Coin Based Mobile Charger using MATLAB
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Abstract:
The purpose of this paper is to provide a design for a mobile charging system which works on coin detection phenomenon. This system will be very useful for the travellers with the requirement of charging their mobile phones immediately. This system can be provided at public places like the bus stops, railway stations. A 32-bit microcontroller LPC2148 is used for the programming purpose. In this system image processing is used to detect the coin. MATLAB software is used for image processing technique. When a coin is placed in the system, a camera is used to take a photograph of the coin. When the coin is recognised and matched with the inputs stored in the microcontroller with the help of the MATLAB software, the system starts to charge the mobile phone. It charges the phone according to the coin inserted for a fixed amount of time. It does not charge the phone from dead to full charge instantly but the charging can be continued by inserting more coins.

Keywords: Mobile Phones, Battery Charger, Microcontroller, Image processing

I. INTRODUCTION
Mobile phones have become an integral part of the present generation’s life. It has become an important tool that is used widely by a large population. A Mobile phone runs on a battery which needs to be charged. It could be a headache in several parts of the world where the grid power is not available for few hours to several hours on a daily basis. In the event of unpredictable current supply, to design a system which can be placed at public places to charge the mobile phones can be very useful, as a person does not have to worry about getting home for charging the mobile phone. In this system the coin detection is done by image processing technique. The type of image processing technique used in this system is edge detection. When a coin is placed its photograph is taken by the camera and then it is processed based on the edge detection method. When the coin is matched with any one of the saved photographs, the charging starts immediately for a fixed amount of time based on the value of the coin.

II. COMPONENTS USED

- ARM7 LPC2148 ISP circuit.
- Web Cam
- LPC2148 IC
- 16 pin IC Base.
- General Purpose PCBs.
- Bug strip.
- 10 K Potentiometer.
- 20x4 LCD.
- Connecting wires.
- L293D IC.
- Power Adapter.

III. ARCHITECTURE

3.1 Micro-controller
The LPC2148 microcontroller is based on a 32-bit ARM7TDMI-SCPU with real-time emulation and embedded trace support that combines microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. In this project it is responsible for all the important activities. It controls the charging time of the phone connected to the system. Based upon the MATLAB codes the microcontroller further decides whether the phone connected is to be charged or not. The result is then displayed on the LCD.

3.2 Coin Based Mobile Charger
The basic block diagram of the mobile battery charger is given in Figure 1.

Figure.1. Block diagram for coin based mobile charger

3.2.1. Input Stage
The mobile battery charger starts charging a mobile connected to it, when a coin is inserted at the coin insertion slot at the input stage. The detection of coin is done with the help of webcam. If a wrong coin is inserted in the slot, it will be rejected. Using MATLAB codes the microcontroller will detect whether the coin is one, two, five or ten rupee. If the coin inserted in the slot is acceptable, the charging system will start charging the mobile battery for a specific period controlled by the software of the microcontroller.

3.2.2. Controller
This section acts according to the input signal. Coin accepted or rejected is based on the edge value of the coin. When the routine completes, it indicates charge complete message through LCD display.
3.2.3 Output and Display
The LCD displays all the information to the customer as and when required. When the mobile battery is connected, it displays “Insert Coin”. While charging it displays “Charging” and at the end of charging cycle it displays “Charge completed”. For charging continuously the coin has to be inserted when the display shows “Charge Completed”.

IV. SOFTWARE SPECIFICATION

MATLAB
It is the software which is used for coin detection in this system. It avoids the coin duplication also.

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VI. CONCLUSION
In this work a novel method of charging mobile phones with coin detection using image processing method has been designed for commuters and travellers who need to charge their mobile phones immediately. This charging system can be placed at public places for immediate use.

VII. REFERENCES


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