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RESEARCH ON ELECTRIC BIKE

Megha Nishad
Dept. of Computer Science
MCA 6th SEMESTER
Kalinga University, NayaRaipur

Mr.Rahul Chawda
H.O.D
Dept. Of Computer Science
Kalinga University,Naya Raipur

Mr.Srikant Singh
Assistant Professor
Dept. Of Computer Science
Kalinga University, NayaRaipur

Abstract— Sustainable and efficient physical mobility solution for our environment traditionally revolved around the utilization of bicycles or by using the pedestal facilities. An electric bicycle of a cheaper and cleaner various travel short to modern distance instead of fossil fuels automatic. From conventional automobile for transport you experience problems like traffic congestion, parking difficulties and pollution from fossil fuel vehicle. It appears that only pedal power has not been sufficient to supply the uses of petrol and diesel automatic date and therefore it is necessary to investigate both the reason behind the continuous use of environmentally unfriendly transport and consider potential solutions. This paper represents the result of a vast study into an electric bicycle effectively. This paper identifies the potential barrier which electric bicycle overcome it by using a suitable, innovative and powerful solution in front of the suspension of electric motor for assistance.

Keyword: Motor, Controller and Batteries.

I. INTRODUCTION

A significant and effective phenomena that we have an implement impact on mobility pattern is the emergence of the electrically assisted pedal cycle or what is more commonly known as the e-bike[I]. The electric vehicle industry is continually growing. One type of such electric vehicle is an electric bicycle (e-bike). E-bike incorporate a normal DC motor, battery and controller along with the motion electricity generator to charge the mobile phone, which required charging from ordinary domestic powersupply link to an electric motor in the bicycle transmission system[II]. The rider has the power to control the output power from motor such that speed using on handlebar and controller[V]. The term E-bike is generic and includes a combination of different electric power two wheelers some of which function by

1. Motor.
2. Battery.

Simply turning a throttle. Electric bicycles like other electric vehicles use of DC Motor (Direct Current Motor)[I]. This paper presents a way of designing and implementing an electronic module for NP bike the paper shows how a low power can be used to drive such a motor and also manage other useful function for an E- bikes. E-bike make the use of DC motor has the propagation method due to the fact.

From experiences, we know that even at currenthigh oil prices, fossil fuel vehicle is more favored over bicycles, despite of them in the cheaper alternative [VI]. Thus, there are some barriers which may exist to the usage of bicycles. The premise of this paper is toovercome any of these barriers by technological means at minimum cost to create a usable transport for public use.

II.PROBLEM DEFINITION

In the modern days the primary concern of government is find out a way by which we can minimize consumption of fossil fuels and daily life there are certain barriers while adopting this latest technology in our daily life[VII].

However, there are certain values while taking this latest technology in our daily life.

III.INSTRUMENT WITH SPECIFICATION

These are the following instrument specification which is used in designing an "ELECTRIC BIKE", and they are:

3.Speed Controller

1. Moter

A DC motor is any of a class of rotating electrical machines that converts direct current electrical energy into mechanical energy. Themost common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, sincethey could be powered from existing direct- current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field.

2 .B

2.

Fig .1- DC MOTOR.

2.Battery

2.Battry

windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

An electric motor is an electrical machine which converts electrical energy into mechanical energy. The basic working principle of a DC motor is: "whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force". The direction of this force is given by Fleming's left-hand rule and its magnitude is given by F = BIL. Where, B = magnetic flux density, I = current and L = length of the conductor within the magnetic field.

Fleming's left hand rule: If we stretch the first finger, second finger and thumb of our left hand to be perpendicular to each other, and the direction of magnetic field are represented by the first finger, direction of the current is represented by the second finger, then the thumb represents the direction of the force experienced by the current carrying conductor.

Batteries come in many shapes and sizes, from miniature cells used to power hearing aids and wrist watches to small, thin cells used in smart phones, to large lead acid batteries or

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devicessuch as flashlights, smart phones, and electric cars.

When a battery is supplying electric power,its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a red ox reaction convert.

high-energy reactants to lower-energy products products, and the free- energy difference is delivered to the external circuit as electrical energy.

Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved to include devices composed of a single cell.

Primary(single-use or "disposable") batteries are used once and discarded; the electrode materials are irreversibly changed during discharge. Common examples are the alkaline battery used for flashlights and a multitude of portable electronic devices. Secondary (rechargeable) batteries can be discharged and recharged multiple times using an applied electric current; the original composition of the electrodes can be restored by reverse current. Examples include the lead-acid batteries used in vehicles and lithium-ion batteries used for portable electronics such as laptops and smartphones.lithium-ion batteries in vehicles, and at the largest extreme, huge battery banks the size of rooms that provide standby or emergency power for telephone exchanges and computer data centers.

According to a 2005 estimate, the worldwide battery industry generates US$48 billion in sales each year, with 6% annual growth.

Batteries have much lower specific energy (energy per unit mass) than common fuels such as gasoline. In automobiles, this is somewhat offset by the higher efficiency of electric motors in converting chemical energyto mechanical work, compared to combustionengines.

Batteries convert chemical energy directly to electrical energy. In many cases, the electricalenergy released is the difference in the cohesive or bond energies of the metals, oxides, or molecules undergoing the electrochemical reaction. For instance, energy can be stored inZn or Li, which are high-energy, metals because they are not stabilized by d-electron bonding, unlike transition metals. Batteries are designed such that the energetically favorable redox reaction can occur only if electrons move through the external part of the circuit.A battery consists of some number of voltaic cells. Each cell consists of two half- cells connected in series by a conductive electrolyte containing metal cations. One half-cell includes electrolyte and the negative electrode, the electrode towhich anions (negatively charged ions) migrate; the other half-cell includes electrolyte and the positive electrode, to which cations (positively charged ions) migrate. Cations are reduced (electrons are added) at the cathode, while metal atoms are oxidized (electrons are removed) at the anode. Some cells use different electrolytes for each half-cell; then a separator is used to prevent mixing of the electrolytes while allowing ions to flow between half-cells to complete the electrical circuit.

Each half-cell has an electromotive force (emf, measured in volts) relative to a standard. The netemf of the cell is the difference between the emfs of its half-cells. The net emf is the difference between the reduction potentials of the half-reactions. The electrical driving force or across the terminals of a cell is known as the terminal voltage (difference) and is measured in volts.The terminal voltage of a cell that is neithercharging nor discharging is called the open- circuit voltage and equals the emf of the cell. Because of internal resistance, the terminal voltage of a cell that is discharging is smaller in magnitude than the open-circuit voltage and the terminal voltage of a cell that is charging exceeds the open-circuit voltage. An ideal cell has negligible internal resistance, so it wouldmaintain a constant terminal voltage of until exhausted, then dropping to zero. If such a cell maintained 1.5 volts and produce a charge of one coulomb then on complete discharge it would have performed 1.5 joules of work. In actual cells, the internal resistance increases under discharge and the open-circuit voltage also decreases under discharge. If the voltage and resistance are plotted against time, the resulting graphs typically are a curve; the shape of the curve varies according to the chemistry and internal arrangement employed.

The voltage developed across a cell's terminals depends on the energy release of the chemical reactions of its electrodes and electrolyte. Alkaline and zinc–carbon cells have different chemistries, but approximately the same emf of 1.5 volts; likewise NiCd and NiMH cells have different chemistries, but approximately the same emf of 1.2 volts. The high electrochemical potential changes in the reactions of lithium compounds give lithium cells emfs of 3 volts or more.

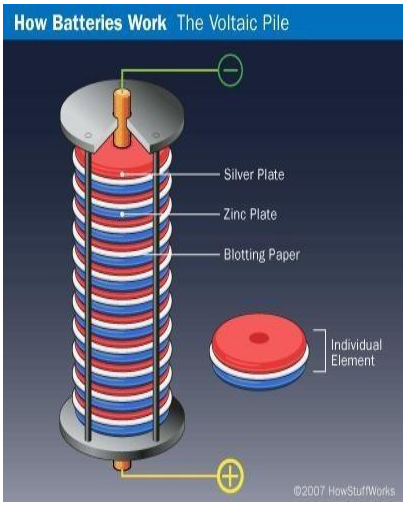

Fig .2- BATTERY

3.Speed Controller

The mechanism of an electric speed controller varies depending on whether you own an adaptive or purpose-build electric bike. An adaptive bike includes an electric drive system installed on an ordinary bicycle. A purpose-built bike, more expensive than an adaptive bike, provides easier acceleration and affords more features. The mechanism of electric bike speed controller varies in these two types.

