seamless payment and user authentication but also ensures compatibility with diverse user preferences and technological ecosystems.

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Figure 1

Figure 2

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Figure 3

III. OBJECTIVES

- To develop a user-friendly charging system accessible via coins and RFID cards.
- To enable charging for various electronic devices such as mobile phones, earphones, and laptops.
- To incorporate a coin box sensor and RFID card reader for payment and authentication
- To implement a relay mechanism for controlling power output
- To display charging duration information on an LCD screen for user convenience.

IV. METHODOLOGY

1. Literature Review:

- Conduct a comprehensive review of existing literature on mobile charging infrastructure, including academic papers, industry reports, and case studies.
- Analyze the strengths and limitations of traditional charging methods, as well as emerging trends and technologies in mobile charging.
- diverse demographics and usage scenarios to participate in usability testing sessions.Observe participants

2.NeedsAssessment:

- Survey users to identify their preferences, challenges, and pain points regarding mobile charging.
- Conduct interviews with stakeholders, including charging station operators, facility managers, and technology providers, to gather insights into current practices and requirements.

3. System Design:

- Develop a conceptual design for the Coin and Smart Card-Based Mobile Charging System, outlining its key features, components, and functionalities.
- Collaborate with engineers and designers to create detailed schematics, prototypes, and mockups of the proposed system.

4. Technical Implementation:

- Select appropriate hardware components, including microcontrollers, sensors, RFID readers, and charging stations, based on the system design.
- Program the microcontrollers and RFID authentication system to enable seamless payment and user authentication.
- Integrate the hardware and software components to create a functional prototype of the proposed system.

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5. Comparative Analysis:

- Deploy the Coin and Smart Card-Based Mobile Charging System in real-world settings, alongside traditional charging stations.
- Collect data on user satisfaction, charging efficiency, reliability, and accessibility for both systems.
- Compare the performance and user experience of the proposed system with traditional charging methods, using quantitative and qualitative metrics.

6. Technical Evaluation:

- Conduct technical assessments of the proposed system, including reliability testing, scalability analysis, and security evaluations.
- Measure the system's power efficiency, charging speed, and compatibility with different devices and charging protocols.
- Identify potential technical challenges and opportunities for optimization and enhancement.

7. Deployment and Pilot Testing:

- Collaborate with partners and stakeholders to deploy the Coin and Smart Card-Based Mobile Charging System in pilot locations, such as airports, shopping malls, and public parks.
- Monitor system performance and user feedback during the pilot phase, making adjustments and improvements as needed.
- Evaluate the feasibility and scalability of wider deployment based on pilot testing results.

8. Stakeholder Engagement:

- Engage with stakeholders, including government agencies, businesses, and technology providers, to promote awareness and adoption of the proposed system.
- Host workshops, demonstrations, and presentations to showcase the benefits and capabilities of the Coin and Smart Card-Based Mobile Charging System.
- Solicit feedback and input from stakeholders to inform future iterations and enhancements of the system.

9. Documentation and Reporting:

- Document the entire research process, including methodologies, findings, and recommendations.
- Prepare reports, presentations, and academic publications to disseminate research findings to relevant stakeholders and the broader academic community.
- Share lessons learned and best practices to inform future research and development efforts in mobile charging technology.

10. Usability Testing:

- Recruit participants representing diverse demographics and usage scenarios to participate in usability testing sessions.
- Observe participants as they interact with the prototype, recording feedback, observations, and suggestions for improvement.
- Analyze usability testing data to identify usability issues, user preferences, and areas for refinement.

V. COMPONENTS USED

- Arduino microcontroller (Arduino Uno/Nano)
- Coin box sensor
- RFID card reader
- Relay module
- LCD screen (16x2 or similar)
- Power supply
- Electronic components (wires, resistors, etc.)
- Mobile charging cables (USB)

VI. SYSTEM ARCHITECTURE

The system architecture consists of the following main components:

- Coin Box Sensor: Detects the insertion of coins and triggers the charging process.

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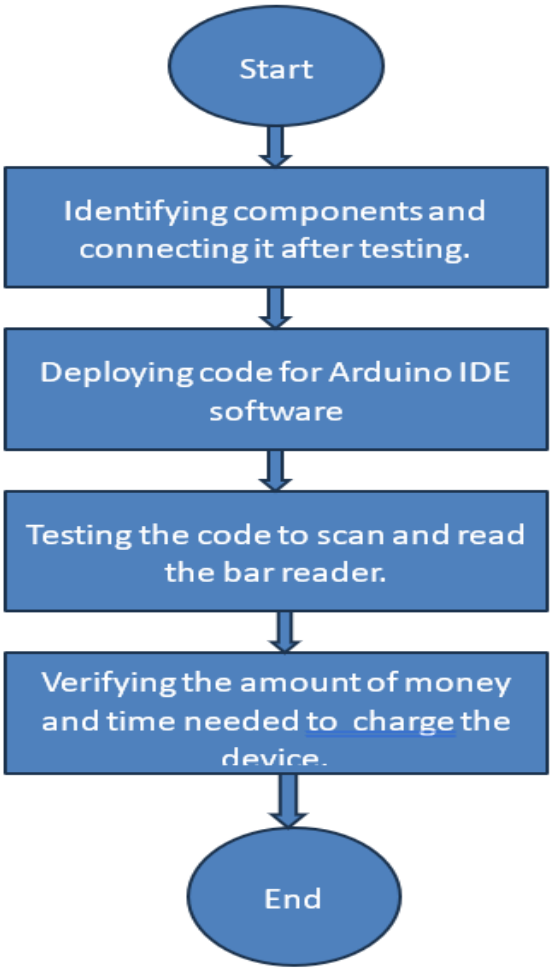
- RFID Card Reader: Authenticates users via RFID cards and initiates charging.
- Arduino Microcontroller: Controls the overall operation of the system, including coin and card detection, relay activation, and LCD display.
- Relay Module: Controls the power output to the charging port based on user authentication.
- LCD Screen: Displays relevant information such as charging duration and user instructions.

VII. WORKING PRINCIPLE

1. Coin Detection: When a coin is inserted into the coin box sensor, it sends a signal to the Arduino microcontroller.
2. RFID Authentication: Users can also authenticate themselves using RFID cards by tapping them on the RFID card reader. The reader sends authentication data to the Arduino.
3. Relay Activation: Upon successful coin detection or RFID authentication, the Arduino triggers the relay to supply power to the charging port.
4. Charging Process: Users can connect their devices (mobile, earphones, laptop) to the charging port and initiate the charging process.
5. LCD Display: The LCD screen displays the charging duration, providing real-time feedback to the user.
6. End of Charging: Once the predetermined charging duration is reached or the user disconnects their device, the relay is deactivated, and the charging process ends.

PLAN OF EXECUTION



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VIII. RESULT

Portable coin operated and smartcard driven chargers for electronics devices are designed to offer convenient devices are designed to offer convenient charging solutions, especially in public or commercial settings. These chargers typically feature multiple charging ports , allowing several devices to be charged simultaneously.

IX. CONCLUSION

Portable smartcard and coin-driven chargers offer a convenient and accessible solution for charging electronic devices in public and remote locations. These chargers cater to users who may not have immediate access to traditional charging methods, providing a reliable power source in emergencies or during travel. The implementation of portable smartcard and coin-driven chargers can significantly enhance user convenience, ensuring that people can stay connected, productive, and safe. These chargers not only address the growing need for mobile power solutions but also present an innovative approach to public infrastructure and service offerings.

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