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DESIGN AND DEVELOPMENT OF ELECTRIC TWO WHEELER WITH FAST CHARGING

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Abstract
The main aim of this paper is to give the exact view by bridling the various sources of energy available to mankind. In today's modernized world travelling is very essential for human beings in order to protract in this world .And to do so his travelling should be done in minimum possible way. This project details about the Electric Bike which runs on the battery thereby providing voltage to the motor. This Paper compromises with design and fabrication of Electric Bike which makes use of Electric energy as the primary source. The electrical power generated which is used to run the bike can give better fuel economy compared to conventional vehicle, better performance and also causes less pollution. It provides an eco friendly vehicle and reduces the usage of fuels. Thus here transmission is also used as to control the speed of the vehicle as by increasing and decreasing .The speed can be varied as like gas powered motorcycle.

Keywords:
Arduino, Fast Charging, Battery Management System, Electric Vehicle

I.INTRODUCTION

The Electric bike is a bike which is driven with the help of battery which is coupled to electric motor. Energy crisis is one of the major concerns in today's world due to fast depleting resources of petrol, diesel and natural gas. In combination with this, environmental decay is an additional factor which is contributing to the depletion of resources which is an alarming notification. Our project has the solution for this above perilous problems .The system which we innovated is the Electric Bike. This project has various benefits both to the members of the team and also external benefits thereby making awareness of using alternative modes of transport. The Electric Bike which works on the battery that is powered by the motor is the general mode of transport for a local trip. The solar panels can be alternative source for this by adding it to the system. The Electric bike which will be running on battery, the power is supplied by the motor, thereby supplying this power to drive the other gear components. The main purpose of using this E-bike is that it is user friendly, economical and relatively cheap. The efficiency of this system undeniable compared to conventional modes of transport. E-bike comprises the features like high mobility efficiency, compact, electrically powered, comfortable riding experience, light weight vehicle. E-bike is the most versatile future vehicle considering its advantages. Electric motorcycles and scooters are plug-in

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electric vehicles with two or three wheels. The electricity is stored on board in a rechargeable battery, which drives one or more electric motors**.**

II.BLOCK DIAGRAM

The diagram shows the parts and the connection between them so it can be easily identified. The parts are as follows:

- Battery
- Motor
- Chain Drive
- Controller
- Throttle
- Charger

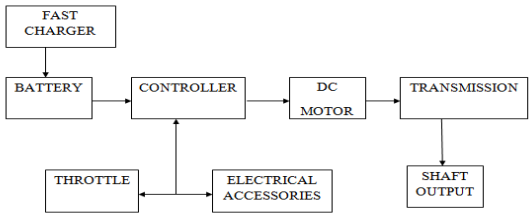

Fig 1: Block Diagram

BATTERY

Lithium batteries are primary batteries that have metallic lithium as an anode. These types of batteries are also referred to as lithium-metal batteries. They stand apart from other batteries in their high charge density (long life) and high cost per unit.

Fig 2: Battery

The three primary functional components of a lithium-ion battery are the positive and negative electrodes and electrolyte. Generally, the negative electrode of a conventional lithium- ion cell is made from carbon. The positive electrode is a metal oxide, and the electrolyte is a lithium salt in an organic solvent.

MOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most 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 form of motor widely used, as they 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 windings. Small DC motors are used in tools, toys, and appliances. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. This output could either be DCAC-DC transformation or DC-DC conversion, based on the selection of a DC brushed motor.

Fig 3: DC Motor

the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles**.**

CONTROLLER

Fig 4: 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 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 an adaptive bike may not the electromotive force of the undriven coil is calculated to get the rotor orientation. The analog control systems on this bike are a result of the need for user operation of the motor control elements.

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CHARGER

Fig 5: Charger

The Charger can be used to charge batteries of Bikes and Cars. It has provision to set the charging current to 2A or 4A. The charging time for bike will be 3 to 4 hours and the charging time for car will be 8 to 10 hours. Anyhow if the battery is not fully discharged then the charging time will be lesser. Batteries do not like to be stored in very hot or very cold conditions, or to be subject to conditions of high moisture. They also do not like to be left in a fully discharged state.

III.SIMULATION

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards.

