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Solar And Coin Based Mobile Charger for Rural Peoples

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Abstract: Now a day's mobile phone has become a major source of business as well as personal communication. These solar panel convert sun light energy into DC current for a range of voltage that can be used for charging the battery. Mobile will get charge, only when a coin is inserted at the coin insertion slot. In this proposed system IR Sensor is used for the correct coin detection and we are adding START and STOP buttons to turn off the charging circuit and the timer. After inserting the coin, turn on the start button then the charging circuit will turn on. Suppose, if any call occurs in the middle of the charge press the stop button to turn off the charging circuit and then the charging circuit will turn off and at the same time timer will also turn off. Then after completion of call press the start button to continue that process without wasting the energy in battery and this all instructions will display on the LCD.

Key Words: Solar panel, Coin, Mobile, Charging circuit, IR sensor, Battery, LCD, Relay.

I. I NTRODUCTION

Access to reliable electricity remains a critical challenge for many rural communities worldwide, hindering their ability to engage in modern communication technologies. In response to this pressing need, our project introduces an innovative solution: a solar-powered mobile charger equipped with a coin-based system. This initiative aims to provide rural populations with affordable and sustainable access to mobile phone charging facilities, empowering them to stay connected and access essential services.

The integration of solar energy into the mobile charging infrastructure offers a renewable and environmentally friendly alternative to traditional electricity sources, addressing both energy access and environmental sustainability. By harnessing the power of sunlight, the charger eliminates the dependency on grid electricity, making it particularly suitable for off-grid rural areas where access to electricity infrastructure is limited or non-existent. Additionally, the coin-based system ensures financial sustainability by allowing users to pay a nominal fee for charging services, thereby covering maintenance costs and ensuring the longevity of the project.

Moreover, our project recognizes the transformative potential of mobile communication in enhancing livelihoods and facilitating socio-economic development in rural communities. Mobile phones serve as vital tools for accessing information, conducting business transactions, and seeking medical assistance, among other essential services. By providing reliable and affordable charging facilities, our initiative seeks to bridge the digital divide and empower rural populations to fully harness the benefits of mobile technology for their social and economic advancement.

II. BACKGROUND & RELATED WORK

In addressing the energy needs of rural communities, it is imperative to consider existing initiatives and research endeavours aimed at enhancing access to electricity in underserved areas. Various projects have explored the potential of solar energy in powering off-grid solutions, including solar home systems and community microgrids. For instance, organizations like [mention specific organizations or projects] have implemented solar-powered charging stations and microgrids in rural regions, demonstrating the feasibility and benefits of renewable energy technologies for addressing energy poverty. However, while these initiatives have made significant strides in improving energy access, challenges such as affordability, maintenance, and sustainability persist, highlighting the need for innovative approaches tailored to the unique context and needs of rural communities.

Building upon existing efforts, our project seeks to develop a solar and coin-based mobile charger specifically designed to address the energy needs of rural populations. By integrating solar panels for power generation and implementing a coin-based payment system, our solution aims to provide affordable and sustainable access to mobile phone charging

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facilities in remote areas. While similar initiatives have been explored in urban settings, our project fills a gap in the literature by focusing on the specific requirements and challenges faced by rural communities, including limited access to electricity infrastructure and financial constraints. Through rigorous research and development, we aim to design a scalable and replicable model that can be adapted to diverse rural contexts, ultimately contributing to the advancement of energy access and socio-economic development in underserved regions.

III.METHODOLOGY

- **Solar Pannel:** It is placed to the 90 degrees of east side for converting AC current into DC to store the energy into battery for producing current to the Arduino board.
- **Instructions Display:** The LCD will display the instructions after connecting to the RPS like Insert the coin.
- **Coin Insertion:** Insert any coin like one-rupee or two-rupee or five-rupee in insertion box.
- **Coin Detection:** The IR sensor will detect the coin whether it is a valid or not and if the coin is valid then LCD will display like Press the start button.
- **Start Button:** Just push the start button which is connected to the Arduino board at Pin 4 to activate the mobile charger for 80sec.
- **Charge the Mobile:** Charge the mobile for 80sec per each coin. After 80sec it automatically stops to charge.
- **Stop Button:** If we want to stop the charging in the middle of the 80sec, we can stop it by pushing the stop button which is connected to the Arduino at Pin 5.
- If we want to continue the process again press the start button then it will again continue from 80sec.

