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PERFORMANCE AND ANALYSIS OF HYBRID VEHICLE

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Abstract: *In Electric automobiles can help reduce greenhouse gas emissions. EVs not only reduce reliance on fossil fuels, but they also reduce ozone-depleting compounds and promote large-scale renewable deployment. The study of electric vehicle attributes and characteristics, as well as charging infrastructure and charging capacity. The automotive industry has entered a new phase in the production of more fuel-efficient, low-emission vehicles and innovative technology in response to environmental concerns regarding pollution and the conservation of fuel supplies worldwide. Hybrid Electric Vehicle is among the finest innovations (HEV). The hybrid electric vehicle utilizes multiple energy sources for entire propulsion. In this project, two independent propulsions, an internal combustion engine (ICE) and an electric motor, are independently operated for combined effort derivation in total vehicle propulsion A hybrid vehicle addresses these issues by combining the benefits of both systems and utilizing both power sources under their optimal conditions. Using cutting-edge technology, this proposed solution intends to improve fuel utilization and reduce dependence on nonrenewable resources. The implementation includes the creation of a hybrid electric vehicle (HEV) that employs both battery and petrol power for propulsion. It cuts air and noise pollution by 50 percent while operating as an electric hybrid vehicle (non-polluting). HEVs combine the advantages of high fuel economy and minimal tailpipe emissions with conventional vehicles' power and range. By driving the fabricated two-wheeler in engine mode, electric mode and hybrid mode, the performance of the bike is tested and analyzed by comparing with the conventional vehicle.*

Keywords:*Vehicle,Converter,battery, Controller, Hub motor, .*

1. Introduction.

Electric two-wheelers are two-wheelers that are powered by electricity. To store and convert the electrical, a battery capacity and a motor are attached. To break and alter the speed, user control is normally mounted to the handle . This Figure 1.1 shows the Overview of Electrical Scooter. A battery-operated Vehicle (Two Wheeler) refers to a vehicle designed for road use and powered solely by an electric motor whose movement energy is supplied solely by the vehicle's battery system.

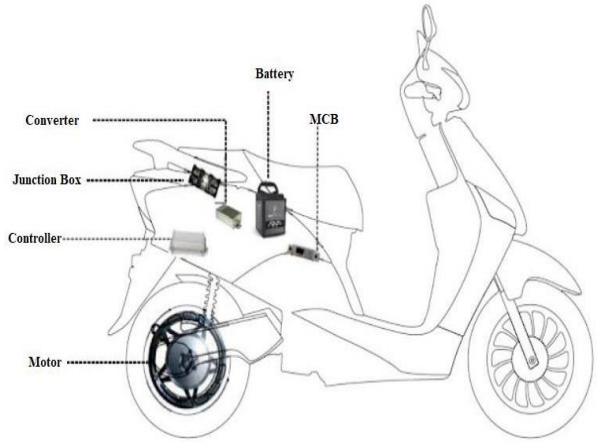

Fig 2. Basic model of Hybrid Vehicle

Electronic Two-Wheelers (ETFs) are a mode of transportation that includes two- wheeled bikes powered almost entirely by electricity (scooter electric bicycles) and low- speed scooters powered by electricity (scooter style electric bicycles). Because of the strong demand for fossil fuels on international markets, as well as the smother ride of environmental concerns caused by an increase in the number of internal combustion engine vehicles, there is a growing interest in battery research and development for electric and hybrid vehicles. These cars represent a viable future solution in the sector of road transportation, taking into account the desire to cut carbon emissions as well as air and noise pollution. Unlike internal combustion engines, which use liquid fuel to power their motors, e- bikes use a brushless DC electric motor (Switched reluctance) that is powered by a rechargeable battery, chargers, and control. The key benefit of these cars is that they do not require any fossil fuel to operate. Because they have fewer moving parts, they require less maintenance. When compared to traditional gas bikes, these e-bikes are more dependable, energy-efficient, and environmentally beneficial. Electric motorcycles in India are free from gas taxes and other laws and do not require an operating license because they travel at a speed of only a few kilometers an hour

