

# RFID BASED MOBILE CHARGING SYSTEM

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**Abstract-**Now a day's mobile is playing a very important role in our day to day life. But it needs to be charged. So, the idea of RFID based mobile charging system helps us in the emergency posture by the way of charging our mobile in a secured manner. Due to continuous work load we face low battery problems and at time emergency we cannot find any solution. To deal with this we found solution for mobile charging by suddenly plugging charger of mobile after scanning RFID. This system uses RFID cards to detect the user and allows him to use the power for some specific intervals of time. In this way every user is only allowed a certain specific duration to use the power port and hence no user can monopolies over the power port. It will take less time to charge compare to other charger.

**Keywords-**Arduino UNO, RFID reader, LCD Display

charging our mobile. Due to continuous work load we face low battery problems and at time emergency we cannot find any solution. To deal with this we found solution for mobile charging by suddenly plugging a charger of mobile after scanning an RFID card. Because of the proposed system it is easy to use as a Prepaid charger and also as a Smart power system. The advantages of proposed system are less expensive, more efficient, charging at emergency situation. "RFID BASED MOBILE CHARGING SYSTEM" is designed and made with the hope that it is very much economical and helpful in many public places. It is also more beneficial to the people to charge their mobile which needs to be charge during urgency period. Secured cell phone charger with RFID this system an attempt has been made to implement the cell phone charger with RFID.

## I.

### INTRODUCTION

Scientific inventions have made this world worth living. They have provided us comforts and luxuries. Technology has become an important and necessary part of our lives. In last few years, there is tremendous advancement in technology. So, human life becomes more dependent on these technologies. To provide more comfort to human there is a technology called as RFID technology. So, we are using RFID based mobile charging system. This RFID based mobile charging system charges the mobile for particular amount of time on scanning RFID. This system is used at public places like railway station, bus stops to provide mobile charging facility in emergency situations. So, we are proposed a project known as RFID based mobile charging system which is used as a simple and quick mobile charger to charge the mobile at emergency situation by using RFID technology which provides security.

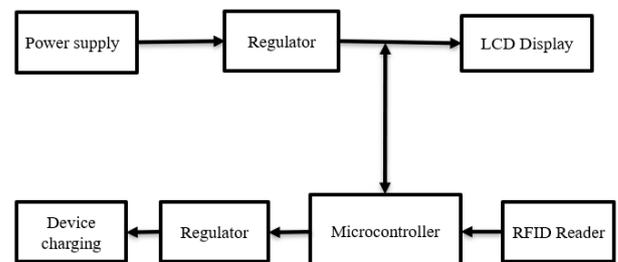


Fig.1: Block diagram OF RFID based mobile charging system

## II.

### PROPOSED SYSTEM

The idea of RFID based mobile charging system is to helps us in the emergency posture by the way of

### III. HARDWARE AND SOFTWARE DESCRIPTION

#### A. ARDUINO UNO:

Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328. First Arduino project was started in Interaction Design Institute Ivrea in 2003 by David Cuartielles and Massimo Banzi with the intention of providing a cheap and flexible way to students and professional for controlling a number of devices in the real world. The current version of Arduino Uno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output. It allows the designers to control and sense the external electronic devices in the real world. This board comes with all the features required to run the controller and can be directly connected to the computer through USB cable that is used to transfer the code to the controller using IDE (Integrated Development Environment) software, mainly developed to program Arduino. IDE is equally compatible with Windows, MAC or Linux Systems; however, Windows is preferable to use. Programming languages like C and C++ are used in IDE. Apart from USB, battery or AC to DC adapter can also be used to power the board. Arduino Uno boards are quite similar to other boards in Arduino family in terms of use and functionality, however, Uno boards don't come with FTDI USB to Serial driver chip. There are many versions of Uno boards available, however, Arduino Nano V3 and Arduino Uno are the most official versions that come with Atmega328 8-bit AVR Atmel microcontroller where RAM memory is 32KB. When nature and functionality of the task go complex, Micro SD card can be added in the boards to make them store more information.

