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ELECTRIC VEHICLE FOR DIFFERENTLY ABLED PERSON

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Abstract: For the growing number of people using personal mobility devices, development of devices that address their unique needs are fundamental to their quality of life. Traditionally those with mobility impairments have used wheelchairs to participate in activities. Two problems with traditional wheelchairs are the stress they put on the user's upper limbs and their inability to actively engage the upper limbs. The goal of this Project is to create easy means of transportation and commutation for differently abled people. Presently, hand-driven vehicles for people with disability in their lower limbs are easily available in the market, but very few vehicles are developed for the people with disability in their lower limbs. The aim of this project is to develop a vehicle for people with disability in their lower limbs and provide vehicle users with improved levels of mobility, facilitating freedom in travel and contribution to the community. The most important part of the design is the incorporation of the steering mechanism which will be fully operated by hands without any discomfort and to make life more comfortable for the physically challenged persons. A battery powered engine was chosen for this design and consideration was also given to the weight.

Keywords: Electric vehicle, BLDC Motor, Chasis, Ball bearing, controller, RFID

INTRODUCTION

1 Autonomous vehicles, Security in AV, B5G tech-
2 Nology, 5G technology, Road safety, Vehicular communications.
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The demand for electric vehicles for disabled as well as for normal people continues to rise as these cleaner vehicles emerge as a key solution to climate change. Since such vehicles are not dependent on fossil fuels, there is no emission of greenhouse gases like carbon dioxide and methane that are produced by the reaction between the fuel and the oxygen present in the air. Around the world, the government and the lawmakers are bringing in new norms and policies that encourage the adoption of electric vehicles. Given the potential disruption electric vehicles may bring in transportation, the automakers are also investing heavily in innovation and production.

Electric vehicles are also gaining popularity among the differently abled due to features these vehicles offer. However, there are still limited options available in electric vehicles for disabled people. The vehicles which are specially designed for this purpose should be safer and more comfortable and affordable for its drivers. Given that the infrastructure for electric vehicle charging is yet to become mature and given the concerns around range anxiety and battery safety, it is especially important to address the concerns of the physically challenged in adopting the electric vehicles.

LITERATURE REVIEW

Researchers nowadays are so advanced that innovations are happening day in and day out. Similarly, there is a huge improvement in the design of vehicles. Some of the literatures which include such improvements are reviewed.

A. Arpit Mehra, Arindam Ghosal, A-3 Wheels Electric Car for Physically Disabled people, International Journal for Innovative Research in Science & Technology April 2012
In this paper author said, building and designing of Electric vehicle-Go cart should be implemented by using the cost effective materials and components. It should be light weight but sturdy. The features of prototype system and benefits are discussed. Vehicle should not have any problems related to its working state and about its implementation of the design.

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B. Tong, Chia-hang and J wo, Wu-Shun, An Assist Mode Hybrid Electric Motorcycle, of Power Sources, Vol.174,Issue t,pp61-68,2007.

In this paper author said, how to implement an electric motorcycle which has hybrid power source of power for vehicle. The main goal was to simplify The main goal was to simplify the Leitman, Set h and Brant, Bob, Built Your Own Electric Vehicle, Mc GrawHill, New York 2009, Vol. 32, pp321-26

In this paper author said, power-efficient IoT-based electric vehicle has been implemented, designed a and developed, tested in various different scenarios. The performance of the vehicle as working has been measured. It is able to sustain weight and speed achieved around 20-25kmph. It was successfully built according to requirements.

