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CONNECTED AND AUTONOMOUS VEHICLES.

"Advancing Electric Vehicles: Bridging Gaps in Range, Efficiency, and User Convenience"

[1]MR. TRUNAL JAGDHANE
S. Y B.sc Cyber Security
Indira College of Commerce and Science, Pune, Maharashtra, India

[2]MR. PRANAY SONAWANE
S. Y B.sc Cyber Security
Indira College of Commerce and Science, Pune, Maharashtra, India

[3]MR. OMKAR DAGADE
S. Y B.sc Cyber Security
Indira College of Commerce and Science, Pune, Maharashtra, India

Abstract: The proposed electric vehicle (EV) introduces a transformative dual-battery system designed to recharge while the vehicle is in motion, thereby extending its range and minimizing charging downtime. Enhanced with integrated navigation through government mapping systems, automated safety features like heat detection and speed monitoring, and an environmentally friendly energy-efficient design, this EV represents a leap in sustainable transportation. These innovations, alongside reduced operating costs and integration of renewable energy sources, aim to redefine urban mobility and contribute to a greener future.

INTRODUCTION

The development of electric vehicles (EVs) has gained momentum due to growing concerns about environmental sustainability and energy efficiency. While current EVs address some challenges, they often fall short in range, reliability, and user convenience. Our proposed EV tackles these issues by integrating a dual-battery system that ensures uninterrupted power supply and minimizes dependency on frequent recharging. Unlike conventional designs, our vehicle features advanced government mapping for precise navigation, customizable driving modes, and innovative safety systems like heat detection and automatic braking. This EV aims to enhance user experience and operational efficiency while prioritizing environmental conservation.

The electrification of transportation systems represents a critical stride toward mitigating climate change and reducing dependency on fossil fuels. Traditional EVs, while effective in minimizing greenhouse gas emissions, often face challenges like limited range, lengthy charging cycles, and inadequate charging infrastructure. Our research proposes an enhanced EV model that overcomes these limitations through innovative engineering and technological integration.

The developed EV introduces dual-battery functionality, where the primary battery powers the vehicle while the secondary battery charges concurrently, offering a seamless energy transition. Government mapping technology ensures precise navigation, while customizable driving modes cater to diverse user needs. Safety is paramount, with heat-resistance coatings, speed monitoring, and automatic signal indications enhancing user confidence and vehicle reliability. The proposed system represents a paradigm shift by integrating renewable energy capabilities, lowering operational costs, and promoting eco-friendly urban mobility.
This study explores the technical underpinnings, user benefits, and societal impact of our advanced EV, emphasizing its role in achieving global sustainability targets and addressing pressing urban transportation issues.

NEED OF STUDY

Electric vehicles, despite their numerous benefits, often face challenges like limited range, long charging times, and dependency on fragile charging infrastructures. These issues hinder their widespread adoption. By developing a dual-battery mechanism that allows self-recharging during operation, this research aims to address these challenges and provide a more sustainable and user-friendly alternative. Additionally, integrating advanced safety and navigation features not only improves usability but also sets a new standard for innovation in the EV market. This study is essential for promoting sustainable transportation, reducing greenhouse gas emissions, and ensuring energy security for future generations.

The global push toward sustainable transportation has amplified the need for innovative EV technologies that address existing barriers to adoption. The conventional charging model of EVs necessitates frequent and prolonged sessions, which not only inconveniences users but also strains the existing power grid. Furthermore, reliance on single-battery systems often limits the range and durability of EVs, discouraging broader adoption.

This research is motivated by the following critical challenges:

1. **Enhancing Battery Longevity:** Frequent charging cycles degrade battery health over time, increasing costs and reducing vehicle reliability. A dual-battery system mitigates this by leveraging simultaneous charging mechanisms.
2. **Reducing Charging Time:** Adopting advanced Level 3 charging technology ensures faster recharging, saving user time and promoting operational efficiency.
3. **Improving Safety Standards:** Current EVs lack integrated safety systems that adapt dynamically to user needs. Heat detection, speed sensors, and automatic indicators embedded in our model significantly reduce risks.
4. **Environmental Sustainability:** By minimizing reliance on fossil fuels and integrating renewable energy sources, the proposed EV model aligns with global objectives to reduce greenhouse gas emissions and combat climate change.

FUNTIONALITY

When the electric vehicle (EV) turns on, a brushless motor powered by the primary battery rotates. This motor is connected to the scooter's rear wheel, causing the other wheel's synchronous motor to rotate as well. When the brushless motor begins to rotate, a synchronous motor that is connected to a secondary battery also begins to rotate. As the synchronous motor rotates, it generates electricity that is transferred through a cable that is connected to microcontrollers (MCUs). This prevents current spikes, which will protect both batteries from draining and being damaged while the electric vehicle is in use. When the primary battery runs out, the secondary battery will recharge if the primary battery is used simultaneously. This way, we always have a functional backup battery. Utilizing the battery switch button the same repeating function will occur when the battery switching button connects to the brushless motor and vice versa.

