RESEARCH ARTICLE OPEN ACCESS

EFFICYCLE USING BLDC MOTOR

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Abstract:

This paper brings an efficient cycle that uses motor instead of using engines, by using a BLDC motor which also controls the pollution. Brushless direct current (BLDC) motor is popular motors in the industry and automotive sectors. In this sector, this motor is often used in an electric vehicle (EV) due to its high efficiency. BLDC motor is an electrical drive that is continually reaching a high popularity in motion controlapplications due to its good dynamic response and low maintenance. Unlike DC motors and Induction motors, BLDC motors need a controller as the motors run in 3 phases but take DC input. It is observed that the proposed scheme works effectively and can be used asa wheel direct driven motor for electrical vehicle.

Keywords —BLDC motor, Electric Vehicle, Controller, Arduino, Battery, Voltage Sensor, LCD display.

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I. INTRODUCTION

In the present, electric vehicles that use batteries are going to replace fuel vehicles because vehicles that use petroleum or fuel vehicles create pollution to the environment, but they can generate mechanical power higher than electric vehicles. Fuel vehicles use rear differential to vary the speed and provide a balance while curving, but it causes a mechanical loss. Therefore, electric vehicles are necessary to reduce mechanical loss to make drive highperformance and reduce pollution to make a good environment.

The goal of any electronic or electrical control system is to measure, monitor, and control a process which can accurately control [2] process by monitoring [3] its output and feeding some of it return to compare the actual output with the desired output so as to reduce the error.

II. PROBLEM STATEMENT

Nowadays earth is getting heated-up due to excess emission of carbon monoxide (CO) from the fuel vehicles,so in order to reduce it, a step has to take to avoid this by replacing the fuels by Batteries [6].

The main concern is, instead of using engines future depends on the motor [1].

III. LITERATURE SURVEY

A survey has been conducted in the main cities as the impact of CO among the people and how it has been affecting them.so this survey gave a clear idea about the pollution effects. In order to reduce these effects, we have to move forward to the electric vehicles which are pollution free.

IV. METHADOLOGY

The block diagram shows the overall working of the system. The motor is getting the supply from the battery through the controller [2] and also the battery is connected to the Arduino through the voltage sensor to get the voltage value and to be displayed.Figure 1 shows the block diagram.

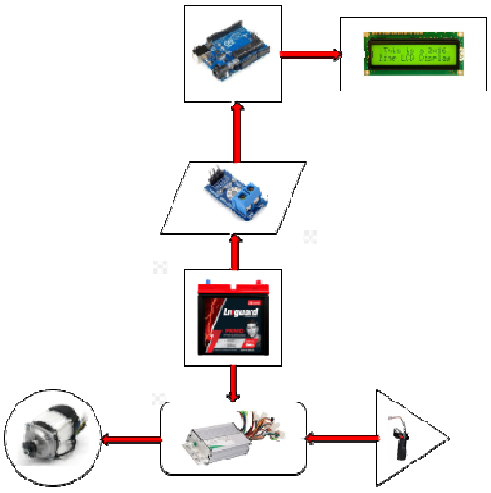

Fig 1: Block Diagram

V. HARDWARE COMPONENTS

In our project, efficycle using BLDC motor, we have developed a mechanical setup for continuous process. The following are the hardware components used,

1. BLDC motor
2. Motor Controller
3. Throttler
4. Battery
5. Arduino
6. Voltage Sensor
7. LED display

1. BLDC motor

Brushless DC motors also known as BLDC motors, have a much longer life span than brushed DC since there are no brushes to wear out. This gives you a better long-term value for your investment. The main advantage of brushless motors[5] is its high efficiency. Brushless motors are the perfect motors for the application running at high speeds. In many cases, brushless motors are made as multi-poles, which enhancesthe torque at the cost of speeds. In suchapplications, a high rpm is not required but a high torque is nice to have. The motor specifications have the information about maximum speed and torque capabilities [1]. Figure 2 shows the BLDC motor.

Fig 2: BLDC Motor

2. Motor Controller

Brushless DC motor systems having compact yet powerful brushless DC motors and high-performance drivers to offer excellent energy savings and speed stability as well as a wide range of speed control [2]. With brushless DC motors, you can downsize your application as the motors have slim bodies and provide high power due to permanent magnets being used in the rotor. It includes the Electromagnetic Brake options. Figure 3 shows the Controller.

Fig 3: Controller

3. Throttler

E-bikes generally combine both pedal-assist sensors as well as a throttle. Some electric bikes

have an electric motor that operates on a power-on-demand basis only. In this case, throttler is used to control and simply operate the motor[4], which is usually on the handgrip just like the ones on a motorbike.

Best throttle for your E-bike [5] no matter what type of your E-bike is, it works on every electric bike. It also works on E rickshaw. There is a button for speed mode choose high speed or low-speed mode on your E-bike. Simply connect the wire and your E-bike is ready to throttle up. It has a smooth start acceleration [4] and uniform stability. This Part is suitable and works together with all kinds of motors. Figure 4 shows the throttler.

Fig 4: Throttler

4. Battery

Reliable performance for E-vehicle application. The powerful yet affordable battery [6] comes with an array of advantages. It is a Cost-effective design that does not compromise on performance that improves reliability. Having a Good starting power and endurance and Effective fume arrestors that enhance safety. It is Instant ignition after reasonable periods of idle stand and a Factory-charged for ready use. Ease of handling. Figure 5 shows the battery.

Fig 5: Battery

5. Arduino

Arduino Uno is a microcontroller. It has 14 digital input/output pins. It has a power jack, an ICSP header, and a reset button. It is having everything needed to support the microcontroller, just simply connect it with a computer with a USB cable or power it with an AC-to-DC adapter or a battery to get started.Figure 5 shows the Arduino.

Fig 5: Arduino

6. Voltage Sensor

It is a simple digital voltmeter, which can easily measure input dc voltages in 0 to 30V range. The Arduino board can be powered from a standard 9V battery pack or from the computer, as usual. The Analog sensor on the Arduino board senses [3] the voltage on the Analog pin from the battery and converts it into a digital format that can be processed by the microcontroller or Arduino. Here, we are feeding the input voltage to the Analog pin using a simple voltage divider circuit contains resistors. With the values used in the voltage divider, it is possible to feed voltage from 0V to 30V into the Arduino board. The junction on the voltage divider network connected to the Arduino Analog pin is equivalent to the input voltage. Figure 6 shows the Voltage Sensor.

Fig 6: Voltage Sensor

7. LCD Display

The LCD has a parallel interface, it refers that the microcontroller has to calculate several interface pins at once to control the display. A register select pin that controls where in the LCD's memory you're writing data. You can select either the data register, which holds what goes on the screen, where the LCD's controller looks for instructions on what to do next. A Read or Write pin that selects reading mode or writing mode An Enable pin that access to writing to the registers 8 data pins (D0 -D7). The states of these pins may be high or low that represents the bits that you're writing to a register when you write, or the values you're reading when you read. There is also a display contrast pin, power supply pins along with ground and LCD Backlight pins. By that you can use to raise the LCD, control the display contrast, and to turn on and off the LCD backlight, respectively. Figure 7 shows the LCD display.

Fig7: LCD Display

VI. CONCLUSION

The following work has been achieved through this work, Emission of CO in the environment can be reduced through this project. In daily life, it can be used as a commuter. The future depends on the E-vehicles.

VII. REFERENCE

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