

Mobile Charging on Coin Insertion

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Abstract— In this world, now a days everyone is having a mobile phone with them. Mobile phones are day by day becoming very important for us as they have become a part of our life. So, it is also necessary to have our phone battery fully charged or at least half charged. But sometimes there is a situation in which we need our mobile phone very much but we do not have that much battery power in our mobile phone also we are not having a charger or even if we have the mobile battery charger, we do not have AC supply. In such situations this Mobile charging on coin insertion system or machine helps us to charge our mobile phone. This system or machine is having an Arduino Nona with ATMEGA328P microcontroller already present in it. The Arduino Nano is coded or programmed in such a way so that the machine will perform the desired function properly without creating any error.

I. INTRODUCTION

The mobile charging on coin insertion system is a system which charges the mobile phone of any operating system. The idea of this mobile charging on coin insertion machine is taken from the Automatic Chocolate vending Machine (ACVM). In the ACVM machine, the user simply have to insert a coin into the machine and a desired quantity and amount of chocolate is delivered by the machine as a output. Also, the water vending machine is a similar type of machine, simply the output is water in the water vending machine. Same concept is applied in this Mobile charging on coin insertion machine. Here, the user will have to insert a coin into the machine and then the will start charging for a particular time.

As soon as, the machine time for charging the mobile will end, the machine will stop the charging of the mobile phone. Then, if the user wants to start the charging of mobile phone again, so he will again have to insert a coin into the machine. If suppose there are only two charging slots or cables in the mobile charging on coin insertion machine and they both are occupied the user so in that case the third user have to wait until the one of the slots or one of the users finish his mobile charging. This machine will return the coin in such a situation in which both the slots are occupied. This machine is used by the users when the users is not having their mobile charger with them. So, in such situations machine will be use full for the users in which only with the help of money the users can be able to charge their mobile phones anytime.

II. DESIGN OVERVIEW

A. Block Diagram

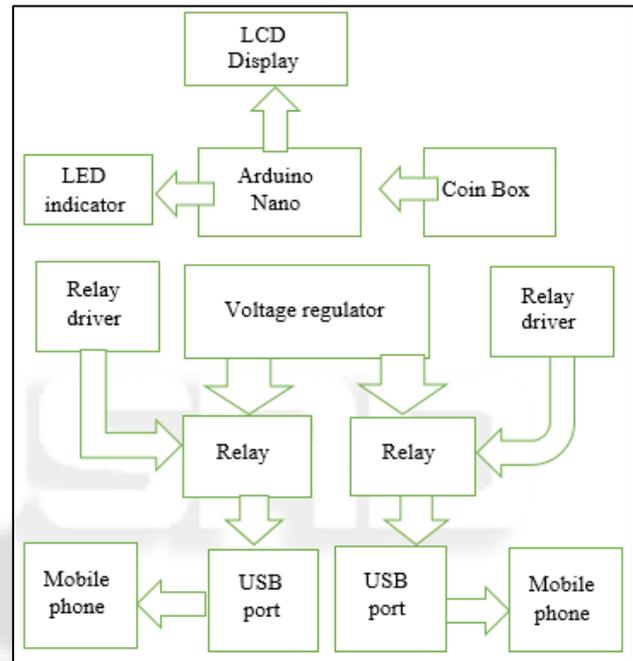


Fig. 1: Block Diagram of Mobile charging on coin insertion Machine

The block diagram mainly consist of following components

- 1) Arduino Nano
- 2) LCD Display
- 3) LED indicator
- 4) Relay
- 5) Relay driver
- 6) Voltage regulator
- 7) Coin box
- 8) USB port

1) Arduino Nano

Arduino Nano is a microcontroller board developed by Arduino.cc and based on Atmega328/Atmega168. Arduino boards are widely used in robotics, embedded systems, and electronics projects where automation is an essential part of the system. These boards are introduced for the students and people who come with no technical background. Any kind of support and help is readily available by the Arduino community that is too easy to approach and set you free from depending on others that may cost you bunch of money. Arduino Nano is a small, compatible, flexible and breadboard friendly microprocessor board, developed by Arduino.cc in Italy, based on Atmega328p (Arduino Nano V3.x) / Atmega168 (Arduino Nano V3.x).

It comes with exactly the same functionality as in Arduino Nano but quite in small size. It comes with an operating voltage of 5V, however the input can vary from 7V

to 12V. Arduino Nano Pinout contains 14 digital pins, 8 Analog pins, 2 reset pins, and 6 power pins. Each of these Digital and Analog pins are assigned with multiple function but their main function is to be configured as input or output. They are acted as input pins when they are interfaced with the sensors, but if you are driving some load then use them as output. Functions like pin mode () and digital write () are used to control the operations for digital pins while Analog read () pins are used to control Analog pins. The Analog pin comes with a total resolution of 10 Bits which measure the value from zero to 5V. Arduino Nano comes with a crystal oscillator of frequency 16MHz. it is used to produce a clock of precise frequency using constant voltage.

2) LCD Display

Computers, Calculator, television set, digital watches, and mobile phones 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. 16x2 LCD display is a very basic module commonly used in DIYs and circuits. The 16x2 LCD translates o a display 16 characters per line in 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. The 16x2 LCD display has two registers, namely, command and data. The register select is used to switch from one register to another. RS=0 for command register, whereas RS=1 for data register.

3) LED indicator

A light emitting diode (LED) is a semiconductor light source that emits light when current flow through it. Electrons in the semiconductor recombines with electron holes, releasing energy in the form of photons. This effect is called electroluminescence. The colour of the light (corresponding to the energy of the photon) is determined by the energy required by the electron to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductor or a layer of the light emitting phosphor on the semiconductor device. The Infrared LEDs are used in remote control circuits, such as those used with a wide variety of consumer electronics. The first LED were of low intensity and limited to red.