Mode 1(switch off)

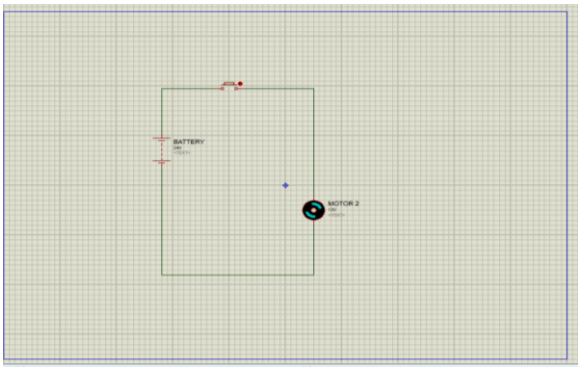

Fig 6: Simulation

Now run proteus simulation the motor does not react because of the open switch.

Mode 2(switch on)

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Fig 7: Simulation

Now run the proteus simulation the motor will start working because of the closed switch

IV.HARDWARE IMPLEMENTATION

Fig 8: Screen shoot of hardware

It works on the principle that the electromotive force of an A.C. motor which receives electrical energy stored in D.C. battery is converted with the help of D.C. to A.C. converter.

An electric motorcycle works essentially the same way a gas-powered motorcycle works it is propelled by an engine, and that engine requires fuel. The main difference is that the gas fuel in a conventional motorcycle is replaced by either batteries or fuel cells in an electric version. The operating principle of an electric motor is quite similar to that of a gas engine. In both cases motorcycles are powered by mechanical energy, but only in one case are they powered by rechargeable batteries. Electric vehicles run on electricity,
that causes a pole into the motor to spin it. It isn't so much a fuel-powered motor but rather a battery that can travel a range of 40 to 100 miles between charges .When the battery is ON the current flows to the motor and the power is transmitted to the rear wheels with the help of chain driveshaft.

ADVANTAGES

- Allows seniors or those physically unable to far travel longer distances

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- The down tube battery keeps weight low and Enhances balance
- It is compact and requires very little maintenance.
- Allows you to travel faster than a regular bike (especially when going uphill).
- Easy to maintain, it's just an ordinary bike with an added battery and motor.
- Very useful for commuting quickly and avoiding traffic.
- High mobility & versatility – overcomes off-road, dirt, snow.
- Less energy consumed.
- High efficiency can be obtained if inverter is used.
- Normal Drag / Pedal is possible – can be taken inside house.
- Deployable batteries – can be taken inside house.
- If using solar panel, free utilization of energy can be done.

V.RESULT

As the future of automobiles will be mostly of electrical and electronics this would help in such way. While the market abounds in motorbikes, electric bikes will soon be the mode of communication for almost every Household .Thus the cost of the fuel and the economical affects that are being faced can be reduced .Electric bike is quite eco friendly and it can bring a huge development to the society in the future here in our project the charging is being the major drawback and the alternate source can be found and it will be rectified as soon as possible

VI.CONCLUSION

With the increasing consumption of natural resources of petrol, diesel it is necessary to shift our way towards alternate resources like the Electric bike and others because it is necessary to identify new way of transport. Electric bike is a modification of the existing cycle by using electric energy and also solar energy if solar panels are provided, that would sum up to increase in energy production. Since it is energy efficient, electric bike is cheaper and affordable to anyone. It can be used for shorter distances by people of any age. It can be contrived throughout the year. The most vital feature of the electric bike is that it does not consume fossil fuels thereby saving crores of foreign currencies. The second most important feature is it is pollution free, eco friendly and noiseless in operation. For offsetting environmental pollution using of on – board Electric Bike is the most viable solution. It can be charged with the help of AC adapter if there is an emergency. The Operating cost per/km is very less and with the help of solar panel it can lessen up more. Since it has fewer components it can be easily dismantled to small components, thus requiring less maintenance.

REFERENCES

1. P.Manikandan, S.Karthick, S.Saravanan and T.Divya," Role of Solar Powered Automatic Traffic Light Controller for Energy Conservation" International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 12, pp.989-992, 2018.
2. R.Satheesh Kumar, D. Kanimozhi, S. Saravanan, "An Efficient Control Scheme for Wind Farm Using Back to Back Converter," International Journal of Engineering Research & Technology (IJERT), Vol. 2, No.9, pp.3282-3289, 2013.

