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Subsisting Electrical Vehicle

Dr. Gopalakrishna K[1], Abhay Jain[2], Hemanth S[3], Sharjeel Ansari[4], N Nagachand [5]

[1]Professor, Department of Electronics and Communication Engineering, Jain (Deemed to be University), Bangalore, India

[2-5]Student, Department of Electronics and Communication Engineering, Jain (Deemed to be University), Bangalore, India

ABSTRACT: Since the globe has been searching for more ecologically friendly and sustainable transportation options, electric vehicles have grown in popularity. Electric vehicle adoption has, however, been significantly hampered by the problem of charging them. The installation of charging infrastructure can be expensive and time-consuming, and compared to gasoline-powered cars, the range of electric vehicles is currently relatively short.One such strategy involves charging the vehicle's battery using a variety of renewable energy sources, including solar and wind energy. To further bolster the charging process, kinetic energy from the vehicle's motion can be harnessed and transformed into electrical energy. A very sophisticated charge controller that can successfully and efficiently handle the charging process is essential to the viability of this technology. To maximize the charge rate, this controller must be able to monitor and manage the utilization of the available renewable energy sources. In order to make sure that the charging process does not interfere with the car's regular operations, it also needs to be able to interact with the onboard computer of the vehicle. The primary goal is to create a vehicle that can function and exist on its own, drastically reducing the need for maintenance and dependence on external sources. In this Paper, we have looked at a number of methods for supplying the vehicle with energy as well as the level we were able to attain with the prototype, as well as its potential in the future.

KEYWORDS: Subsisting,EV,Sensors, Charge,Battery

I. INTRODUCTION

The development of contemporary electric vehicles has an impact on the automotive industry today. These vehicles often have an electric motor that is powered by batteries. But the procedure takes more time and can only be used to charge these batteries while they are stationary.There are numerous car kinds that have had an impact on the world today. They run on fossil fuel-based operating systems. At the moment, fossil fuels have a limited lifespan, are more expensive, and pose a significant environmental risk.Since their inception, automobiles have added carbon dioxide to the degradation of our ecosystem.About 20 percent of all CO2 emissions are caused by road traffic, which also contributes to the increase in global-mean surface temperature. Alternative fuels and other energy sources like solar, wind, etc. are advancing the vehicle industry as a result of these limitations. But as technology for internal combustion engines and electric vehicles develops, there are yearly improvements in fuel efficiency and emissions.The introduction of numerous electric car models has particularly aided this improvement in fuel economy. Between 2012 and 2017, the number of electric and plug-in hybrid cars (PHEV) tripled. Although fully electric vehicles have no exhaust emissions, it should be highlighted that the carbon footprint left by their creation and disposal still contributes to environmental harm.Today, there are more hybrid cars on the road. They perform better than the current traditional automobiles. Additionally, electric vehicles are evolving quickly despite the positives and cons of these vehicles. The biggest benefit is that it doesn't need petrol, doesn't emit any pollution, and is also more economical. Longer recharge times, battery replacement, and fewer charging stations are its drawbacks.We have made an effort to build and create a self-charging electric vehicle in response to these issues with this particular vehicle. The power source for electric motor-driven cars is typically a battery, and how well the battery can be charged determines how well the vehicle will run. When the car is immobile, that's the only time it needs to be charged.

In order to generate the necessary power for the vehicle, the major goal of this project is to focus on the most efficient energy generating techniques. These include solar, wind, regeneration, piezoelectric, dynamic braking, induction heating, rechargeable cells, and pressure on the tyres. Additionally, the battery will be connected to the overall power through a charge controller so that the car can continue to run without any requirements on long run.Researchers and engineers are continuously exploring new technologies and concepts that could contribute to self-subsisting vehicles.

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This includes advancements in energy storage, alternative fuel sources, innovative propulsion systems, and even concepts like energy harvesting from the vehicle's surroundings, such as through wind or electromagnetic induction.