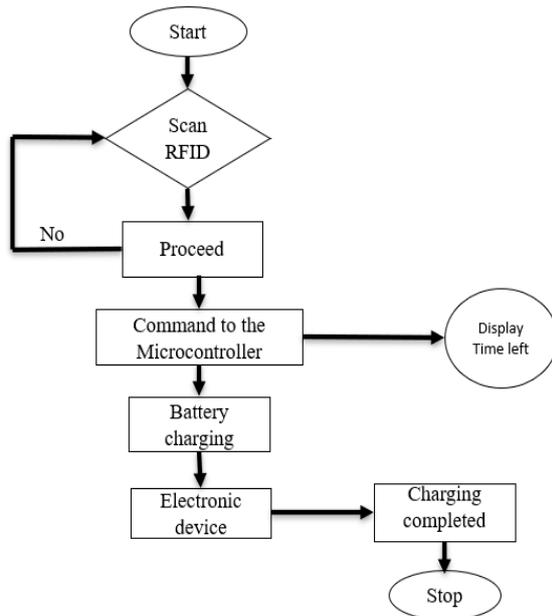


Fig.2: Flow chart of RFID based mobile charging system

In this we are using Arduino Uno as the microcontroller which is used to read the information from the RFID reader and display it on LCD display. This project features an RFID card reader, to recognize a user. Once a valid user has been identified by the system then starts charging the mobile. Before a user can charge his/her phone, he/she has to register their respective card/cards. So now, the user must connect a phone to the charging port and swipe the card. Once identified as a valid user the system starts charging the phone. Firstly, the RFID reader will be initialized and would be in the reading mode and hence a message would be displayed on the screen to asking the user to please swipe his/her particular RFID card. As soon as a user swipes his/her card across the RFID reader, the RFID reader reads the card and transmits the 12-bit unique code of the particular card to the microcontroller and then the microcontroller detects that particular user by comparing the database inside of it. Then next thing done is recognizing how much time the user needs to charge his/her phone. When the RFID reader reads the card, it will charge the mobile for particular amount of time. Then according to the time, the microcontroller closes the relay. In this the relay will be ON when the RFID reader reads the RFID card. It will be OFF when the invalid card reads by the RFID reader. Along with charging, the system also keeps a record of how much charging time the user has got left, this remaining time is displayed on an LCD. Furthermore, if an Invalid user tries to recharge his/her phone by swiping the card; the system tries matching it with the valid IDs stored. But since this user isn't registered, the system shows Invalid user and doesn't credit any charging time and it shows as an invalid card on the LCD display.

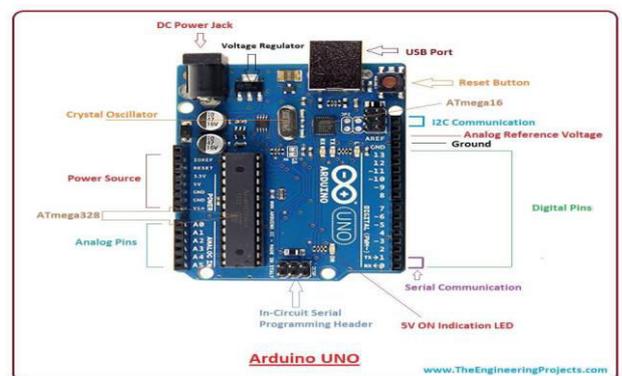


Fig.3: Arduino UNO

**B. LCD:**

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. Computers, calculators, television sets, mobile phones, digital watches use some kind of display to display the time. An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16x2 LCD display is a very basic module commonly used in DIYs and circuits. The 16x2 translates to a display like 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5x7 pixel matrix.



**Fig.4: LCD Display**

**C. RFID Reader:**

Radio Frequency Identification (RFID) establishes the identity of subjects in the physical world using uniquely numbered electronic tags. RFID is an electronic technology whereby digital data encoded in an RFID tag is retrieved utilizing a reader. In contrast to bar code technology, RFID systems do not require line-of-sight access to the tag in order to retrieve the tag's data. RFID Reader is a module which reads the ID information stored in RFID Tags or Cards. This ID information is unique for every tag which cannot be copied. In this project we are using EM18 RFID reader module.



