Development Of Two-Phase Vehicle for Handicap Person

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Abstract – This project name is Development of two phase vehicle for handicap person is a two phase vehicle, the first phase vehicle is about to fabricate a wheelchair that can be run with the help of a battery pack and can be controlled with simple hand operated controller / remote. While the second phase vehicle is about to fabricate a vehicle that is build in a specific way to incorporate the first phase wheelchair entirely and can be operated with hand held remote as well. Both of these remote are wireless in nature so as to increase comfort and can easily be converted into IOT based operations.

The first phase vehicle incorporates two geared DC motor, battery, controller unit, etc. this vehicle can be used by the handicap person for short distance travel, the battery can be charged with the help of solar panel. This wheelchair can easily be moveword by the operator with the help of a simple controller unit. This wheelchair that is the first phase vehicle can be moved in forward and reverse direction and can be moved in right and left direction with the help of the controller unit.

The second phase vehicle is a bigger one that can accommodate the entire first phase vehicle within its volume. This stage is a four wheeled cart that incorporates geared DC for forward and reverse motion. These Dc motor runs on battery which can be charge with the help of solar panel that is mounted on the roof of this vehicle. This second phase vehicle is meant for longer distance travel. This vehicle being a solar vehicle will be green in nature.

Keywords - Two-Phase Vehicle Design, Accessible Transportation, Smart mobility, Safety Standards for Disabled Transport, Smart Transportation, Accident detection. Tilt sensor

I. INRODUCTION

The problem statement for fabrication of the project work was given as to do sometimes new for communication for handicapped people. It was decided to build a two phase vehicle for handicap person. In which the stage one should be a motorized wheel chair which enables the person to manner new in close Perimetric. Which second vehicle should be able to accommodate the wheel chair with its own body which special ramp type mechanism to allow a run in slope for the motorized wheel chair. To further modify the project work it was decided it work to work the project work model battery operated those charged main solar powered become so the project become a solar powered twophase vehicle for handicap people. The stage second vehicle available the handicap person along with wheel chassis to roam around in wide proximity of area. The detail regularly construction and working of other things related to the project to work are discussed in fourth coming chapter.

II. METHODOLOGY

Creating a two-phase vehicle for people with disabilities entails creating a system that improves accessibility and mobility. Making sure the car has a low floor, automated ramps, or lifts for uncomplicated boarding is the initial phase's main concern. With its emphasis on control and adaptability and its use of voice commands and other user-friendly driving mechanisms, the second phase is appropriate for people with a variety of disabilities. The design incorporates contemporary technologies to increase the user's independence and convenience while placing a high priority on efficiency, comfort, and safety.

III.LITERATURE SURVEY

A two-phase vehicle intended for people with disabilities seeks to improve mobility and freedom by means of a cutting-edge transportation system. The development of such vehicles involves integrating advanced engineering solutions, including automated controls, adaptive seating, and multi-terrain capabilities. Researchers have explored various designs, such as transforming wheelchairs that can shift between seated and standing positions or modular vehicles that allow seamless transitions between indoor and outdoor mobility. Recent advancements focus on lightweight materials, electric propulsion, and smart assistive technologies like voice control and IOT connectivity to improve accessibility and ease of use.

Numerous studies emphasize how crucial price, convenience, and safety are when designing two-phase vehicles for people with disabilities. Ergonomic design considerations, such as adjustable seating, easy ingress and egress, and user-friendly interfaces, are crucial in ensuring usability. Additionally, research emphasizes the need for regulatory compliance and integration with public transport infrastructure to create an inclusive mobility ecosystem. Ongoing innovations in battery technology, autonomous navigation, and human-machine interaction continue to refine these vehicles, making them more efficient and practical for real-world applications.

IV. EMBEDDED SYSTEM

The goal of creating a two-phase vehicle for people with disabilities is to increase accessibility and mobility by using an embedded system-driven design. To ensure stability and user-friendliness, this vehicle incorporates sophisticated microcontroller-based control for seamless phase transitions. While the second phase permits prolonged mobility in outside settings with more speed and adaptability, the first phase permits compact, slow speed navigation for indoor surroundings. With its ergonomic controls, automated brakes, and sensors, the system puts user comfort and safety first. The goal of this innovation is to greatly enhance the quality of life for those with mobility issues by granting them efficiency and independence.

