

Use of Potential Energy to Charge battery in Electric Vehicle

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Abstract – The non-polluting mechanized transport is having an increasing demand and has also revived the interest for its use of electric energy for transportation purposes along with helping reduce dependence on ICE vehicles which contributes to pollution. A better and cheap alternative to this is an electric driven bike. However, due to current conditions and improvement in this field, electric bikes have been limited for short distances or recreational purposes as in for personal use. This paper describes the complete making of an electric bike that will increase the scope of its use by increasing the range of its run per charge. This bike consists of two sources of energy. The already charged battery will take the rider to a limited distance, and electric motor running off a 36-volt lead-acid battery. The power module is controlled by a microprocessor, so that the rider can operate the bicycle at a set speed which is also known as cruise control. This power control module attached to the motor will manage and reverse the current flowing from the motor if the speed of bike exceeds the desired speed. This leads to the generation of current from a third wheel that charges the battery, and thus provides regeneration when moving down the slope, or when the rider is moving faster than the set speed.

Index Terms— Potential energy, Electric energy, Bike, Generation, Utilization, Slope, Energy storage, Efficiency, Battery.

1 INTRODUCTION

A much important factor in the development of mankind is proper utilization of energy. We can clearly see that as conventional resources are depleting, the development and research on inexhaustible, unconventional and renewable energy resources is required for our existence like wind energy, solar energy, tidal energy, Etc. The conventional electric power has been utilised by humans for a sufficiently large time period and the technology linked with its utilization and harvesting is more changed and modified compared to other energies that leads to more pollution nowadays. Today electric energy is attracting the attention of power sector and their application is entering into quicker development. Electric energy is considered as another form of energy using wind, solar which gives electricity without any pollution creation and use of it doesn't emit any harmful gases. It is a kind of clean fuel. Nowadays, usage of electricity is increasing and technology related to electric application is also boosting almost in the last couple of years. Hence utilization of this energy and application of this is efficient than using conventional fuel, for example using gravitational force. The Mechanical energy generated from the rotation or any other means can be utilized and converted by various techniques into electrical form of energy which can be

utilized at a broader extent. DC motor is a device used to convert one form of energy into another. In the industries, the speed of DC motor is set to a specific value to perform various task and for load changes. Dc motor can also be used as a generator in a way.

LITERATURE REVIEW

Previously Stanford students have made this project but it had some drawbacks the article presents an overview of the past present and future of electric bike along with the problem an electric bike has face at particular phase of its development. There are various Objective included in this Project e.g Production of two wheeler electrical vehicle which utilises existing mechanical energy so the vehicle can run longer on one charge and used on most of the road particularly domestic places and avoiding conventional vehicles which uses fossil fuels that causes pollution and harms environment and additionally the fossil fuels are not available in abundance.

METHODOLOGY

This project can be done by means of an alternator, Slope utilization in the electric vehicle uses an alternator which will utilize gravitational energy on slopes and conserve energy instead of conventional fuel Sources or conventional electric vehicles. There has been large ongoing research on electric vehicle and conserving energy but no one has worked on utilizing slopes. The initial step will be to design the model in solidworks suitable to make room for the alternator and an extra wheel once a model is fixed then we select the required DC motor/BLDC motor. The electric bike will be having two set of batteries, one of which will always be in discharge or partial discharge state so that that the electric energy while moving on the slope will always be stored. If we just get one

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set of batteries, then the energy generated during downward motion of the bike will not be able to be stored during 100% charge condition as batteries are charged. Hence two set of batteries are needed in this system. Once the required parts are selected followed by the selection of a suitable material which is headed for the fabrication and then assembled on the vehicle. The model is then ready and can be sent for repeated testing.



the increasing global warming due to combustion of fossil fuels. Once a third wheel having BLDC motor is attached to the bike it will start generating energy and start storing in the battery for later use.

Among the different renewable energy sources that are nowadays suitable for integration with the already available electric bike. Particularly the utilization of already available energy like Kinetic Energy. The purpose of this electric bike and efforts in increasing mileage is to reduce the conventional bike which produce a lot of pollution and are not so Eco-Friendly. Also, the electric bikes are mostly made for domestic use.

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WORKING

This little electric bike contains battery which can be charged regularly and runs on electricity. Today's problems being wastage of energy which was utilized in this bike using alternator. When the bike is navigating on plain roads it will use energy from battery hence battery will get discharge but it's also not utilizing energy which we can be utilized. Hence alternator is used to utilize this energy which is being wasted specifically on the slopes so we can generate electricity on slopes when going downwards. When the bike is on slope going downwards, the battery won't give the supply i.e. it will stop hence because of inertia of bike, it will continue to move while alternator will be switched as a generator of energy. It will produce the electricity using the BLDC motor which can be used to produce more electricity and then this electricity is stored in battery which will be utilized later whenever required.

Conclusion

Renewable Power in India is a fast developing industry. With about 1/3rd of the roads especially highway having slopes, the calculated kinetic energy conserved during this bike can be of immense importance in (kWh) per charge a usual electric bike can generally travel 50 km with a single charge but with this utilization, the range can be increased to 55km depending on the road. This new method of harnessing available energy can overcome the disadvantages and drawback of IC engine bike or conventional electric bike, 2-4 kms increase per charge can lead to 700-1400 km in a year due to 365 charges in a year. We can implement this bike for daily use and can help prevent