II. SCHEMATIC DIAGRAM

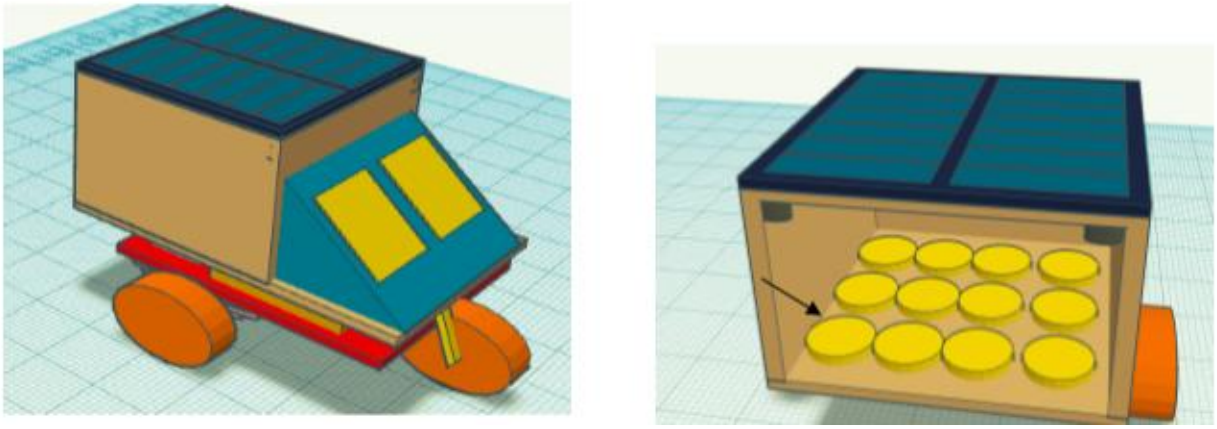

Figure 1: Model Diagram

III. WORKING

There are multiple methods to charge an EV; we figure out the most efficient and cost-effective ones.A motor and dynamo that generates current while the automobile is running and stores it in the battery can be connected to do this. Additionally, a horizontal wind turbine configuration will be fitted in the car's wheels, and a flexible photovoltaic cell will be fixed to the roof of the vehicle to increase the battery's charging capacity. The next section goes into detail about each process.We anticipate employing either a single very effective battery or two batteries in this scenario. One battery can be charged both statically and while the car is driving.On the other hand, if we use two distinct batteries, one will be used to power the motor and the other will charge while the first one empties. The second battery will power the motor after the first battery discharges, while the first battery is being charged.By rerouting the current flow into the supply battery during deceleration, utilizing the motor's capacity to serve as a generator, and switching the direction of current in the motor-battery circuit.When under mechanical stress, some materials exhibit the piezoelectric effect, which causes them to discharge an electric charge.

While driving on the road, electric vehicles can be recharged via this effect. The concept is to incorporate piezoelectric materials beneath the road surface, which when crossed by moving automobiles, will produce electricity. Electric cars can then be powered by the generated electricity, which has been stored in batteries. Due to its ability to continuously charge electric vehicles while they are being driven, this technology has the potential to completely change how we recharge our electric cars. This would eliminate the need for frequent pauses at charging stations. Additionally, this technique reduces the need for non-renewable energy sources by producing electricity from the mechanical energy of moving cars.

Power Generation: The vehicle would have a number of power generation systems. This might comprise Solar panels: Built-in solar panels would harness solar energy and turn it into electricity. To maximize energy production, these solar panels would be made to cover as much of the vehicle's surface as feasible.Then, Wind Turbines: Wind energy might be captured and converted into electricity using wind turbines built into the frame of the vehicle. While the car is moving, this might be especially handy.Alos, Energy Harvesting: To collect and transform different types of energy, the vehicle may make use of energy harvesting devices. It might, for instance, gather kinetic energy from road friction or vibrations and transform it into electrical energy.

When mechanical pressure or stress is applied to piezoelectric materials, electricity can be produced. Using this concept, energy can be produced from the mechanical motions and vibrations that take place as a car travels along the

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road. The electric vehicle's range can be increased and the need for regular refuelling decreased by using the generated electricity to recharge the battery.Installing piezoelectric plates on the vehicle's load deck is the basic concept. In order to transform the mechanical energy produced by the piezoelectric plates into electrical energy that may be used to replenish the car battery, these plates are connected to an energy collecting circuit.

First, similar constructions are used on three-wheelers, such as mounting solar panels on the top of the vehicle and wind turbines on the wheels. Additionally, the regenerative braking system will be the same as the current system, and for the piezoelectric part, the original model's supposedly only locations were on the tyre suspensions. However, this model has the advantage of being a goods mover, which means it has a lot of storage space.

IV. ADVANTAGES

- Energy Independence: Self-sustaining cars would lessen or completely do away with the need for external energy sources like fossil fuels or grid electricity. This independence might result in lower energy costs and less sensitivity to changes in fuel prices or energy supply.

- Environmental Sustainability: Compared to conventional vehicles, self-sustaining vehicles that produce their own electricity from renewable sources, such as solar or wind energy, would have a substantially smaller carbon footprint. They would aid in lowering dependency on non-renewable resources, air pollution, and greenhouse gas emissions.

- Enhanced Resilience: In circumstances where access to energy or fuel sources is constrained or disrupted, self-sustaining vehicles would be more resilient. Even in remote or off-grid places, emergency scenarios, or during power outages, they would be able to continue operating.

