International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2018 IJSRCSEIT | Volume 3 | Issue 1 | ISSN : 2456-3307

Smart Charger for Mobile Phones using Embedded System

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ABSTRACT

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is designed for a specific function or for specific functions within a larger system.In earlier times, cell phones are used as symbol of money and success but nowadays even kids find it necessity of life. The importance of cellphones has grown over the years and more people getting addicted to its usage. The benefits of smart charger shows charging nature of different cellphone chargers with different cellphones. It also gives an idea of using USB based charging and control current rating automatically. The report shows how the current varies when we connect the mobile with different charger. Using the mobile while charging may cause danger to life of human being and it will lead to severe accidents. Charging the mobile with different amps charger may reduce the lifetime of battery and damage the battery easily. So in order to overcome these difficulties an effective system is developed.

Keywords: Embedded System,Smart Phones, USB Based Charging,Control Current Rating Automatically.

I. INTRODUCTION

The growing development of electronic devices,lithium-ion polymer batteries are widely used as power sources owing to their high energy density.In order to both guarantee safe operation while alleviating the risk of over discharging or over charging and make use of the optimal potential to ensure battery longevity. SOC indicates how long the battery will sustain before it is recharged. Cell Phone Accessories that Claim to Shield the Head from RF Radiation Because there are no known risks from exposure to RF emissions from cell phones, there is no reason to believe that accessories which claim to shield the head from those emissions reduce risks. Some products that claim to shield the user from RF absorption use special phone cases, while others involve nothing more than a metallic accessory attached to the phone. Studies have shown that these products generally do not work as advertised. Unlike "hands-free" kits, these so-called "shields" may interfere with proper operation of the phone. The phone may be forced to boost its power to compensate, leading to an increase in RF absorption.The scientific evidence does not show a danger to any users of cell phones from RF exposure, including children and teenagers,but steps to be follow as reduce the amount of time spent on phones and use the speaker mode or a headset to place more distance between the head and the cellphones.

II. EXISTING VS PROPOSED SYSTEM

In the existing system most of the youngsters are using the mobile while charging. Some people listen songs and someone is speaking through headset. These type of activities may cause danger to life of human beings and it will lead to several accidents. Charging the mobile using different ampere charger will reduce the life of battery and the battery will

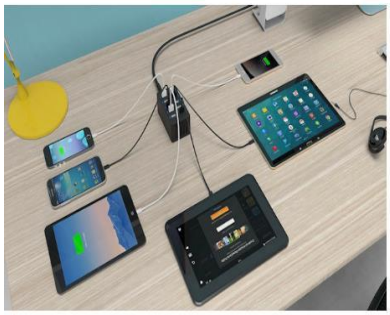
damage easily. So in order to overcome these difficulties an effective system need to be developed.

The disadvantage of existing system as follows

1. Charging puts pressure on the motherboard of the phone,using it during charging increases the pressure manifold.
2. The batteries of mobile phones are made of lithium iron,these batteries suffer from a little problem called "**ThermalRunaway".**whereby excess heat promotes even more excess heat which leads to the disaster.
3. Overcharging (leaving the mobile phones on the charger overnight is the most undesirable thing to do)

In the proposed system,using new technology to reduce severe accidents .The system consists of a charger with controller and Bluetooth embedded in it. The Bluetooth will pair with the Bluetooth present in the mobile. When the mobile phone is connected to the charger and if any call occur or headphone connected to it then a notification will be shown in the mobile to remove the headphone. If the person removes the mobile while charging without switching off the plug point, then immediately the buzzer will ring in the charger to switch off the plug point. Then if the mobile phone is connected to the charger then immediately the specific voltage and current of the battery will be transferred to the controller circuit through Bluetooth. Then according to the specification of the mobile, the voltage and current will be given.

FEATURE



III. RELATED WORKS

Xiao Liang et al In [2] Energy saving is the most critical problem in sensor networks and dominates the design objectives. Due to the unique characteristics of sensor networks, to design energy-efficient modulation schemes, both the energy transmitted through radio channels, and the energy spent in the circuitry and MAC protocols, should be considered. In light of this observation, we propose a non-coherent FSK based flexible modulation scheme in this paper. We employ adaptive modulation and multiple simultaneous access which can be implemented by very simple low-power circuitry. A simple symbol synchronization algorithm is also given for the implementation of the proposed system.