2. The Proposed Hybrid Vehicle

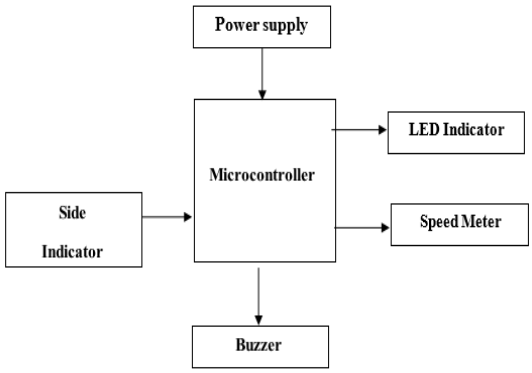

Fig 2. Block Diagram of Proposed Method

A controller is a device or set of devices that regulates the performance of an electric motor in some predetermined way. Starting and pausing the motor, picking forward or reverse rotation, selecting and regulating the speed, limiting or regulating the force, and safeguarding from overloads and faults are all possible to analyze in controller. The control system is the system's central component, controlling all of the system's functional capabilities. This is lithium ion battery, charger circuit the essential necessity for the control, especially for DC motors, is to manage the amount of power given to the motor. This can be accomplished with the help of a controller. By measuring the terminal voltage, the controller calculates the real speed of the motor, which is then LED indicator

3. Power Supply.

The electrical power is almost exclusively generated, transmitted and distributed in the form of AC because of economical consideration but for operation of most of the electronic devices and circuits, dc supply is required. Dry cells and batteries can be used for this purpose. No doubt, they have the advantages of being portable and ripple free but their voltages are low, they need frequent replacement and are expensive in comparison to conventional dc power supplies.

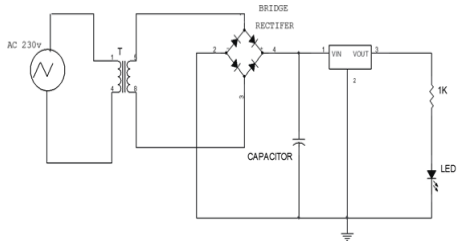

Fig 3. Power Supply

Now day, almost all electronic equipment includes a circuit that converts ac supply into DC supply. The part of equipment that converts ac into dc is called DC power supply. In general, at the input of the power supply there is a power transformer. It is followed by a rectifier (a diode circuit) smoothing filter and then by a voltage regulator circuit.

Components Used

- Tvs Scooty Pep
- Hub Motor Setup
- Battery

4. Hub motor features

- Front wheel drive
- Low speed Motors support up to 50 km/h* Nominal output up to 1500W*
- 22.5 Nm nominal and 104 Nm peak torque
- Weight: 10.0 kg
- No gear, no brush, no wear, no noise
- Smooth, controllable variable speed operation
- Highly energy efficient

5. Hub motor specifications

- Shaft Length: 276mm
- Brake Type: Regular Brakes (shoe type)
- Motor Outer Diameter: 276.5mm
- Brake Size: 110mm
- Types: Tubeless
- Suitable Tyre Size: 90/100-10
- Rated Power: 750W
- Rated Torque: 22.5N.m
- Peak Torque: 104N.m
- Operating voltage: 48V
- Rated Current: 18A
- Peak Current: 39A
- Rated RPM: 650

6. Battery

Electrochemical innovation is generally utilized in microfluidic and Nano fluidic gadgets since they are appropriate for scaling down, have higher affectability than optical location innovation, and can guarantee that their segments are partitioned. It can be dealt with. Not with standing examples, electrochemical identification, and measurement. It tends to be utilized to screen organic cell demise and protein partition/refinement measures. At the point when this sort of innovation is utilized in mix with microfluidic and Nano fluidic gadgets, from the viewpoints of reasoning, cost, impression, convenience, and freedom, fringe gadgets are essential to a plausible structure. An assortment of terminal materials and gear setups have been utilized to meet these prerequisites. The continued improvement of these advances carries a plan to the up-and-coming age of research center on-a-chip hardware that can accomplish the specialized objectives

