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E-cycle Using BLDC Motor and Android Application For Battery Indication

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***Abstract*—The paper presents a way to reduce pollution of cities by motivating the use of bicycle and converting a conventional bicycle into a plug-in electric bicycle for A replacement of motorized two-wheelers by converted plug-in hybrid electric bicycle is proposed. and some update in it we are using android application with the benefit of indication battery how much charge available in it. This is also help to improvement in health and fitness.**

Keywords—,pollution , motorized two-wheeler, electric bicycle.

I. INTRODUCTION

Every Metro city in india like pune,mumbai,dehli are polluted due to large amount of motorbikes and transport use. According to cbn news surve India has now become the largest motorcycle maker in the world. India sold 17.5 million motorcycles during the last fiscal, 2016-2017 making it the largest motorcycle manufacturer in the world overtaking China. Hence the paper contributes towards a reduction of pollution caused by motorized two-wheelers by motivating the use of bicycle converted to plug-in electric bicycle[1].

2. internal Design

Electric vehicles make use of BLDC motors as the propulsion method. Due to the fact that BLDC motors do not have brushes, they present some advantages over the DC brushed motors, from which we remember: (I) longer life span, (II) lower EMI (Electromagnetic interference) radiation, (III) noiseless operation[2].

Due to the geometry of the windings in the motor, the BEMF (back electro-motive force) generated by the motor when in generator mode can be BLDC motor is presented in Fig. (I). BLDC motors are 3-phase motor[2].

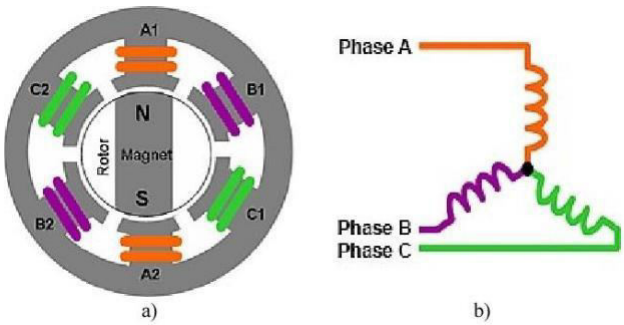

Fig. 1. BLDC motor: a) simplified internal structure; b) motor phase

then we are using lithum ion battery 48v and 9amp and use BMS(Battery mangment system) here is some information about batterys Lithium batteries are most modern type of battery used in present day power system and electric vehicles. Lithium batteries are batteries that have lithium as anode. Among that Lithium –ion and Lithium-polymer batteries are widely used in portable power systems and electric vehicles. Lithium batteries have several features such as high energy density, high power density and more cycle life than other types of secondary batteries[6].

The advantages of Lithium batteries are namely i) Sealed cells: no maintenance required ii)Long cycle life iii) Broad temperature range operation iv) Long shelf life v) Low

Self discharge rate vi)Rapid charge capability vii) High rate and high power discharge capability viii) High columbic and energy efficiency ix) High specific energy and energy density x)No memory effect.

The disadvantages are its inability to withstand larger currents i.e. many times higher than its maximum current capacity. It cannot withstand high temperatures and mistreatment causes it to explode. The need of temperature control technology and current and voltage control circuit is the main challenge in the case of Lithium batteries.

3 .BATTERY MANAGEMENT SYSTEM

To ensure smooth operation of lithium batteries battery management systems must be introduced in order to control over charging, undercharging, over current, over voltage and temperature control and protection. Lithium based batteries are intolerant of over-voltage and multi-cell systems require each cell to have an over-voltage detection device[7] .The battery management system includes current monitoring, voltage monitoring, cell balancing and thermal management. Multi-cell lithium-ion battery systems require tightly controlled voltage and current operating conditions BMS shown in fig(II)