**Fig.5: EM18 RFID reader module**

**D. Relay module:**

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. A Relay Module is a very useful component as it allows Arduino, Raspberry Pi or other Microcontrollers to control big electrical loads. We have used a 1-channel Relay Module in this project. The relay module used in this project is shown in figure 6. This is a small and easy to use 1 channel relay board that operates on 5V. Use it to control one 240V power appliance lights, fans, etc directly from microcontrollers or low voltage circuits. The relay can handle a maximum of 7A/240 V AC or 7A/24V DC. Relay has all three connections – Common (COM), Normally Open (NO), Normally Closed (NC) brought out to 3 pin screw terminals which makes it easy to make and remove connections.



**Fig.6: Relay module**

**E. Software required:**

The software used for this project is Arduino IDE known as Arduino integrated development environment (IDE) which is a cross platform application that is written in the programming language java. It is used to write and upload programs to Arduino compatible boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. We are using Arduino IDE because it is easy to develop code in this IDE and also easy to understand where the code is similar to C language code, which we understand very better. The IDE is split up into the Toolbar across the top, the code or Sketch Window in the centre and the Serial Output window at the bottom. The code that is required to our project should be written in the code block. After the code is written it should be verified, for that Verify/Compile button is used to check that your code is correct, before you upload it to your Arduino. After it is verified it is uploaded to the Arduino by using USB cable.

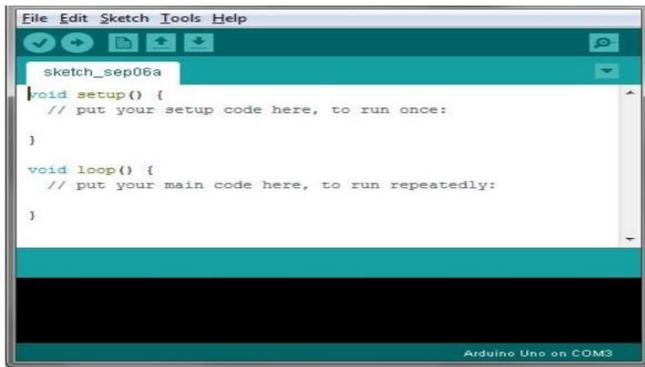


Fig.7: Arduino IDE



Fig.9: When an invalid RFID card is scanned

#### IV. RESULTS

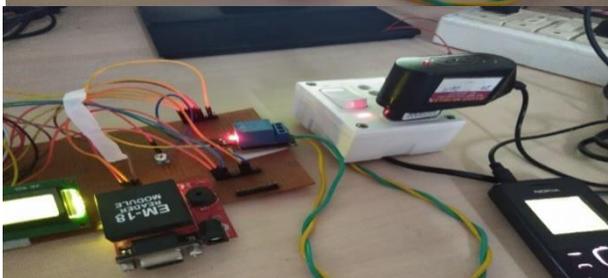
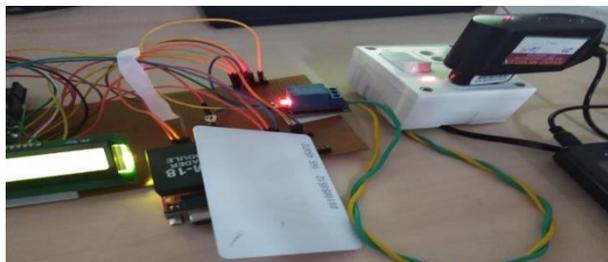


Fig.8: When a valid RFID card is scanned

When a valid RFID card is scanned as shown in the figure 8, then the 12-bit unique code is matched with the unique code that is already registered in the database RFID reader detects and sends the signal to the microcontroller which in turn on the relay and starts charging the phone while charging the remaining time is also shown in the LCD Display.

When an invalid RFID card is scanned as shown in the figure 9, that means the 12-bit unique code of the RFID card doesn't match with the already registered cards in the database then the phone will not charge and it shows as an invalid card on the LCD Display.

#### V. CONCLUSION

This paper is to bring aware of the RFID based mobile charger to the public places. This project is very useful in our daily life. Because now a days the necessity of communication is very important, so every person having cell phone but every time we cannot carry charger with us. When we are going for long tour, we may always forget to carry phone charger. Also, now a days because of the use of internet and smart phones, usage time of mobiles is also increased without decreasing the battery charge, the RFID based mobile charger is used at the time of unavailability of charger with us.

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