BATTERY CHARGED POWER CYCLE

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Abstract: This paper presents the development of an associate degree, "Electric Bicycle System" with an innovative approach. The aim of this paper is to show that the normal bi-cycle can be upgraded to electric one by some means– that including the development of a regenerative braking system and innovative BLDC motor control – but also uses real- time sensing and the powers of crowd sourcing to improve the cycling experience; get more people riding bikes; and to aid in the design and development of cities. Electric bikes have simultaneously gained popularity in many regions of the world and some have suggested that it could provide an even higher level of service compared to existing systems. There are several challenges that are related electric cycle design: electric-assisted range, recharging protocol and battery checkout procedures. This paper outlines system requirements to successfully develop and deploy an electric

cycle, focusing on system architecture, operational concepts, and battery management. Although there is little empirical evidence, electric cycle could be feasible, depending on demand and battery management, and can potentially improve the utility of existing cycle systems.

Keywords: BLDC Motor, Dynamo, Throttle, Circuit, Lead-acid Batteries.

Introduction: When thinking of possible senior projects, we all decided that we wanted to do something that would somehow be beneficial to the planet. We decided that the electric bicycle would be the best fit. The electric bicycle offers a cleaner alternative to travel short-to-moderate distances rather than driving a gasoline-powered car. In recent years, the United States has increasingly encouraged a cleaner environment and less dependence on foreign oil. The price of crude oil has increased significantly over the past few years and there seems to be no turning back. The environment has also been more of a focus throughout the world in the past few years, and it seems that cleaner alternatives have been steadily on the rise with no end in sight. The electric bicycle is a project that can promote both cleaner

technology as well as a lesser dependence on oil. It will run on clean electric power with the ability to recharge the battery 3 separate ways: through the 120 VAC wall source, by generating power through the pedals of the bicycle, and by solar-cell generative power. An extra benefit to building the electric bicycle is that it can also show the general public how much cheaper it would be to convert their regular bicycle into an electric bicycle.

The transportation in all over world is going to increase in small time period, where advanced vehicle which gives more comfort to human but also affect the human health. Electrical bicycles have been gaining increasing attention worldwide. For the personal transportation the bicycle is the best option. And bike is better than the bicycle, but it requires a fuel to ride and it also creates a environmental effect. The bicycle is drive with the help of electric power. Electrical bicycle uses an electric motor, alternator and battery system, in which riders have to pedal the bicycle and the generated electricity in the generator, is stored in storage battery. The stored energy can be used for riding the bicycle. Electrical bicycle can be used for a variety of purpose.

METHODOLOGY:

1. BLDC Motor:

Specifications:

1) Voltage: 24V
2) Wattage: 350W
3) Rotation: 2650 RPM
4) Torque: 2.5 Nm to 4 Nm
5) Efficiency (%): >75
6) Dimension (Width x Length) = 101x69
7)Application : Scooter and Small Electric motorcycle.

In this project we used 24v, 350W BLDC motor. Brushless DC motors have been in commercial use. Brushless dc motors develop a maximum torque when stationary, And it will be linearly decreasing as increase in velocity. Some limitations of brushed motors can be overcome by brushless motors such as higher efficiency and a lower susceptibility to mechanical wear. Permanent magnets which are placed in a brushless DC motor those magnets rotate around a fixed armature, eliminating problem associated with the connecting current to the moving armature. An electronic controller replaces brush or commutator assembly of brushed dc motor turning. By using solid state circuit the controller distribute the timed power. The brush or commutator system is replaced by the solid state circuit.

2.BATTERY:

Battery used here is 12V, 35Ah lead acid battery. Lead acid batteries are one of the most popular types of batteries in electronics. Although slightly lower in energy density than lithium metal, lead acid is safe, The provided certain precautions are met when charging and discharging. This have many advantages over other conventional types of batteries, the lead acid battery is the optimum choice for a solar assisted bicycle. A battery is rated in ampere-hours (abbreviated Ah) and this is called the battery capacity. The lead acid cell technology is the most efficient and practical choice for the desired application. The battery chosen for this project was a high capacity lead acid battery pack designed specifically for vehicles. Plastic casing is provided to house the internal components of the battery.

3. Twist Throttle:- A twist throttle is a handle that can be twisted to operate and control the motor. It is commonly connected at the right handle bar of motorcycle, but sometimes it can be connected elsewhere, such as on a bicycle as a gearshift.

4. BREAKING SYSTEM:

A bicycle brake is used to slow down or stop a bicycle. V brakes are a side-pull version of cantilever brakes and mount on the same frame bosses. However, the arms are longer, with the cable housing attached to one arm and the cable to the other.. As the cable pulls against the housing the arms are drawn together. Because the housing enters from vertically above one arm yet force must be transmitted laterally between arms, the flexible housing is extended by a rigid tube with a 90° bend known as the “noodle”. The noodle seats in a stirrup attached to the arm. A flexible bellows often covers the exposed cable.

5. CHARGER;

In this project we have used a 220V AC, 50Hz, and 3.0A Charger with the following specifications:

INPUT - 230-250V AC,50-60HZ

OUTPUT - 12-15V DC 3.0AMP

6. DYNAMO:

In electric bicycle system we use a dynamo for generation the electric power. A dynamo is electrical generator they produce power with use of a commutator. Here in electric bicycle dynamo is placed on front wheel of the bicycle and dynamo commutator is connected with front wheel of bicycle. If bicycle is running, at this condition by help of wheel the commutator is rotating and it generates the power. In dynamo use a rotating coil of wire and magnetic, so it converts mechanical rotation into an electric current through Faradays law of induction. A dynamo is simple generator that used to convert mechanical motion into electrical motion with the help of magnet. It consist of powerful magnet and pole on which coil has been rotate about. The rotating coil cuts the line of magnetic force, there by inducing current to pass through the wire. The mechanical energy produced by the rotation is thus converted into electrical current in the coil.

Conclusion: The issues associated with electric bicycles may be addressed by custom-designed drives that are most efficient over a given operating cycle. These include city bicycles, distance bicycles, and speedy bicycles. The results of the studies listed here can serve as a platform to improve electric bicycle performance if new drive systems are designed around key parameters that will result in improvement of the system performance. Furthermore, they can be used for comparison of existing drives in a systematically, comprehensive, and technical way.

There are multiple opportunities with this project and we hope that within a few years, this bicycle can become very efficient and marketable. We understand that this bicycle can be intimidating because of its weight and its ability to go 25 kmph

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