

Three wheel electric vehicle

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Abstract - The three wheel electric vehicle is one of the several transportation device under the circumstance of roadway and other used path and is to fabricate at low cost by using simpler drive mechanism and control equipment and there is a third wheel is used so there is no need of gyroscope and balancing purpose. This vehicle is capable of transporting a person weighting upto 70-80 kg and person can travel to 8km distance with varying speed this vehicle do not harm to the environment. This takes into consideration the design of three wheel electric vehicle cover less space. This vehicle able to operate controller mode and transport mode. This vehicle turns right-left and forward-backward movement when the driver operating relay switch in transporter mode to stabilize body. In this work three wheel electric vehicle as well as manually balancing electric vehicle is prepared. This is also called as personal transporter vehicle

Key Words: Fail-safe, Stability, Dc motor, Batteries, Wheel, Controller,etc

1.INTRODUCTION

The two wheel self balancing electric system are studied in many concepts. They can be considered as gyroscopic sensor and fluid based levelling sensor are used for detect weight shift and for the movement of vehicle. they used handlebar to turn the left and right.[2].But in three wheel electric vehicle there is third wheel is used for balancing so there is no need of gyroscope because it is a self balancing three wheel transporter vehicle and also for the movement of vehicle. it is able to operate in controlling mode and transporting mode.[6]. The project work is a to construct and design vehicle that carry the load with human weight. This vehicle is design and construct without using sensors by using switch and circuit board and electric supply go forward and go backward direction easily with the help of perfect balancing.[6]. This vehicle uses a rechargeable battery which convert the electrical energy to mechanical energy and this battery can be charged the power connection. The problem with the vehicle is rise but this three wheel technology is affordable to low income. This is eco friendly since, it does not release any emission because it is electric vehicle.

2. BASIC STRUCTURE

In this structure as shown in fig 2.1 the three wheel electric vehicle we will used two wheels, two motors, and batteries for supplying the power to the battery charger is used and for controlling the motor the controller are used. The two wheel are connected with motor with the help of shaft and the third wheel is used for balancing vehicle.

The power supply is passes to the battery with the help of charger. In the battery electrical energy which convert into mechanical energy and this mechanical energy is need to drives the motor and run the motor.

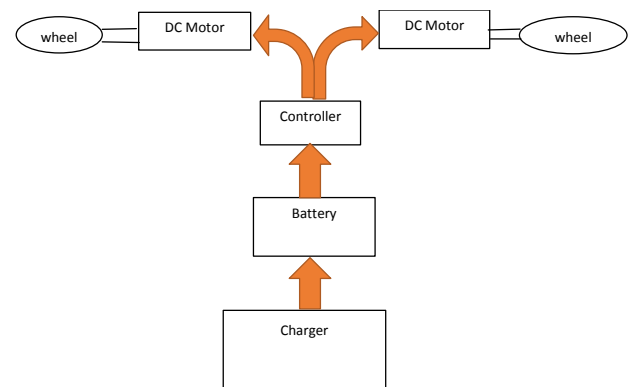


Fig2.1:Block diagram.

3. SKID MECHANISM

The steering mechanism of the vehicle is on the basis of differential drive as shown in fig 3.1. In this vehicle it has a two independently controlled drive motor and also controlled the speed of two wheels independently. This speed difference makes the vehicle to skid and turn.

The vehicle turns right when the speed of the left wheel is more than the right wheel and the vehicle turn left when the speed of right wheel is more than left wheel. When both the wheel rotating in opposite direction, the vehicle turns about its own axis. This property is known as zero turn radius. The third wheel just turns in the direction given by the two driver wheels and do not disturb the regular motion of vehicle.

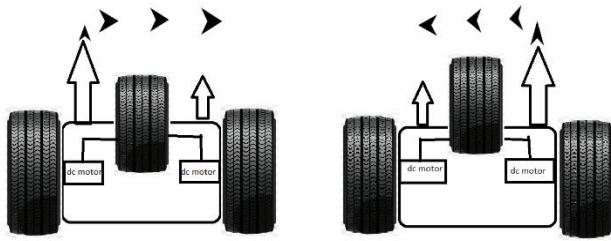


Fig3.1:- Skid steering mechanism

Components used to fabricate three wheel electric vehicle are as follows

1. Arduino board
2. Dc motor.
3. Battery
4. Handlebar
5. Chassis

4. MECHANICAL STRUCTURE

The entire structure is made up of iron. This vehicle stands on three wheels which place right left and back side. After both the motors are individually connected to the wheels rectangle sections is connected between them. They are welded at both the ends. A rectangular wooden platform is fitted on this section. A vertical rod is screwed on this platform with a rectangular rod welded at the top end. The rider stands on the platform and takes support on the platform and takes support form the vertical rod. Total height of the body is approximately 1.2 m from the ground. This mechanical structure as shown in fig 4.1.

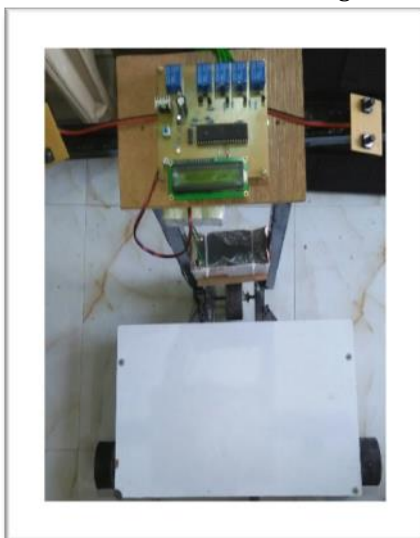


Fig4.1: Module of vehicle.