Speed Control Basics

The speed controller of an electric bike is an electronic circuit that not only controls the speed of an electric motor but also serves as a dynamic brake. This controller unit uses power from the battery pack and drives it to the hub motor. Different types of controllers are used for brushed and brushless motors. For adaptive e- bikes, a conversion kit is used and the controller is the main component of that kit.

Function

The electric bike speed controller sends signals to the bike's motor hub in various voltages. These signals detect the direction of a rotor relative to the starter coil. The proper function of a speed control depends on the employment of various mechanisms. In a purpose-built electric, bike, Hall effect sensors help detect the orientation of the rotor. If your speed controller does not include such sensors -- and the speed controller on

Benefit:-

Once you understand the basics of your electric bike speed controller, you can easily shift between the two modes of operation -- manual pedaling and electric driven. This allows you to get a good workout without overly taxing your muscles and lungs. If you're a beginning cyclist, for instance, you might find yourself breathless during uphill climbs. You can switch to your electric speed control while climbing hills, gradually reducing your dependence on the electronic operating as your endurance increases. If you enjoy biking with family and friends, the ability to switch to electric speed controls can help ensure a comfortable ride for everyone, regardless of differing abilities and strengths.

Considerations

The aesthetics and speed controller of an electric bike varies depends on whether you buy an electric bike new or convert a standard bike. you might find it economically and environmentally sound to use either for transportation. Electric bikes don't produce gas emissions or noises The top speed of an electric bike is limited to 20 mph, so it reduces the chances of accidents and serious injuries of the riders as compared to manually operated bikes. An electric bike costs less to operate than other fuel-powered vehicles.

Fig .3- SPEED CONTROLLER

IV. CONSTRUCTION

8.SEAT:-It is mounted on the top of the frame with the comfortable cushion, so that rider sits comfortably.

a.POWER ON DEMAND:- Some e-bikehave electric motor that operate on thepower on the demand basis only. In this case the electric motor is engaged and operate manually using a throttle, which isusually on the handgrip just like the ones on the motorbike or scooter.

FRONT AND REAR WHEEL: - It is themain component of an automobile. There are many types of wheel are available in themarket with high specs. However, we are using 36 spokes 24-inches tubeless wheel onboth front and rear for better performance.

1. BRAKE: -Brake is the most importantbecause of the help it, we can stop the vehicle. There are many types of brakes are present in the market, but we are using the most suitable brake with our requirement which is a normal brake as the normal brake gives the more comfortable feeling to theuser of this bike.
2. THROTTLE: -Throttle is the main component by which we can control the power delivered to the wheel with the help of a motor and engage and disengage the motor to the wheel as well. There are many types of throttle available in the market but we are using racing type throttle by which we can control the speed of the motor.
3. CONTROLLER: - It is a controller box, which acts as a brain of the e-bike. It controls all the electrical systems as well as BLDC motor and the throttle also.
4. FRAME:-It is a backbone of every automobile.The entire components is mounted in it. We are using an aluminum based frame.
5. PEDAL:-It is the component connected in both the side and with the front sprocketis connected to the chain and chain are connected with the rare sprocket and doing pedaling we can drive the rare wheel.
6. MOTOR:- To provide a driver to the rear wheel without the necessity of the human power we need an alternative such as a motor.Therefore we are using this to fulfill our requirement.

V.CONCLUSION

With the help of these research paper we area able to design an e-bike which may be the solution to our problems which we are experiencing now a days like traffic congestion, parking difficulties and pollution from fossil Fueled vehicles. And it provides the greatfacility to Charge the mobile phone whilethe user was driving the cycle.

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