Solar Powered Electric Bicycle

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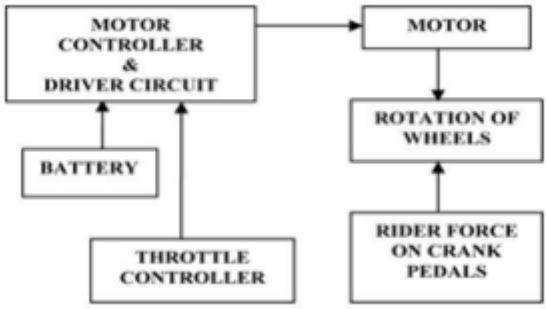
ABSTRACT: The Electric Bicycle System is a systems project that incorporates three different ways of charging a lithium-ion battery. This project is based on an automation technology microcontroller consisting of components such as ATMEGA328 and PIC30F2010 as controllers, three phase inverters, solar panels, hall-effect sensors, variable resistors, etc. In the proposed system, an electric bicycle carries batteries that supply electrical power to a motor that is coupled to either wheel, the engine used here is a BLDC engine with high efficiency. The project consists of additional features i.e. LCD display, umbrella, mobile charger, Bluetooth connectivity and speaker, mobile charging ports etc. This project can be broken down into five separate categories: the lithium-ion battery, the DC-DC converter, the solar panel, the motor, and the motor controller. Hope this design can become very efficient, cost-effective, and one day mass-produced, especially in developing countries where automotive transportation is an impossibility.

KEYWORDS: Electric bicycle, Solar powered, Bluetooth, BLDC motor, Solar recharging, Hall effect sensor.

1. INTRODUCTION:

An electric bike (e-bike) is a bicycle with an integrated electric motor that can be used for propulsion. The aim of the project is to show that it is possible and relatively simple to build an electric bicycle on one's own. E-bikes use rechargeable batteries and lighter ones can travel up to 35 km / h while higher powered varieties can often travel more than 40 km / h. Bicycles can be fully powered by the engine. Bicycles are commonly referred to as electric pedal cycles. In this project, the term "electric bicycle" is used to describe "electric-motor-powered bicycles," including both fully and partially powered bicycles. This electric bike uses the compact circuitry built around the DSPIC30F2010 microcontroller[1]and the programs ATMEGA328 are developed in Embedded C. Power[2] requirements and various driving speed situations are also identified and displayed on the LCD. The results will be confirmed by the results of the experiment. The electric bike offers a cleaner alternative to driving short to moderate distances rather than driving a gasoline-powered car. Solar and energy[3] generated by solar cells. They are environmentally friendly without the use of any fuel or release of toxic fumes that could cause global warming. Solar cells are independent from the power source and can be charged on an ongoing basis. They also have a long life span of at least twenty years and require little or no maintenance. A traditional bike is a two-wheel vehicle powered by a rider who delivers muscle power through a pedal that rotates one of the two wheels. The rider controls the front wheel to create a force that returns and keeps the vehicle's center of gravity in a stable zone whenever necessary, keeping the bike upright. An electric bike[4] carries batteries that supply electrical power to a motor that is coupled to either wheel. In most electric bicycles, the rider may choose to use muscle power to deliver all, part or none of the propulsion power required to maintain the speed of travel. The aim of this project is to reduce human pedal power and riding a bicycle by using a solar-charged battery. It can be easily self-energized.

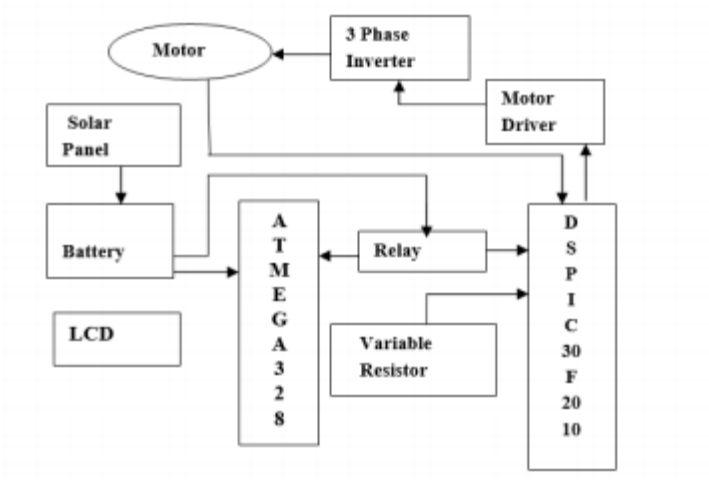
2. EXISTING SYSTEM:



Block diagram for solar powered electric bicycle

3. METHODOLOGY:

The solar panel is used to charge the battery. The Hub engine is being implemented. The "Hall Effect" sensor is built in. The Embedded C tool has been adopted. The variable resistance control method is used to control the speed of the vehicle.



Experimental Details:

The motor could build up to 40A with a 36V battery for 20kms.The electric bike offers a cleaner variety to travel short-to-moderate distances instead of driving the fuel vehicles It will run on clean power with the flexibility to recharge the battery through the power generation of solar cells. The Speed will be detected and fed back to the controller. Battery and Speed are indicated on the LCD display using the ATMEGA controller.

4. RESULTS:

This e-bicycle can be used as personal transporter inside the colleges and schools. This Electric Bicycle run in an efficient manner with the voltage of 37V for 20 km. The Battery level can be displayed in a LCD display and its eco-friendly. It has extra features like mobile charging capacity, Bluetooth and roof facility.

5. CONCLUSION:

Bicycle use is known to be healthy, efficient and environmentally friendly and in some locations is even faster than driving (either because of traffic conditions or because of the distance of parking spaces available from origin and destination, respectively). These include lower energy costs per distance traveled by a single rider, savings in other costs such as insurance, licensing, registration and parking, improved traffic flow, environmental friendliness and health benefits for the rider. This paper shows the design of the electric drive for a motorized bicycle, using commercial components available on the market. In this paper, we proposed an electrical propulsion system using a BLDC motor with sensory speed control and smooth running operation. System performance can be improved if renewable energy sources such as solar power can be used to make the world a much better place to drive safely.

REFERENCES:

[1] W. C. Morchin and H. Oman, "Power control for electric bicycles," in *Proceedings of the Intersociety Energy Conversion Engineering Conference*, 1993.

[2] B. Kumar and H. Oman, "Power control for battery-electric bicycles," in *1993 IEEE National Aerospace and Electronics Conference*, 1993.

[3] L. Alter, "Solar powered electric bicycle.," *TreeHugger*, 2015. .

[4] S. Adhisuwignjo, I. Siradjuddin, M. Rifa'I, and R. I. Putri, "Development of a solar-powered electric bicycle in bike sharing transportation system," in *IOP Conference Series: Earth and Environmental Science*, 2017.