FABRICATION AND IMPLEMENTATION OF THE SOLAR E-BIKE

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Keywords: EV-electric vehicle, PVC - photovoltaic cell, IOT -internet of things, sensors-DHT11, voltage sensor ,current sensor , microcontroller -ESP8266 ,BLDC - brush less direct current.

INTRODUCTION

India is one of the ten largest automobile markets in the world today. The average population is growing well, purchasing power is increasing, and the economy is growing steadily. But gasoline prices have increased by more than 50 percent. 13 Levels of the last two years. India's potential demand to use alternative technologies such as electric vehicles (EVs). Although the initial investment is approximately 1.5 times higher than that of a traditional internal combustion engine, there has come a time when environmental costs are considered more important than vehicle costs. The aim of the project is to describe the technology used to make electric cars and explain why electric cars are better than internal combustion engines. It includes the reasons why electric vehicles are growing rapidly and why it is necessary to improve the world today.

Solar car refers to the use of photovoltaic cells (PVC) to generate electricity from solar energy and then store it in the battery. The tricycle operates using energy stored in the battery. PVC is the building block of solar panels and is made of semiconductors, mostly light-absorbing silicon. The electricity produced is used to start the car's engine. However, now that consumers are showing interest in renewable energy, automakers like Mahindra, Hyundai and Kia are launching electric cars in Nepal.

Cities all over the world are experiencing rapid growth. Urban mobility is one of the

problems that needs to be solved and improved for a better life in society.

The increase in mobility is closely related to traffic conditions, fuel consumption, vehicle emissions, pollution and quality of life. Urban traffic is a common problem in many cities around the world. Urban traffic problems affect the quality of life, and environmental safety is attracting increasing attention worldwide.

Objectives

- To have continuous charging on the EV using solar panel to avoid natural charging time gap
- A proper controllable well designed EV bike with reduced drag effects with proper safety to drive.
- To monitor all the factor of the EV an proper monitoring system with IOT enabled and an display unit.
- An working E-bike with zero pollution generation.
- Lightweight and Durable Frame Design

Methodology:

The below image (fig1) is the block diagram of the project. The solar panel is used for the continues charging of the EV while in absence of the sunlight the charger is used to charge the battery of the EV by the grid controller is used is too control the EV based on the user input such as braking and acceleration based on these values the voltage supplied for the motor will be varied. To have proper monitor over the factors of the EV the sensors and microcontrollers and even the display with IOT enabled devices is used.

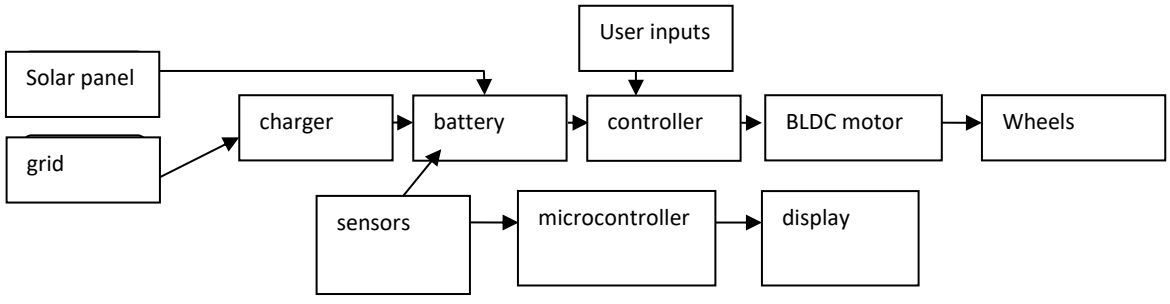

Fig1

To have proper designed frame work to have all these components with safety and offering less drag the below image (fig2) describes the image of the design which includes coil spring suspension to have comfort for the user and even aerodynamic

shape which reduces the drag.