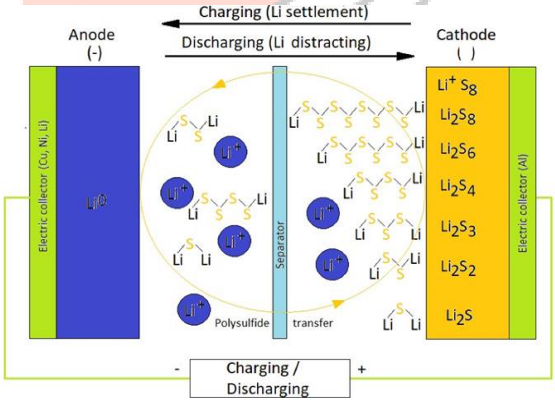

Fig 4. Schematic Model for the Discharge Process in the Electrode in Electrochemical Detection

7. Performance Detection of Lithium Battery

The lithium battery way toward checking information things having a place with a predefined class as indicated by a model developed from a lot of chosen information. Particularly with the end goal of regulated order, at that point, take in the model from the informational preparation collection used to group the concealed test information.

Interestingly, the motivation behind the unaided arrangement is to mark information by gathering the information into significant classes. The possible utilizing streamlining calculations that can make presumptions about the information model

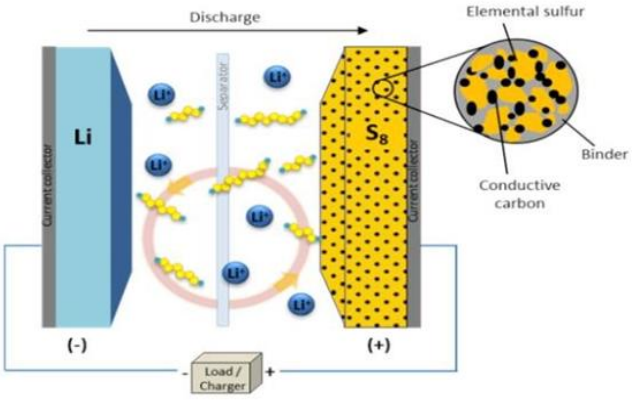

Fig 5.Partial condition-based controlling battery condition.

The arrangement is utilized in territories, including picture handling and record investigation. Directed order is utilized to recognize pictures, districts, or pixels having a place with a given semantic class Despite what might be expected, the solo arrangement is utilized to semantically and semantically bunch a lot of pictures and a class or a lot of pixels on important pictures as indicated by splendor, shading, and surface, or to assemble the pixels in a similar picture region This Figure 5 Shows the Partial condition-based controlling battery condition. However, unlike commercial insert cathodes, high energy density cathodes are still in the research stage because of their low capacity retention rate, and long-term cycling The prolonged cyclic transport due to the reduced capacity of the soluble polysulfide gradually diffuses out of the cathode area.

7. Result and Discussion

Content	Petrol	Electric	Hybrid
Source	IC Engine	Battery	Dual
Drive	Engine	Hub Motor	Dual
Maximum speed	45	35	35 - 45
Mileage	45-50 km	40-45 km	90 km(appx)
Emission	Yes	No	Very low