METHODOLOGY

I. Literature review and recognition of scope

II. Design

III. CAD modelling

IV. Fabrication

V. Implementation and testing

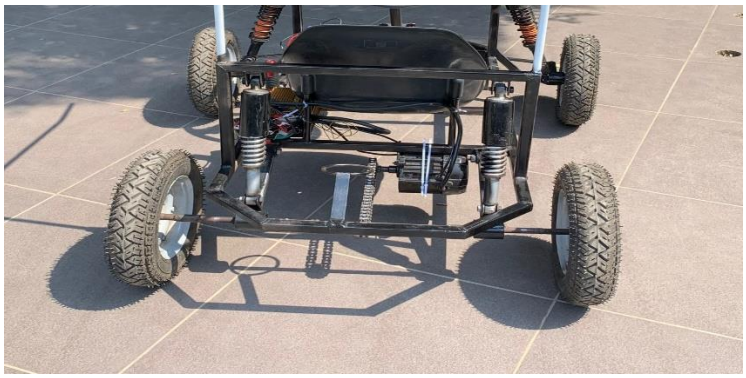
DESIGN STAGES

A.Design of Steering mechanism

The steering mechanism consists of a steering rod which is nothing but the vehicle handle and an operative rod which is mounted in two bearings attached to an 'L' shaped connecting rod. Also it consists of two sprockets and a chain to transmit the motion from the operative rod to the steering rod. The two sprockets are attached at the upper ends of these rods in such a way that, the rotation of one will lead to the rotation of other. A pedal mechanism is provided at the bottom of the operative. The operative rod which mounted in two bearings is connected with the steering rod with the help of an 'L' shaped connecting rod which is welded at its two ends respectively Overall, 5G technology enhances the performance, reliability, and capacities of automated vehicles, paving the way for safer and more efficient transportation systems

B.Design of Side wheels frame

Side wheels were attached to the main body of the vehicle with the help of a frame. The side-wheel frame was designed keeping in mind the overall structure of the vehicle. The frame primarily consisted of a two parallel L- angle brackets connected by a horizontal L-angle bracket. All the brackets were connected to each other with the help of welding. Further, the brackets were fitted with two hollow circular rods of diameter 6cm each at their mid-sections. These circular rods were then tight fitted to the side-wheels of the vehicle which would then help in maintaining the balance of the vehicle.



C. Design of Seat frame

Changes and accessibility:
Make sure that the seatbacks are adjustable to accommodate different body shapes and sizes.
Add features such as height adjustment, swivel seats and lumbar support to meet individual needs.
Design chairs so that individuals with lower limb impairments can easily get in and out. This may include a wide corridor or turntable for easier access.

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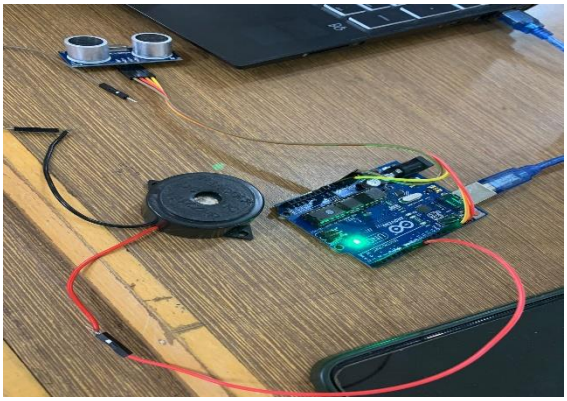
Supporting Programs:
EBuild a strong frame structure out of lightweight but strong materials like aluminum or carbon fiber. This ensures that the seats provide adequate support while keeping the weight of the vehicle to a minimum to improve energy efficiency.

D. Biometric RFID

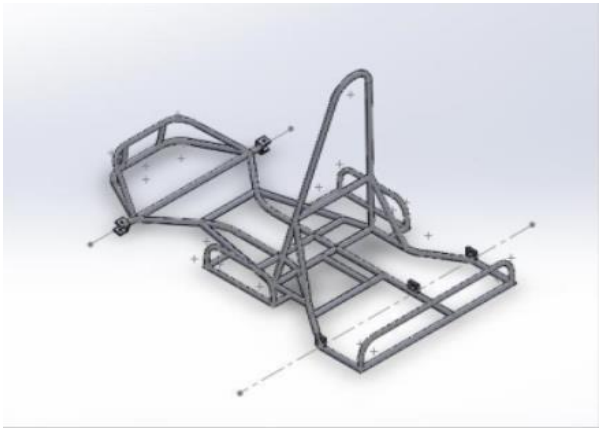
Access control: RFID could be used for keyless entry systems in EVs, allowing drivers to unlock and start their vehicles with a traditional key. Car doors can be opened and the fire can be started by waving a card or RFID-enabled fob near the reader

Safety : RFID can enhance the safety of electric vehicles by providing additional reliability. For example, an RFID-enabled key can be used in conjunction with a traditional key or password to prevent unauthorized access to a vehicle.