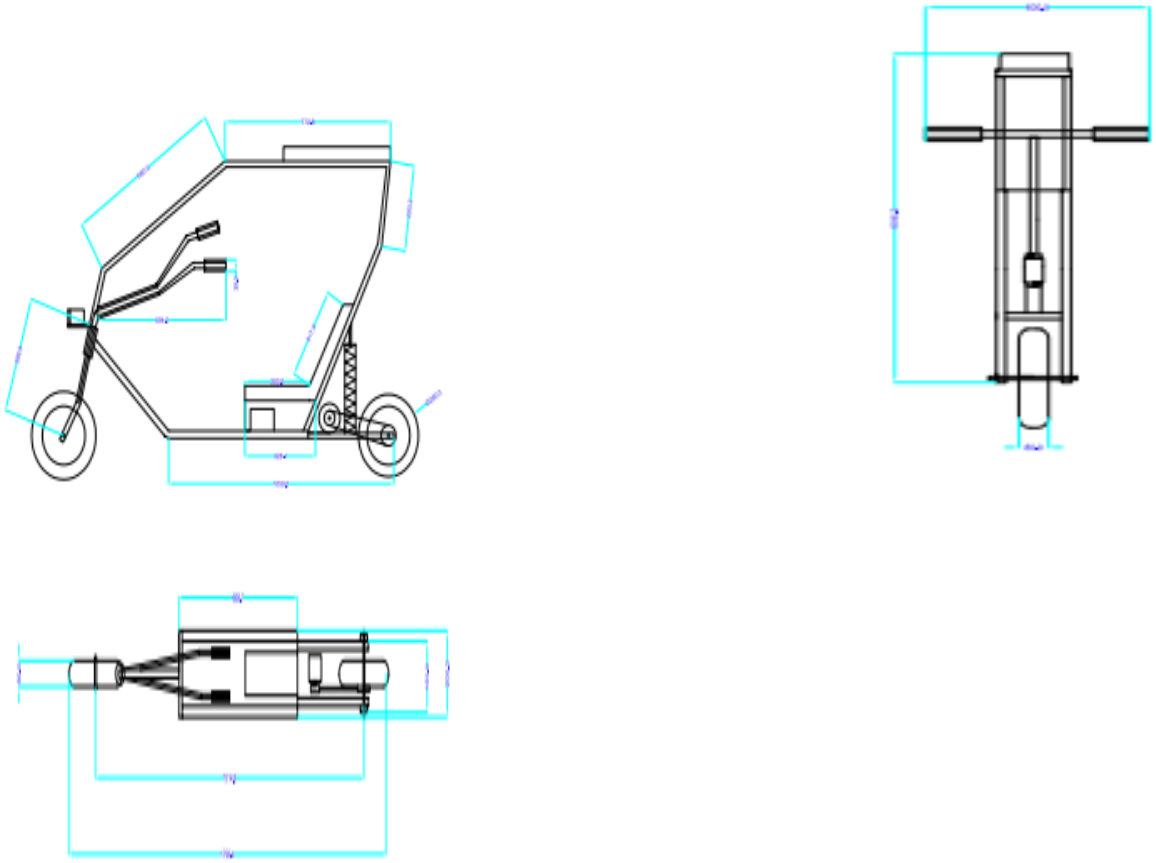

Fig 2

After the completion of the projects tests are done the E-bike such as water proof test, load test and aerodynamic and distance test are conducted for to get the exact operating conditions of E-bike and get the exact analysis.

Results and conclusion:

The proposed "Fabrication Implementation of the solar e-bike" stands out in its approach with the normal electric bikes It goes beyond previous working of electric bike by combining solar module with electric bikes which give much more advantage to the users as solar provides continuous charging to the electric bike and reduces the charging time and even reduces the loading crises on the grids as before due to normal electric bike there was huge spike in the electric loads but due to this project change can be brought in the current situation as maximum usage of the electric bike can be seen. In conclusion,

the fabrication and implementation of a solar-powered electric bike represent a significant advancement in sustainable transportation technology. By integrating solar panels onto the bike's frame or accessories, riders can harness renewable energy to supplement the battery's charge, thereby extending the bike's range and reducing dependence on grid electricity. The fabrication process involves carefully selecting efficient solar panels and integrating them seamlessly into the bike's design while ensuring structural integrity and aerodynamic performance. Implementation requires consideration of factors such as solar panel orientation, charging efficiency, and compatibility with the bike's electrical system. Despite challenges such as limited surface area for solar panels and variable weather conditions affecting solar energy availability, the concept holds promise for reducing carbon emissions and promoting eco-friendly transportation solutions. With continued innovation and improvements in solar technology, solar e-bikes have the potential to become more widespread, offering a sustainable and cost-effective alternative for urban commuting and recreational cycling.

Description and innovation of the project:

- The design of the E-bike is most unique having less drag and well balanceable design and can withstand a load up to 120KG.
- This project is mainly based on solar charging and offers an on board continuous charging condition it's an unique ability as compared in other E-bike.
- The IOT enabled E-bike gives more advantage to the user to have continuous monitoring of E-bike parameters and life cycle of the battery maintaining a history of all the parameters.
- The suspension on the bike gives makes user to feel fewer jerks.
- The figure 3 describes the prototype of the design an working model of our design

Fig 3

Future work space:

- Installing battery cooling system and battery fire extinguish system.
- Designing and installing new kind of solar panel on the E-bike to make the bike run on complete solar power.
- Replacing of lead acid battery to lithium ion battery
- Reducing width of the bike.
- To increase the ground clearance of the E-bike
- After few more modification design has to be patented.
- To design in addition to make chainless E-bike.
- Using Free/Fly wheel can be generating free electricity which will be given to motors and also given to battery for charging purpose.