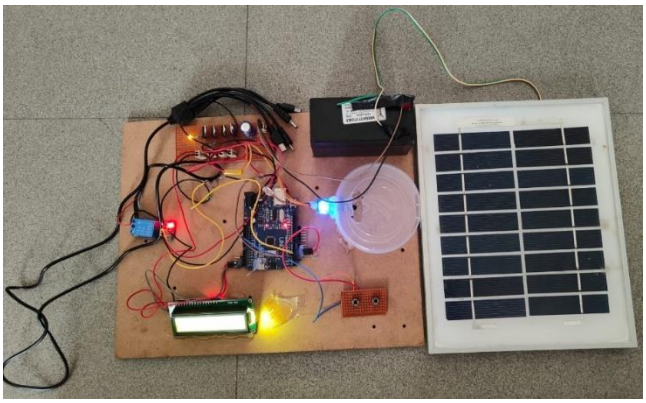

FIG 1.1: EXPERIMENTAL SETUP

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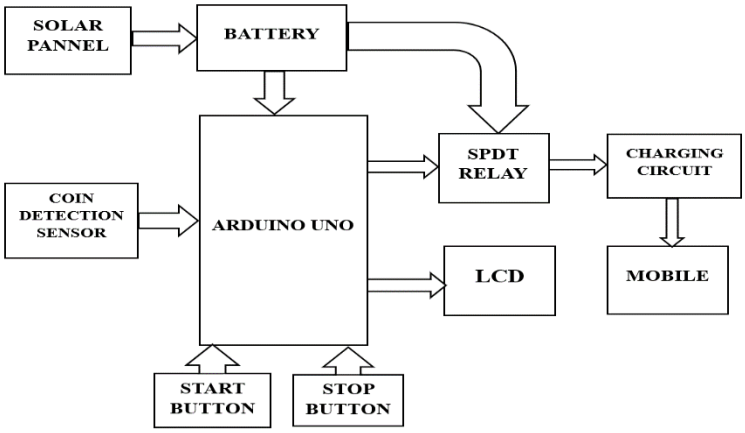
IV. PROPOSED BLOCK DIAGRAM



SOLAR PANNEL:

It generally absorbs sunlight and converts it into DC electric energy and it is reduced to 12v & 5v Dc by voltage regulator in order to provide required voltage to Relay, Coin sensor, Microcontroller, LCD Circuitry.

BATTERY:

Here we use 1 rechargeable battery of 12V.The power generated from solar panel is converted into electrical power and stored in these batteries.

SPDT RELAY:

(**S**ingle **P**ole **D**ouble **T**hrow **Relay**) an electromagnetic switch, consist of a coil (terminals 85 & 86), 1 common terminal (30), 1 normally closed terminal (87a), and one normally open terminal (87).

LCD:

It is used to display the countdown time and the timer starts when relay gets ON. The countdown time is 60sec from the coin insertion.

COIN DETECTION SENSOR:

In this detector we use IR Transmitter & Receiver which are placed in Line of sight. When the coin is inserted, it interrupts the IR transmitter & receiver. That interruption is compared with Voltage controlled oscillator if any change occurred in received signal, then LM567 (VCO) sends signal to the micro controller which triggers relay.

ARDUINO UNO:

Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed easily using the C or C++ language in the Arduino IDE.

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V. RESULTS

FIG 1.2: OUTPUT ON MOBILE FOR CHARGING THE MOBILE (AFTER START BUTTON PRESSED)

FIG 1.3: OUTPUT AFTER STOP BUTTON PRESSED

VI. CONCLUSION

The new manner of offering chargeable services to the general public is described in our article. For the convenience of users, coin-based mobile charging stations have been erected in a number of public locations. It is also less expensive and more convenient for long-distance passengers.

VII. FUTURE SCOPE

In the future, the prediction can be done by using the 180 degrees Solar Pannel which is used to turn along with the sun and also in future we can continue at a particular time when we press start button, while we stopped the charging in the middle of the charge time this can be implement by using the Raspberry pi for more convenient for business and users.

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BIOGRAPHY

Dr. S. Murali Krishna working as Professor in Department of ECE, Bapatla Women's Engineering College, Bapatla. He completed his B.E. in Electronics and Communication from Osmania University, Hyderabad, and completed his M. Tech in Instrumentation and Control from JNTUK, Kakinada and Ph.D in Rayalaseema University, Kurnool He has 33 years of teaching experience in various Engineering College's.

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