Personal Vehicle Configuration: RFID tags can be linked to individual driver profiles, allowing the EV to adjust settings such as seating position, climate control preferences, and entertainment options based on the detected RFID tag. This ensures a decent driving experience for each user.



E. CAD Modelling-



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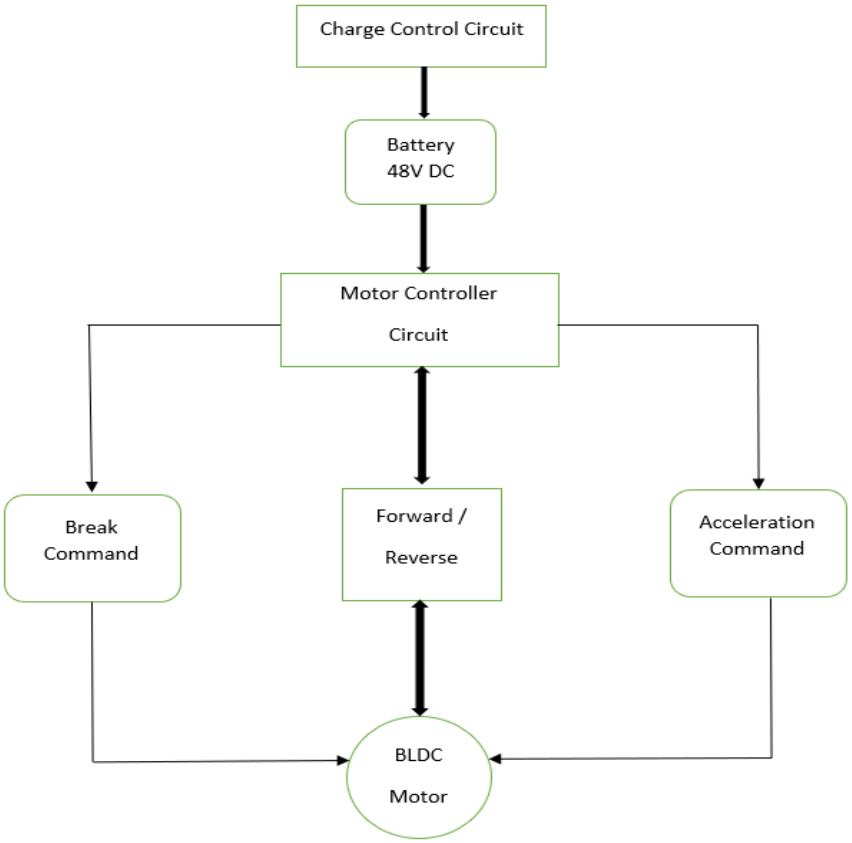
F. Fabrication and implementation-

The fabrication of Legs- freeVehicle for Disabled People has been was done successfully within desired values and paramters. The machining operations undertaken include Cutting, Drilling, Grinding, Turning, Arc welding etc.

G.Work Flow System



CONCLUSION

For people with lower limbs, electric vehicles have the potential to transform accessibility and enable individuals with disabilities to participate more fully in society. By adopting inclusive design principles and collaborating with stakeholders, EV manufacturers can develop vehicles that not only meet the needs of individuals with lower limb disabilities but also to set new standards for accessibility and inclusion in the automotive industry.

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FUTURE SCOPE

In the future, adaptive electric vehicles may be included accommodate individuals with lower limb disabilities. This can include features such as low flooring for easy entry and exit, adjustable seating arrangements for wheelchairs or mobility aids, and customization for individuals with limbs a the lower one cannot move.

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