International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

Smart Bag Pack

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Abstract—With the rapid advancement of technology in the field of smartphones, laptops, and many similar devices, our dependency on them has increased drastically. However, these devices need battery power for them to work. So, there is a constant requirement of power recharging in them for which users need to be in the vicinity of power-sockets or have to carry power banks with them. To make this issue of recharging hassle-free, we have introduced the concept of **"**Smart Bag Pack" or Arduino based Smart backpack. This product considers the use of Li-Ion batteries with the help of the Arduino circuit as a power supply to monitor various electronic devices that uses USB-based charging such as laptops, smartphones, tablets, etc.

Keywords— Develop, Educational, Entertaining, Hesitates, Smart Bag Pack.

1. INTRODUCTION

The recent advances in mobile phones, laptops and technology have been proven a boon for the mobile communication industry to work its way up to the top. With companies like Apple and Google competing on a daily basis, it has lead to the introduction of new and exciting gadgets every week or month. These gizmos generally are operated by Li-ion batteries. Users of these technology ranges from a simple student to a business man whose life is On-the-Go. However, there is still a constant quench to be connected to the internet and outside world that running out of battery for a phone has proven to be a real state to worry so far. This state of running out of batteries can create problems for businessmen and travellers. A smart is a bag that utilises technology. Usually it is setup with the power backup an battery which would be able to charge the hand-held device via USB socket RFID blocking liners to prevent identity theft (not all bags have this) and also there would be an additional capability to track the bag incase of loss of the bag pack using GPS tracking.

2. LITERATURE SURVEY

Portable essentially the only solution available for the ever increasing Smart Devices and their power management are Power-Banks. Power Banks can be thought of as a reservoir of energy which are encapsulated in the Lithium-ion cells. These cells store Electrical energy which can be later used to charge the electronic devices. These power banks also have a charging and discharging circuits which is used to have a controlled power supply from reservoirs to the devices. Excess power may damage the electronic devices and also may lead some other damages. The power banks we mentioned about can be used for almost any USB powered devices like Smartphones, Cameras like GoPro, Portable Bluetooth Speakers, GPS systems, Portable MP3 Players, Tablets and sometimes even Laptops. But charging these many devices may run your Reservoir i.e.power bank out of energy. This is why we need to keep them charged as well. However, charging them is a big hassle as these banks have larger batteries. The bigger the battery the larger is the charging time required to recharge the reservoir. To ensure a good quality power bank, Features like quick charge are taken into consideration. Quick charge is a feature mostly used by companies like Qualcomm that make specialised chargers and chipsets that can give increased outputs for better and fast charging[6]. The quality of their battery banks lasts on the number of charge cycles it can support. A charge cycle can be thought of as the time it takes to charge the battery from 0% to a 100%. Stock power banks available in market come in different combinations and capacities. However the maximum charge cycles it can give is around 500. This means that the power bank will allow you to recharge a device every day for 1.5 years before it looses its capacity to with-hold the energy for a long term. How- ever these power banks tend to loose power and lead to power loss and are only 70%-80% efficient. Figures are based on a formula which assumes an average device capacity of 1500mAh, a device power level of no less than 20%, and an 80% Power Bank efficiency rating. Many Power Banks boast efficiency ratings up to and over 90%, but we find that real- world usage in Australian climates typically ends up with an 80% efficiency rate. We would give the input on based on fair estimates and results and usually the huge power banks fail to supply enough capacity sufficiently. Other factors can also improve or limit the discharge potential of a PowerBank, so look after them and they'll

work better for longer.

III. PROPOSED SYSTEM

Portable essentially the only solution available for the ever increasing Smart De- vices and their power management are Power-Banks. Power Banks can be thought of as a reservoir of energy which are encapsulated in the Lithium-ion cells. These cells store Electrical energy which can be later used to charge the electronic devices. These power banks also have a charging and discharging circuits which is used to have a controlled power supply from reservoirs to the devices. Excess power may damage the electronic devices and also may lead some other damages. The power banks we mentioned about can be used for almost any USB powered devices like Smartphones, Cameras like GoPro, Portable Bluetooth Speakers, GPS systems, Portable MP3 Players, Tablets and sometimes even Lap- tops. But charging these many devices may run your Reservoir i.e.power bank out of energy. This is why we need to keep them charged as well. However, charging them is a big hassle as these banks have larger batteries. The bigger the battery the larger is the charging time required to recharge the reservoir. To ensure a good quality power bank, Features like quick charge are taken into consideration. Quick charge is a feature mostly used by companies like Qualcomm that make specialized chargers and chipsets that can give increased outputs for better and fast charging. The quality of there battery banks lasts on the number of charge cycles it can support. A charge cycle can be thought of as the time it takes to charge the battery from 0% to a 100%. Stock power banks available in market come in different combinations and capacities