In the first stage, a self-balancing system that uses sensors and microcontrollers to guarantee stability on two wheels—much like a Segway—is implemented. When necessary, such as during stops or tough terrain, the second phase's adaptive control system enables a smooth transition into a more stable fourwheel mode. To create a secure and intuitive experience, the embedded system anlayzesreal-time data from accelerometers, gyroscopes, and human inputs. The goal of this creative design is to increase the mobility and freedom of people with disabilities.

V. HARDWARE SPECIFICATIONS

- 1. Microcontroller unit
- 2. WIFI unit
- 3. Plastic container
- 4. Battery / power supply
- 5. Connectors
- 6. Servo motor /PMDC Motor
- 7. Buttons
- 8. Plywood

- 9. Nut, bolts washers and screws
- 10. Battery holder
- 11. Aluminium strip
- 12. Motor driver unit
- 13. LCD display unit
- 14. Solar panel
- 15. Reduction gear boxes
- 16. MDF Sheets
- 17. Toggle Switches
- 18. LED lights
- 19. Wheels
- 20. Aluminium sheets
- 21. Aluminium angles
- 22. Acrylic sheets

Uses:

- 1. Homes
- 2. Offices
- 3. Industries
- 4. Educational and other institutions
- 5. Large campus area
- A. Microcontroller unit

A microcontroller unit (MCU) is a small computer chip that controls specific tasks in an embedded system. It's a type of microcontroller that designed to be cost effective.



B. Servo motor /PMDC Motor

A servo motor is a motor that can precisely control the position, velocity and acceleration of a mechanical system. Servo motors are used in manyapplication, including robotics, CNC machinery, and medical equipment.



C. Reduction gear box

A reduction gear box, also known as a speed reducer, is a mechanical device that reduces the speed of an input while increasing its torque. Its made of gears, shafts and bearings. Reduction gear box are used in many applications including machinery, vehicle and industrial equipment. The output gear has more teeth than the input

gear which rotate slowly. The reduction gearbox is essential components for high precision processing and precision.

VI. BLOCK DIAGRAM



Block Diagram: Wheel chair

VII. CONTRUCTION AND WORKING

- 1. The project model of "Two phase vehicle for handicapped people" is made using various materials like plastic sheets, 2mm aluminium sheet, 8mm; 6mm MDF (Medium density fibre) core hand wood plywood sheet, foam styrom foam, sheet, acylic sheet, etc and various components used are mentioned in separate chapter.
- 2. First of all various chasis point are made using 8mm MDF sheet and assemble so as to keep it length as 24 and width as 10. The height is kept 12 to this chasis, front draving motors are attached to these drives motor a gearbox is attached.
- 3. The gearbox is 90:1 reduction ratio gearbox and the motor is 2400 rpm PMDC motor. This subassembly of motor and the gearbox is attached with the chassis housing an aluminium running up to 2mm aluminium sheet.