The most primitive way to drive dc motor is through bang bang controller which uses relays to create a basic H-bridge scheme, in such a way that the motor can spin at full power forward, full power backward, or stop the fig show how it is possible to use four relays to create a bang bang controller for to opposite wheel motors.

As shown in fig 3.2.1, when the E1 & E2 relays are closed and the D1 &D2 are open, the vehicle turns to left. On the other hand, closing relays D1&D2 while opening capital E1 & E2 would make the vehicle turn to the right, as shown in the lower picture fig 3.2.2. To move forward, you only need to open all 4 relays. To move backward you should close all relays finally, to stop the vehicle ,you can choose for instance to close E2 & D2, while opening E1 &D1. in the above example, if a 12v battery was use, then each motor would only receive either + 12v, 0v or -12v.

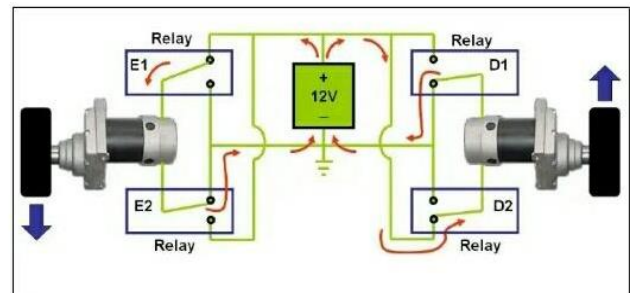


Fig4.2.1:- Turn left through bang bang controller.

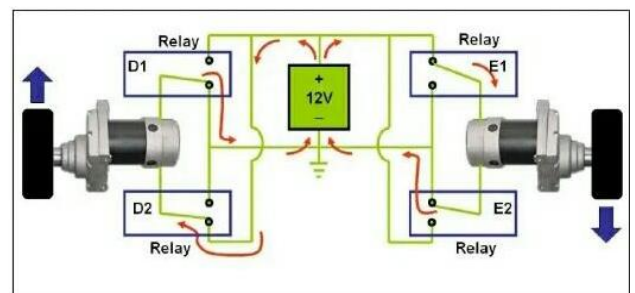


Fig4.2.2:- Turn right through bang bang controller.

5. CONCLUSIONS

In this paper present the results and market survey for electric balancing vehicle from this research work demonstrate the remarkable use of he balancing vehicle for the vehicle whose concern its safety first and people with certain disability. It clear from our research this wheel be cheap and alternative way for transportation in urban as well as rural area which is advanced and comparatively cheap than current conventional vehicles

REFERENCES

- [1] Mr.Velaji Hadiya, Mr. Akash Rai, Mr.Sushant Sharma, Miss. Ashwini More,"Design and Development of Segway", IRJET, Volume:03, Issue:05,May-2016.
- [2] Mr. Mayank Sharma, Rahul sharma, Kshitij Singh,Vikrant Sinha, Shakil Tadavi,"Segway-The Human Transporter ",IJIRST, Volume1,Issue11,April 2015.
- [3] B. Harshavardhan Reddy ,G Ravi Teja Reddy , G Suresh ,M . Vinodh Kumar Reddy, N. Prassana Kumar, B.Venu,"Design and Fabrication of Fail Safe Segway ",IOSR-JMCE,Volume 12, Issue 3.
- [4] J.B.Gupta, Theory and Performance of electrical Machines, 14th edition ,SK Kataria and Sons,2010
- [5] M.V.Kothari, Design and Testing of Electrical machine.
- [6] Ankit S. Khanzode, Ashish G. Masne, Mohd.Shahzad Gulam Ali, Akshay P.Tale,Kamalkishore G Maniyar,"Mechanical Segway",IJETR, Volume-4,Issue-3,March 2016.
- [7] Prof.Yogesh Risodkar, Mr.Ganesh Shirsath, Ms.Monali Holkar, Mr.Mayur Amle,"Designing the Self- Balancing Platform(Segway)",IJETR, Volume 4, Issue 9, September 2015.
- [8] Prashant Gowardhan, Akhilesh Thakre, Nehal Shende, Nachiket Phadnis, Sudarshan Muley,"Survey on Self Balancing two wheel electric Prototype",IJERGS, Volume 5,Issue 5, sep 2017.
- [9] Infanta Mary Priya.I, B.K. Vinaygam, M.R.Stalin John",jcpsh.
- [10]]Eng.Wael Younis*Prof.Dr.Mohammed Abdelati**, "Design and Implementation of an Experimental Segway Model",proceeding of the 2nd Mediterranean Conference on Intelligent System And Automation, March 2009.Zarzaris,Tunisia.
- [11] Pratik M Chavan, Mr.D.P.Patil, Dr.Madhukar S.Chavan,"Design and Implementation of Low Cost Segway the Human Transporter",IJRASET,Volume 5 Issue IV,April 2017.
- [12] Siddhart Varhadi, Neha Dhere, Prof. Priyanka Verma, Atul Ghorpade, Jayesh Shinde, Prof.Suraj Marale,"A Review Paper on Segway Forklift",IJERT,Volume 8 Issue 01,Jan 2019.