IV. METHODOLOGY

Arduino UNO is a microcontroller board based on AT mega328. It has 14 digital in- put/output pins of which 6 can be used as PWM output, 6 Analog inputs. Arduino Uno can be programmed with Arduino software Arduino IDE (integrated development environment). The At mel 8-bitAVRRISC-based microcontroller combines 32 kB ISP flash memory with read- while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, se- rial programmable USART. This Circuit board will be able to handle to all the data inputs as well as outputs with extra processing power to be utilised in future iterations and upgrades that may be done to the existing system after all.The battery which are used in conventional market are lithium ion which are easy and cost effective to use and little to no effect on functionality. Rechargeable Lithium-Ion batteries are primarily found in market segments where their high energy and power density as well as their superior cycling ability create value. Li-ion batteries are the product of choice for electric and hybrid vehicles in which both these criteria are important. They are the electrical energy storage technology of choice for large renewable energy farms in which smoothing functions are required along with ancillary services to the network (frequency regulation, primary power regulation), as both these requirements place a high demand on the battery cycling ability.Lithium-ion batteries are also the reference technology for plug in and full- battery electric vehicles (PHEVs and BEVs) of the coming years. While other types of batteries, including lead- acid and nickel-metal hydride (in the first generation of the Toyota Prius hybrid) will continue to retain considerable market share in the the usability of the small battery having a higher output has a better track performance over the span . Their cost is rapidly decreasing.The humidity sensor which is used here is DHT11 and its best advantage is easy to setup and measure the humidity or the air moisture content the only downside which it has is the reading can be late roughly around 2 seconds over the period.

A. Arduino IDE

The Arduino is a system on chip with and and integrated development (IDE) which can we used on various operating system such windows, linux the Arduino is usually uses the general languages such as C and C++ it can be used to test the cross the 3rd party application and it can be solely integrated with various types sensor and models the Arduino has the general public license which makes it free to be used by any system the Arduino provides the library function which can be called and they provide and input and output the user can call the functions of Arduino using the simple call in the main the functions can be simply called after creation of sketch and the library functions are pre-integrated and this gives the mode of faster functionality and usability the Arduino it can be used for various modules and platforms.

B. Bluetooth Module (HC-05)

HC-05 module which uses the serial protocol of bluetooth which can operate for wireless communication and is an ideal choice to operate on along with it would also support of master and slave analysis where one has the access to connect disconnect and other to just as a node or processing node it allows for enhanced transmission with 3MBPS modulation and 2.4 GHz for the transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature) The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The lower modules or can be referred as slave cannot start or create a connection to another reticulated device, but can get connected and disconnected various Bluetooth devices which them on the master module to start and

creathe connection

V. DEVELOPMENT CYCLE

This involves for the Li-ion batteries to be soldered together with power-bank module and placed snugly in 18650 battery holder. The power bank module which we are using here supports up to 20000mah of the power hours. This modular board will further be intercepted and re-wired to work with the Arduino board. Once the power bank is made and working here we are starting with just 20000 mah for testing and prototyping purpose. Now we need to assemble together the purchased batteries into a certain fashion. This can be achieved by simply placing 2 cells together in series and then combine the paired cells in parallel to attach each one to its separate power bank module. However, we can include more capacity anytime without disturbing the current assembly. We can move on to the second step. Mobile charger is basically a Switch mode power supply(SMPS). A mobile charger commonly contains a high frequency transformer, a full-wave rectifier, a high frequency switch and its control mechanism and filters.The traditional chargers that are available in market comes with at the most 5 volts and 2 amps of charging capacity which gives power output of 850mah. These kinds of chargers will take around 12 hours to completely charge a 20000mah banks. However this is limited because of the current output provided by standard chargers. We as a team propose a little theory here to narrow down the charging time upto 4 hours at minimum The theory is to charge up the batteries upto 80% of capacity with accelerated charging by constantly monitoring the voltage spikes in the input cur- rents and batteries internal voltages. The rest 20% can be charged by any standard charger and would take up 1.5 hours of extra time(This is just an idea and is still experimental).