- Extended Range and Flexibility: By producing their own energy and resources, self-sustaining cars may be able to go farther between stops for refuelling or charging. This increased range would allow for more freedom and independence when travelling, especially in regions with poor infrastructure or far-flung refuelling facilities.

- Reduced Dependence on Infrastructure: The creation of substantial infrastructure, such as charging or fuelling stations, may not be as necessary with self-sustaining vehicles. In isolated or impoverished places, this decrease in reliance on infrastructure can improve accessibility and make transit more practical.

- Economic Opportunities: The creation and use of self-sustaining vehicles may open up new avenues for the production and upkeep of sophisticated technologies and systems. It might also encourage innovation in sectors related to renewable energy and its technology.

- Personal and social advantages: Individuals may be able to travel in self-sustaining vehicles that are more ecologically friendly and sustainable. As there would be less of a need for frequent refueling or charging, they might allow for more personal freedom. Additionally, the widespread adoption of self-sustaining automobiles could support a greener, more sustainable society, improving both the environment and public health.

V. FUTURE SCOPE

- Advances in Renewable Energy Technologies: The future of self-sustaining cars will be greatly influenced by the creation of more effective and affordable renewable energy technologies, including as solar panels, wind turbines, and energy storage devices. Advances in energy generation, storage, and utilisation may result from further research and development in these fields, making self-sustaining vehicles more realistic and useful.

- Integration of numerous Energy Sources: To guarantee a dependable and continuous power supply, future self-sustaining vehicles may integrate numerous energy sources. For instance, a vehicle might include fuel cells, solar panels, and wind turbines to produce power from sunshine, wind, and hydrogen, respectively. The self-sufficiency of the vehicle would rise thanks to such hybrid energy systems that maximise energy generation.

- Advanced autonomous and intelligent technologies are anticipated to be incorporated into self-sustaining cars in order to optimise energy usage, resource management, and route planning. To make wise decisions, maximise

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energy efficiency, and adjust to changing conditions, these systems might utilise real-time data, predictive analytics, and machine learning techniques.

- Improved Energy Storage Options: The development of energy storage technology will determine the future of self-sustaining vehicles. The range, effectiveness, and dependability of self-sustaining vehicles could be greatly improved by the development of high-capacity, lightweight, and quick-charging batteries or other energy storage media. Supercapacitors, new energy storage technologies, and innovations in hydrogen storage may potentially be important.

- Energy harvesting from Environment: Self-sustaining cars could use cutting-edge energy gathering technologies to collect energy from their surroundings. For instance, waste heat, vibrations, or electromagnetic energy could be captured and converted by vehicles into useful electricity. By utilising energy sources that would otherwise be lost or untapped, these energy harvesting strategies would further increase the vehicle's ability to sustain itself.

- Infrastructure Development: Supportive infrastructure development would be advantageous for self-sustaining vehicles in the future. This could involve setting up networks for refuelling or charging self-sustaining vehicles as well as incorporating renewable energy sources into current infrastructure to enable on-the-go energy replenishment.

- Collaboration and Policy Support: In order to fully realise the potential of self-sustaining vehicles, it will be necessary for governments, researchers, manufacturers, and energy providers to work together. A sustainable transportation ecosystem might be supported by encouraging legislation, rules, and incentives for the creation and use of self-sustaining vehicles.

VI. CONCLUSION

In summary, the idea of a self-sustaining vehicle offers an intriguing glimpse into the near future of transportation. Although fully self-sustaining vehicles are not yet a reality, significant developments and current research in numerous fields all support this idea.

Energy independence, environmental sustainability, improved resilience, increased range, decreased reliance on infrastructure, economic prospects, and societal and personal advantages are some of the benefits of self-sustaining cars. The development of supportive infrastructure as well as improvements in renewable energy technology, energy storage options, and sophisticated systems are all necessary for automobiles to become self-sufficient.The potential for additional invention and development in the field of self-sustaining vehicles is enormous. Improvements in renewable energy technology, the blending of various energy sources, autonomous and intelligent systems, better energy storage options, energy harvesting from the environment, infrastructure development, and stakeholder cooperation are some examples of this.It's crucial to recognise that further research, funding, and cooperation amongst diverse stakeholders will be needed to fully realise the promise of self-subsisting vehicles. To make self-sustaining vehicles a reality, it will be required to overcome obstacles in the areas of technology, infrastructure, economics, and legislation.Self-sustaining cars present a compelling vision for environmentally friendly and sustainable transportation, and with further development and work, they might completely change the way we travel and lessen our dependency on fossil fuels.

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