Cong Wang et al In [3] Several recent works have studied mobile vehicle scheduling to recharge sensor nodes via wireless energy transfer technologies. Unfortunately, most of them overlooked important factors of the vehicles' moving energy consumption and limited recharging capacity, which may lead to problematic schedules or even stranded vehicles. In this paper, we consider the recharge scheduling problem under such important constraints. To balance energy consumption and latency, we employ one dedicated data gathering vehicle and multiple charging vehicles. We first organize sensors into clusters for easy data collection, and obtain theoretical bounds on latency. Then we establish a mathematical model for the relationship between energy consumption and replenishment, and 5 obtain

the minimum number of charging vehicles needed. We formulate the
scheduling into a Profitable Traveling Salesmen Problem that maximizes profit - the amount of replenished energy less the cost of vehicle movements, and prove it is NP-hard. We devise and compare two algorithms: a greedy one that maximizes the profit at each step; an adaptive one that partitions the network and forms Capacitated Minimum Spanning Trees per partition. Through extensive evaluations, we find that the adaptive algorithm can keep the number of nonfunctional nodes at zero. It also reduces transient energy depletion by 30-50 percent and saves 10-20 percent energy. Comparisons with other common data gathering methods show that we can save 30 percent energy and reduce latency by two orders of magnitude.

Ji Li Fan Ye et al In [4] Wireless charging has provided a convenient alternative to renew sensors' energy in wireless sensor networks. Due to physical limitations, previous works have only considered recharging a single node at a time, which has limited efficiency and scalability. Recent advance on multi-hop wireless charging is gaining momentum to provide fundamental support to address this problem. However, existing single-node charging designs do not consider and cannot take advantage of such opportunities. In this paper, we propose a new framework to enable multi-hop wireless charging using resonant repeaters. First, we present a realistic model that accounts for detailed physical factors to calculate charging efficiencies. Second, to achieve balance between energy efficiency and data latency, we propose a hybrid data gathering strategy that combines static and mobile data gathering to overcome their respective drawbacks and provide theoretical analysis. Then we formulate multi-hop recharge schedule into a bi-objective NP-hard optimization problem. We propose a two-step approximation algorithm that first finds the minimum charging cost and then calculates the charging vehicles' moving costs with bounded approximation ratios. Finally, upon discovering more room to reduce the total system cost, we develop a post-optimization algorithm that iteratively adds more stopping locations for charging vehicles to further improve the results. Our extensive simulations show that the proposed algorithms can handle dynamic energy demands effectively, and can cover at least three times of nodes and reduce service interruption time by an order of magnitude compared to the single-node charging scheme.

IV. MODULES DESCRIPTION

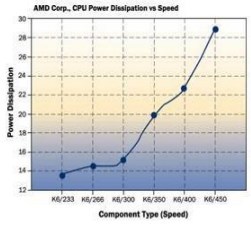
A. Power Supply Control
B. Alerting the user
C. Detection of Buzzer

A.Power Supply Control

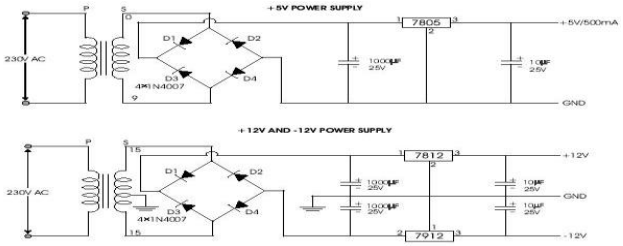
When the mobile phone is connected to the charger,the specification of voltage and amps current of the particular device is noted.According to the specification ,the power supply is given.

In case of linear regulated power supply the AC voltage is first stepped down, then this voltage is rectified and then filtered using a capacitor. The output of this capacitor goes to linear type power supply circuit. Linear regulators employ a Voltage regulator which further employs a passing case of linear regulated power supply the AC voltage is first stepped down, then this voltageis rectified and then filtered using a capacitor. The output of this capacitor goes to linear type power supply circuit. Linear regulators employ a Voltage regulator which further employs a passelement serving as a variable resistor which forms a voltage divider with the load. The pass element can be a transistor placed in between the unregulated dc voltage and the desired regulated dc output.