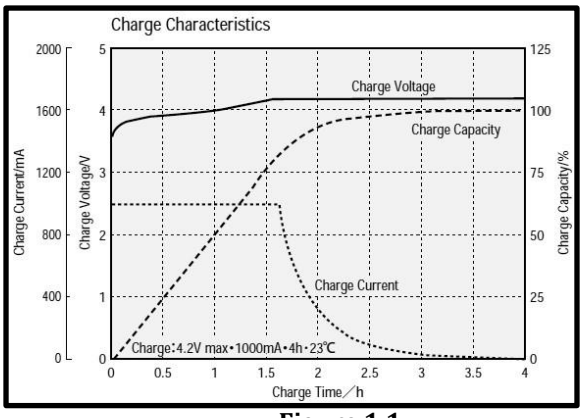

Figure 1.1

Fuel Gauging refers to the process of determining the capacity left in the batteries. Traditionally its done by some ICs or relay circuits. The methods we propose is to continuously monitor the current and voltage values that both the sensors capture continuously over a delay of 20 seconds(can be altered) with the help of Arduino. The data can be then sent to the Android App which will process it and check against a pre-built dataset and show the corresponding battery level. Includes the actual implementation of above mentioned methodologies using Arduino and sensors. Also we need to monitor the rise in temperature as the cells charge and discharge Modelling in Auto Desk Maya Autodesk Maya is an industry leading 3D animation software application developed by Autodesk that enables video professionals who work with animated film, television programs, visual effects, and video games to create highly professional three-dimensional (3D) cinematic animations. We used the software to model our hub as well and determine the position of each component including the outer hub (red coloured) that should be made from plastic or wood at max. We have used an application called Maya which is used for the 3D modelling and solving the real time infrastructure problems and highly versatile also it could be saved over multiple formats which increases the scalability Maya exposes a node graph architecture. Scene elements are node-based, each node having its own attributes and customisation. As a result, the visual representation of a scene is based entirely on a network of interconnecting nodes, depending on each other's information. For the convenience of viewing these net- works, there is a dependency and a directed acyclic graph.

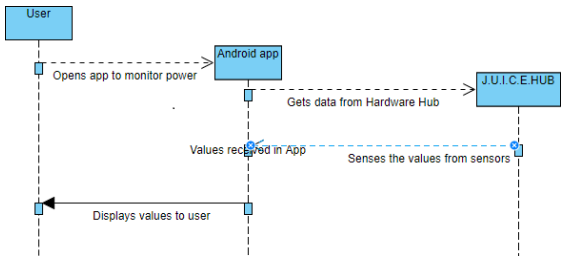

Figure 1.2

VI. RESULTS

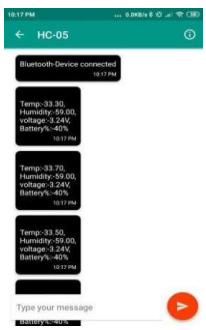

Figure 1.3

VII. CONCLUSION

The Project J.U.I.C.E is an innovative project which integrates a power bank module inside a bag pack. Project J.U.I.C.E also includes the feature of a dedicated app in order to monitor different parameter provided in the power bank module. Applications: Intelligently charge, protect and monitor your gear on-the-go Can charge anything from a smartphone to a laptop. Monitor and control charging from the app, without even opening a zipper. Control charge levels on the customisable JUICE SmartApp dashboard. Get alerted if you leave your bag behind (Find my bag). Perfectly designed spaces for all your gadgets with plenty of room for every- thing else. Compatibility: Any and all types of USB devices.

ACKNOWLEDGMENT

I would like to convey my special thanks of gratitude to project guide professor and project coordinator of Information Technology Mrs. Dakshata Argade who gave us the good opportunity to do this amazing project on the topic Smart Bag Pack , which also helped us in doing a lot of research and providing us with all the resources that was required for this project.

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