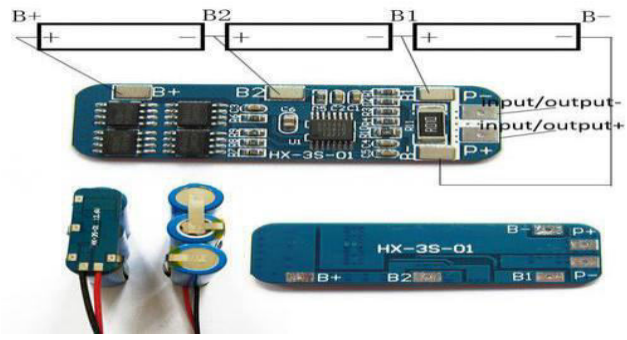

Fig 2 :Battery Management system

4. BLOCK DIAGRAM

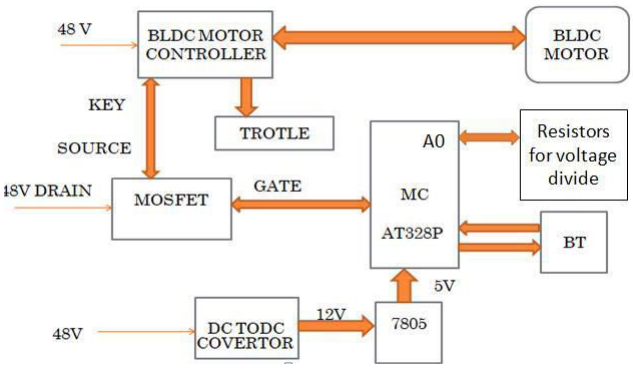

Fig 3 :Block diagram

One of the improvements this design brings is the use of a DC-DC step down converter, which greatly lowers the power consumption of the module and reduces the ambient temperature in the case of the module. The latter is an important issue. The user of the e-Bike receives relevant data (e.g. instantaneous speed, battery state of charge) from the motor controller via Bluetooth protocol and can view the data on a GUI (graphical user interface), i.e. on a smart phone. By using a Bluetooth transmitter instead of a graphical display, the power consumption is furthermore reduced. The hardware implementation of the block diagram from. The power supply is designed using a dedicated DC-DC step down IC (integrated circuit) – By using an IC with integrated power MOSFETs, EM radiations are reduced, due to the fact that there are no necessary external traces on the PCB. The logic circuitry of the controller is presented. The heart of this block is an ATMEGA328P microcontroller. This solution has been chosen as a good compromise between processing power and low consumption. In order to increase the EM radiation immunity of the microcontroller, the voltage supply level of the microcontroller is the maximum allowed, i.e. 5V.

5. ANDROID APPLICATION

MIT App Inventor is an open-source app-building platform that allows users to drag-and-drop visual objects to create an application that can run on the Android system as a means of democratizing mobile app development. Application behavior is provided by piecing together blocks in a visual blocks based programming language. MIT App Inventor is used by students, teachers, developers, hobbyists, and entrepreneurs to develop apps for collaboration, productivity, personal use, recreation, learning, social good, and community activism. The ease of use of the system as a tool for making has contributed to its success and over 10 million people have used MIT App Inventor worldwide to create 43 million projects[4].

Algorithm for MIT app inventor

Open MIT app inventor
Then create project
Enter: listpicker1, listpicker2
IF (listpicker1=1)
{
Print (“scan for Bluetooth device”)
Enter the client name and address
}
Else
{
Listpicker2 =1
If (Bluetooth is ON)
{
Connect the device
Show the battery available
}
Else
{disconnect the device}

6. SYSTEM SPECIFICATION

Table.1 :system specification

Criteria	Designed system	Commercial system
Maximum speed	40km/hr	25 km/hr
Motor power	350W	250W
Averege	50km	35 km
Battery	48V Li-Ion / 9A Ah	36V Lead–acid / 12 Ah
Battery Life cycle	300to500 cycle	50 cycle

The entire system has been implemented and tested. The results obtained are comparable with commercial e-Bikes, and the proposed implementation presents a higher ratio. The results presented in Table I have been obtained using a 350W, 3-phase BLDC motor and a 48V / 9A Li-Ion battery pack, mounted on a 13kg bicycle. The use of Li-Ion cells has been taken into consideration after studying the e-Bike market and observing that many commercial e-Bikes use Lead-acid batteries. The designed e Bike is compared with a commercial e-Bike of about same cost and complexity.

7. CONCLUSION

in India,. It is observed that 2157 tons of CO2, 178 tons of CO, 15 tons of NOx and 4 tons of PM can be reduced. In addition, 115 tons of HC, 14.5 tons of CH4 and 1.05 tons of SO2 can be reduced per day. In addition, the practicability of conversion of the bicycle to proposed plug-in hybrid electric bicycle is discussed in detail along with the sizing of electric power train components[3]. 300 W of motor and 9 Ah, 48 V of battery is sufficient for a travelling distance of 35 km with a maximum speed of 40 km/hr. The battery capacity can be reduced to 5 Ah, 12 V with a wattage of 300 W for a motor with a same maximum speed of 35 km/*hr*. The health of millions of commuters can be improved along with the reduction of time of exercise by using the proposed methodology.

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