4) Relay

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 relay. Relays are used where it is necessary to control the circuit by a separate low power signal, or where several circuits must be controlled by one signal. The first relay were used in long distance telegraph circle as amplifier. In this Mobile charging on coin insertion machine, the is used to start and stop the charging of the mobile phone. When the user will insert the coin through the coin acceptor box, the relay will switch ON and charging will start.

5) Relay driver

A relay driver is an IC which is a electromagnetic switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF which is connected to 220V main supply. The required current to run the relay coil is more than the current that can be supplied by various integrated circuits like op-amp, etc. Relays have unique properties and are replaced by solid state switches that are strong than solid state devices. High current capacities, capability to stand ESD and drive circuit isolation are the unique properties of relay.

6) Voltage regulator

The voltage regulator is a system designed to automatically maintain a constant voltage level. A voltage regulator may use a simple feed forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Electronic voltage regulator are found in devices such as computer power supply where the stabilize the DC voltages used by the processors and other elements. In automobile, alternators and central power station generator plant, voltage regulators control the output of the plant.

7) Coin Box

Coin acceptor box is a device which will accept coin and validate their automatically very quickly by comparing the physical properties of coin against known characteristics of acceptable coins. The detector evaluates the coin based on its weight, size, magnetism and using optics to match the image to the pre-defined list, or test the coins "metallic signature" based on its alloy composition. Once validated, the coin acceptor will then send an appropriate electrical signal via its output connection to the host machine.

8) USB port

USB port is a Universal Serial Bus. It is an industry standard that establishes specification of cables, connectors and protocols for connection, communication and power supply between personal computers and their peripheral devices. It has largely replaced interfaces such as serial and parallel port, and has become common place on a wide range of devices.

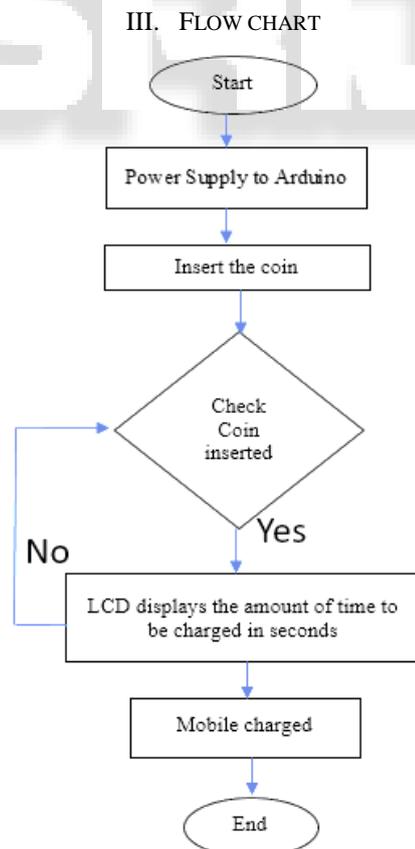


Fig. 2: Flow chart of Mobile charging on coin insertion machine.

The above flow chart explains us that how the mobile charging on coin insertion machine will actually work. When the machine start it will power the Arduino Nano. After that, when the user will insert the coin, the machine check whether the coin inserted is valid or not. If YES, then the LCD will display the amount of time for which the mobile will charge. And if NO, then LCD will again ask to insert the coin.

IV. PROJECT OUTCOME

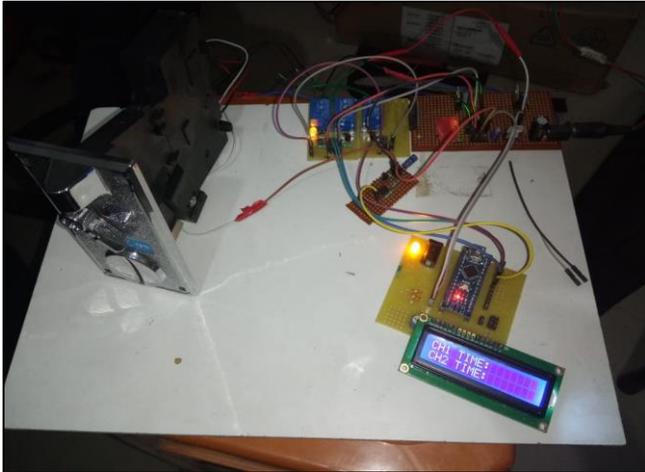


Fig. 3: Mobile charging on coin insertion

It is very good to say that the project, named, "Mobile Charging on Coin insertion" is completed successfully within the due date. The project is working good without any type of error. For time being, we have provided two channels or slots for charging. But we can increase the number of channels according to our suitability in the future.

V. CONCLUSION

This project is a very cost affective type of project. It can be implemented at any place such as, Railway station, Bus station, parks, shops, offices, hospitals, etc. This project occupies less area. These are some advantages of these project. As nowadays, in this very fast moving and hectic life, many times people forget to charge their mobile phone, again they forget to take their mobile phone charger with them. In such condition and situation, this mobile charging on coin insertion machine will help these people out.

VI. FUTURE SCOPE

This machine attached with a GSM module (i.e. Global System for Mobile Communication) after which the machine will be connected to the mobile phone of the owner so that the owner can handle the machine from his place and also will know everything about the machine on his place. Again, we can attach a multiple pin USB cable so that any type of mobile phone can be charged by this machine. Before applying the multiple pin USB cable, we have to add one extra circuit of current sensor. Whenever anyone will insert a coin and charge two mobile phones at a time then the current load across the USB cable and also on the machine will increase. This time the current sensor which is keep on sensing the current through the machine and the cable will observe that the current load is increased. And so the current sensor will switch OFF the relay and the mobile charging will be stopped.

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