Features

1. NIC MAPS: The government's cutting-edge mapping program that offers unmatched accuracy and dependability. Through the provision of clear, market-level data, Nic Mao guarantees that users can access accurate and reliable information.

2. Heat-detecting: Sensor detects the temperature inside the vehicle and notifies the user via the dashboard when the vehicle needs to be stopped, rested, or powered off.

3.Speed Limit Sensors: When the user is in safety mode, the speed limit sensor detects the speed limit of a specific route or highway and sets the vehicle's speed limit accordingly, which is beneficial for novice drivers. and if the driver is in normal mode, it won't set the vehicle's speed limit; instead, it will only alert them to the fact that their vehicle is speeding on that specific route.

4.Automatic Indication: Automated signal putting safety first more by detecting handlebar movement and utilizing a mapping system, this indicator automatically turns on indicator lights, ensuring the safety of both the user and other user and drivers.

5.Unlimited Energy Supply: The primary characteristic that sets our EV apart from others is its unlimited energy supply, which generates continuous energy on its own after the EV is in use and has completed a charging cycle.

6.Heat Resistance Coating: We have applied a heat-resistant coating to the exterior frame of our EV to prevent potential heat damage from sun exposure and excessive use.

MOTIVATION

While using various types of electric vehicles commonly we face problems like charging infrastructure issues and grater charging time we found that if we modify an electrical vehicle or its mechanism of charging and discharging in such a way that we can overcome many problems relating to charging like if charging a battery again and again causes impact on battery life of electric vehicle mostly electric vehicles use lithium ion batteries Dual battery system will be used in our vehicles this will definitely make a good impact on life of batteries will reduce charging cycles causing increase in durability of battery this will save so much electricity and charging cost.

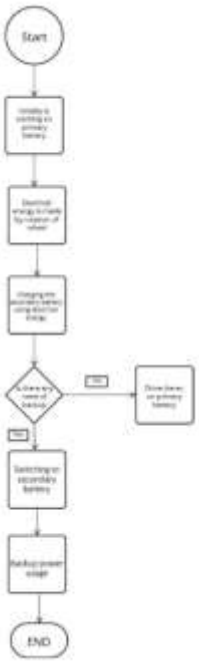
OBJECTIVE

To improve current charging technology of electric vehicle currently all electric vehicles has charging process when plug is connected to electric vehicle electric current flows through wire and enters in battery in electric vehicle during this process small computer system in electrical vehicle monitors the charging level and other thigs in electric vehicle but in current modified version of electric vehicle charging technology our main focus is to develop charging as much as possible particularly our electric vehicle has two batteries namely primary and secondary primary battery is charged on electricity and secondary battery will be charged by draining of primary battery means when vehicle is using primary battery and moving forward there is brushless motor in vehicles of electric vehicle that uses energy made by movement of vehicle's tire in charging of secondary battery . Increase charging speed of electric vehicles this electric vehicle will be based on level 3 charging technology which will charge the vehicle from 0-100% within just 90 min it is 480volts technology it will definitely save so much time of customer or user Our some objectives are like reducing greenhouse gases effect, decreasing air pollution, enhancing energy security, promoting sustainable transportation, improving energy efficiency, lower operating cost Normal vehicles works on fossil fuels like petrol , diesel due to this the emit lots of greenhouse gases like carbon dioxide , carbon monoxide, nitrous oxide, hydrofluorocarbons, methane but in case of electric vehicles there is zero green gas emission so there will be not any harm to environment another couple objectives of electric vehicle are to enhancing energy security and controlling air pollution electric vehicles works on zero emission principal so electric vehicles will not spread any pollution in fact they use energy sources like electrical energy which is clean source of energy.

3.1Alogithm of Autonomous EV

Step 1: start.
Step 2: check Battery level [If primary battery has not enough charged then switch to secondary battery].
Step 3: choose your route.
Step 4: speed monitoring [Monitor the speed using sensors or warn you over speeding].
Step 5: when switch the battery primary to secondary then primary battery start charging automatically.
Step 6: Indication system [Indicator is operated automatically with map direction].
Step 7: power off.

3.2Flowchart of Autonomous EV



CONCLUSION

The envisioned electric vehicle (EV) incorporates a groundbreaking dual-battery system that enables recharging while in motion, extending its range and enhancing convenience. This innovation is complemented by integrated Google mapping, allowing for seamless navigation. Notably, the integration of turn signal activation upon selecting a trip on the map enhances safety and ease of use. Additionally, the inclusion of a heat alert system, battery status display, and automatic braking system underscores the vehicle's commitment to user safety and comfort. With a suite of advanced sensors, this EV represents a paradigm shift in electric vehicle technology, offering unparalleled efficiency, convenience, and safety features to users. The EV bike aims to redefine urban mobility. The bike aims to reduce traffic congestion, emissions and overall environmental impact, with autonomous features that enhance safety and efficiency. By building this bike, we are contributing to a future where smart, sustainable transportation is not just a choice, but a necessity for a thriving planet.

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