Table.1: Performance and analysis of hybrid vehicle

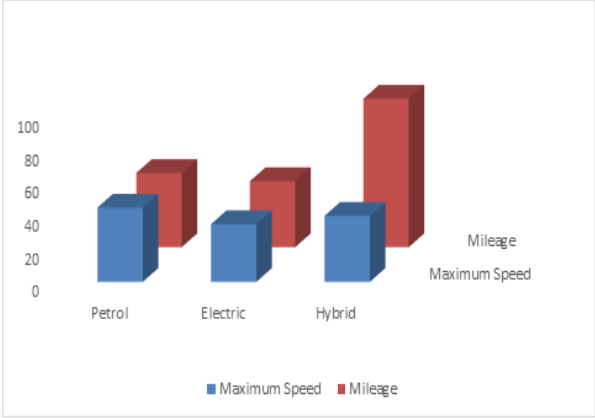

Fig 6. Mileage Vs Maximum Speed

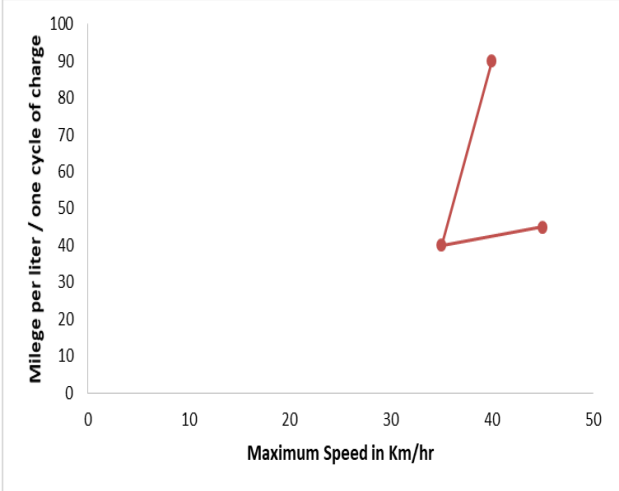

Fig 7. Performance Analysis

7.Experimental setup

8. Conclusion

The efficiency of an HEV obviously depends on the road profiles. A profile is a composition of various parameters. In this paper, few vital parameters are identified using size reduction techniques and based on these DC are ranked in order of their fuel economy using multi criterion optimization methods. The results are further validated using GA based intelligent power split control strategy. It is concluded that the Indian urban DC is promising and provides higher fuel efficiency for an HEV as compared to other countries. The favorable Indian road profile will attract more people to use HEVs, thus boom in the automobile manufacturing market is expected. This will further reduce toxic emissions and will contribute to the Indian economy. It is also recommended that ICA should be applied rather than PCA for extracting DC parameters to analyze the performance as they follow non Gaussian distribution. Engine idling should be considered as a powerful feature for improving fuel economy on city roads.

References:

[1].Srija, D. K., (2019)"Performance analysis of non-isolated high step-up DC-DC converter topologies used in photovoltaic grid-connected electric vehicle charging stations", Fifth International Conference on Electrical Energy Systems (ICEES).

[2]. Arazi, M., Payman, A., Camara, M. B., & Dakyo, B. (2018) "Study of different topologies of DC-DC resonant converters for renewable energy applications", International Conference on Ecological Vehicles and Renewable Energies

[3]. Arazi, M., Payman, A., Camara, M. B., & Dakyo, B. (2018) "Control of isolated DC/DC resonant converters for energy sharing between the battery and supercapacitors", 2018 7th International Conference on Renewable Energy Research and Applications (ICRERA)

[4].Farhani, S., & Bacha, F. (2018) "Modeling and control of a DC-DC resonant converter interfacing fuel cell in electric vehicle" the International Renewable Energy Congress (IREC).

[5].Shen, Y., Wang, H., Al Durra, A., Qin, Z., & "A Structure-Reconfigurable Series Resonant DC-DC Converter with Wide-Input and Configurable-Output Voltages', IEEE Transactions on Industry Applications. 2018.

[6].Singh, S. K., Kumar, D., Prakash, M., Kumar, A., & Sadhu, P. K. (2018)"Analysis and Control Implementation for Instantaneous Mode Switching Bi-Directional DC-DC Converter for Plug-In Electric Vehicle", International Conference on Power, Energy and Environment: Towards Smart Technology (ICEPE).

[7].Sun, Z., & Bae, S. "Multiple-Input Soft-Switching Step-up/down Converter for Renewable Energy Systems", International Conference on Renewable Energy Research and Applications (ICRERA) 2018.