- 4. These two steering motors is fixed using a 8mm MDF sheet point this motor is also a same specification as of drives motor but the difference in gearbox.
- 5. The steering motor Is attached with a gearbox of reduction ratio 150:1 so as to give sufficient torque and slow speed to steering the vehicle even in loader condition at the real of vehicle a during wheel attachment shaft is provide to fix dummy wheels.
- 6. All wheels i.e dummy and driving wheels are made up of PVC and having four the during motor are connected parallelly so as to run is either forward on brake direction.
- 7. The power supply to their vehicle is provided with the help of 6v and 5Ah drive cell secondary battery.
- 8. Mounted in the fronton direction so as to compensate for CG a provide plat for of size 8.5*11 made up of 6mm MDF is attached to the chassis within the carvity of chassis this platform is connected to a T Lever using a connecting rod.
- 9. This T lever is attached with the help of a steering to a 10rpm gearbox motor, whenever this motor is retorted the T lever pushes thus two platform up and down from the chassis.
- 10. The height pillar at extreme back of the vehicle is fitted with a 8.5*12 door that is again made open and closed by using a 10 rpm gearbox and motors that is mounted on the subframe placed centerally all the chassis and other path of the chassis vehicle is covered using 4mm thick strysoform sheet along with 2mm thick transfer Arcyclic sheet.
- 11. This is how the second phase of the said project is contributed for the first phase i.e for the motorized wheels chassis is arrangement wheel chair is farmicated using 6mm and 8mm MDF sheet the wheel chassis is provided his gearbox and motor having reduction ratio of 100:1 on either sides which also supports wheels of diameter 2.5 made up of PVC material at the frontal parts of wheels chassis a caster wheels of ability is mounted.
- 12. The power supply to the wheels is provided of 6 cell AA size unit 1.5 ends total is the output of 6v DC.
- 13. This is how the first phase of this vehicle is constructional on the second phase a solar panel of 6v 5w put is fixed on the body cover whose outputs is gives to any one battery and charge the same vehicle the other battery is used for runs the entire vehicle.
- 14. The connections of each of the motor is given form the buttons with a six pin toggle is two pin on /off type of switch is done to home the possible to quickly charge the polarity of the power supply to the motor so as to charge two directions of rotational of motor shaft. This is required as we need to forward and revered the vehicle is also close and open the gates
- 15. This is how the entire project constructed and its works.
- 16. This is how the first phase of this vehicle constructed. on the se stage phase solar panel of 6v 5w output fix on the body cover whose is give to any one battery and charge the same while the other battery is used for running the entire vehicle
- 17. The project is control using microcontroller unit which is connected to user device mobile or laptop rare in HTML page appearance and having buttons on operating this button the phase one and phase vehicle work according forward, backward, left side and right side movements and for phase two door opening or slop down or making wheel chair platform down.

VIII. SIMULATIONS AND RESULTS



SPECIAL MANUVERABLE PLATFORM TO ACCOMODATE WHEEL CHAIR

Figure 1.1: Schematic diagram Development Of Two Phase Vehicle For



Figure 1.2:Development of two phase vehicle for handicapped person

The development of a two-phase vehicle for handicapped individuals focuses on making transportation easier and more efficient. The design includes two modes of movement—one for stability (such as a seated mode) and another for mobility (such as a standing or tilted mode).

The project uses calibrated power supply to run microcontroller units of ESP module and other drives. Various other part of this project is made with materials like aluminium sheet and various materials are used The vehicle is also possible with the help of another geared DC motor. These DC motor runs on the battery which can be charge and the second phase vehicle involves improving technology to make the vehicle smarter and more adaptive. Features such as self- driving capabilities, obstacle detection, and emergency assistance systems can be added for better safety and ease of use. Battery-powered to make the vehicle eco-friendly, reducing pollution while ensuring smooth travel. Customizable seating and smart navigation system help users personalize their driving experience. By combining accessibility with modern technology, this two phase vehicle can greatly improve the quality of life for handicapped persons, giving them great independence and confidence in daily transportation.

Simulation Process:

- 1. **Phase 1: Stability Mode** The vehicle is tested to ensure that it remains stable when stationary or moving at low speeds. Simulations check for balance, weight distribution, and user comfort.
- 2. **Phase 2: Mobility Mode** The vehicle is tested for movement, speed, and control. The simulation ensures smooth acceleration, braking, and easy transportation.

Results:

- **Smooth Transition** The vehicle successfully shifts between stability and mobility modes without discomfort.
- **Improved Accessibility** The design allows handicapped individuals to move easily without external help.
- **Energy Efficiency** Simulations show that the vehicle consumes minimal power while maintaining performance.

IX. INDIAN CONTEXT OF VIEW

In India handicapped people are simply ignored by Authorities for their rights even a physically handicapped persons would be of enhance the importance for society. This project work gives by handicap person his/her basic freedom of communication wondering so as to explore his /her capabilities and render services to society.

In India there is large numbers of handicapped peoples who can use this vehicle on afford the same so regarding India context of view this project work would to do wonder.

X. CONCLUSION

The project work "Development Two Phase Vehicle for handicap person" Was successfully craffed and its exhibit the expected result. After few further modificationsuggested in the relevant chapter this project work can be of the great use for handicapped people. For India also this project can be great use and can serve handicapped people in every aspects. The project work may have bright future ahead.

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