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3. K.Prakashraj, G.Vijayakumar, S.Saravanan and S.Saranraj, "IoT Based Energy Monitoring and Management System for Smart Home Using Renewable Energy Resources," International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1790-1797, 2020.
4. J Mohammed siddi, A. Senthil kumar, S.Saravanan, M. Swathisriranjani, "Hybrid Renewable Energy Sources for Power Quality Improvement with Intelligent Controller," International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1782-1789, 2020.
5. S. Raveendar, P.M. Manikandan, S. Saravanan, V. Dhinesh, M. Swathisriranjani, "Flyback Converter Based BLDC Motor Drives for Power Device Applications," International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1632-1637, 2020.
6. T.R. Vignesh, M.Swathisriranjani, R.Sundar, S.Saravanan, T.Thenmozhi," Controller for Charging Electric Vehicles Using Solar Energy", Journal of Engineering Research and Application, vol.10, Issue.01, pp.49-53, 2020.
7. G. Poovarasan, S. Susikumar, S. Naveen, N. Mohananthini, S. Saravanan," Study of Poultry Fodder Passing Through Trolley in Feeder Box," International Journal of Engineering Technology Research & Management, vol.4, Issue.1, pp.76-83, 2020.
8. C. Sowmya, N. Mohananthini, S. Saravanan, and A. Senthil kumar," Using artificial intelligence inverter power control which is based on DC link voltage regulation for IPMSM drives with electrolytic capacitor," AIP Conference Proceedings 2207, 050001 (2020); https://doi.org/10.1063/5.0000390, Published Online: 28 February 2020.
9. M.Revathi, S.Saravanan, R.Raja, P.Manikandan," A Multiport System for A Battery Storage System Based on Modified Converter with MANFIS Algorithm," International Journal of Engineering Technology Research & Management, vol.4, issue 2, pp.217-222, 2020.
10. Dr.S.Saravanan, S.Karthick, K.Rajeshkumar,S.Sriramachandran, P.Surjeethkumar," Fishermen Border Alert System," International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.9, Issue, 03, pp.236-241, 2020.
11. A.Ananthan, A.M.Dhanesh, J.Gowtham, R.Dhinesh, G.Jeevitha, Dr.S.Saravanan," IoT Based Clean Water Supply", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.154-162, 2020.
12. S.Karthikeyan, A.Krishnaraj, P.Magendran, T.Divya, Dr.S.Saravanan," The Dairy Data Acquisition System", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.163-169, 2020.
13. A.Arulkumar, S.Balaji, M.Balakrishnan, G.Dineshkumar, S.Saravanan," Design and Implementation of Low Cost Automatic Wall Painting Machine", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.170-176, 2020.
14. N.Harish, R.Jayakumar, P.Kalaiyarasan, G.Vijayakumar, S.Saravanan," IoT Based Smart Home Energy Meter", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.177-183, 2020.
15. M.Amaran, S.Mannar Mannan, M.Madhu, Dr.R.Sagayaraj, Dr.S.Saravanan," Design and Implementation of Low Cost Solar Based Meat Cutting Machine", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.184-190, 2020.
16. R.Anbarsan, A.Arsathparvez, K.S.Arunachalam, M.Swathisriranjani, Dr.S.Saravanan," Automatic Class Room Light Controlling Using Arduino", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.192-201, 2020.

iJETRM
International Journal of Engineering Technology Research & Management

17. S.Monika, M.Priyadharshini, R.Rajalakshmi, T.Rajeshwari, C.Ramkumar, Dr.S.Saravanan," Design and Implementation of Electrochemical Etching Machine", International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.37-44, 2020.
18. V.Periyasamy, S.Surya, K. Vasanth, Dr.G.Vijayakumar, Dr.S.Saravanan," Design and Implementation of IoT Based Modern Weaving Loom Monitoring System", International Journal Of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.11-18, 2020.
19. M.Yogheshwaran, D.Praveenkumar, S.Pravin, P.M.Manikandan, Dr.S.Saravanan," IoT Based Intelligent Traffic Control System", International Journal of Engineering Technology Research & Management", Vol.4, Issue.4, Pp.59-63, 2020.
20. S.Shenbagavalli, T.Priyadharshini, S.Sowntharya, P.Manikandan, Dr.S.Saravanan," Design and Implementation of Smart Traffic Controlling System", International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.28-36, 2020.
21. R.Pradhap, R.Radhakrishnan, P.Vijayakumar, R.Raja, Dr.S.Saravanan," Solar Powered Hybrid Charging Station For Electrical Vehicle", International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.19-27, 2020.