TO INCREASE BATTERY LIFE AND AVOID POWER DISSIPATION



Voltage regulators comprise a class of widely used ICs.Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage. The regulators can be selected for operation with load currents from hundreds of milli amperes to tens of amperes, corresponding to power ratings from milli watts to tens of watts.

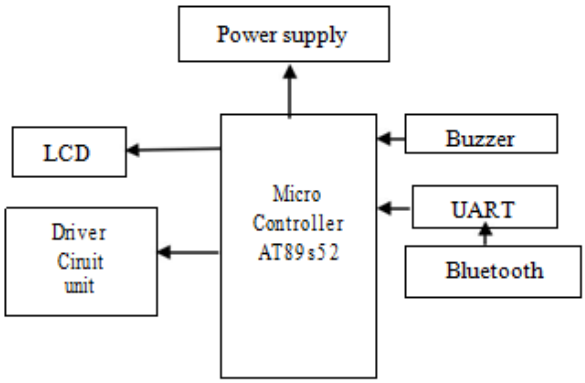


B. Alerting the user

When the call is detected while charging or it is connected to the head phones ,then it will not allow the user to perform any sorts of activity.

C. Detection Of Buzzer

When the user does not switch off the plug point after charging,the buzzer starts ringing in the charger.So that the current coming from the charger can be saved.



A.Micro Controller

All the functions required on a single chip. A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

The AT89s52 is a low-power,high-performance 8-bit microcontroller with 8k bytes of in-system programmable flash memory.The device is manufactured using atmel`s high-density non-volatile memory technology.

B. Power Supply

The potential transformer will step down the power power supply voltage from (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op–amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.

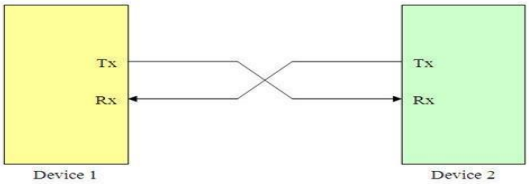
C. Bluetooth

The Bluetooth standard is based upon master-slave operation mode.The Bluetooth module is a transceiver module constructed with a transmitter and receiver.The Bluetooth module is directly interfaced to the micro controller,it doesnot need any external middleware.

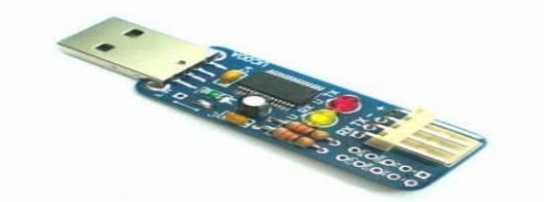
V. SYSTEM ARCHITECTURE

D.Uart

The Universal Aysnchronous Receiver/Transmitter(UART) controller is the key component of the serial communication sub-system of a computer.UART is also a common integrated feature in most micro-controllers,which takes bytesof data and transmit the individual bits in asequential fashion.



Uart Communication Between Two Devices



Usb To Uart Converter

E. Buzzer

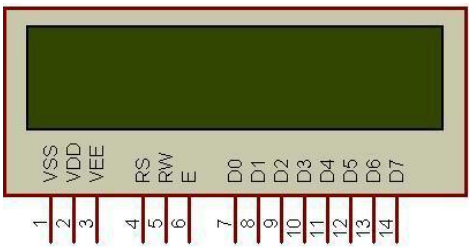
Buzzer is the beep sound from the ciruit board,it occurs when something is happened incorrectly.This sound will alert the people from the surrounding and prevent them from major cause.

F. Driver Ciruit Unit

Driver Ciruit Unit is used to regulate flowing through a ciruit which used to control the other ciruit and drives the data for other peripheral devices for output.

G. Lcd

Liquid Crystal Display is the flat panel display which used to display the overall fuction in the electric board.



VI. CONCLUSION

In this project,a proposed system is to make a protype of charge cell phone batteries in absence of any external electricity supply.Usally while travelling for successfully implemented with the help of inventive cell phone charger also its designed to automatically cut-off the charging process when its ouput terminal voltage increases above the pre-determined voltage level.This provides a back-up to sufficient hours.This charger has simple ciruit layer and its easy to implement and use

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