

Pneumatically Controlled Wheel for Angular Rotation of Vehicle

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Abstract:

In the modern world, there are many types of vehicles developed in this society, yet many people have a problem with parking and retrieving their vehicles at the parking lot. The concept of parallel parking is introduced in Malls, Hotels etc., but it is hard when there is very less space left for the driver to park the vehicle at an available slot. So we have developed a new way for “Angular rotation of vehicles” as a project for a better vehicle parking. This project hopefully helps in parking and retrieving of vehicles easier than ever before. In this project two pneumatic double acting cylinders, DC Servo motor, a stepney wheel, links to hold the wheel and assist the vertical movement of wheel. When the pneumatic cylinder is activated, it moves the wheel which further makes the rear end of the vehicle lift up. The single wheel touches the ground and becomes ready for rotation about the front axle. This single wheel, keeping the front part of the vehicle fixed, rotates only the rear end thus eliminating the difficulty of moving partially inside the available parking place.

Keywords: DC motor, control setup, angular rotation

1. INTRODUCTION

Roads that facilitate parallel parking have an additional lane or an outsized shoulder for put cars. it's also used whenever parking facilities aren't accessible typically in giant metropolitan areas wherever there's a high density of vehicles and few or restricted accommodations like multi-keep automobile parks. Some jurisdictions have eliminated individual spots permitting shorter vehicles to use less area. Parallel parking could be a methodology of parking a vehicle in-line with different put vehicles. Parallel parking needs at first driving slightly past the automobile parking space, parallel to the put vehicle before of that area, keeping a secure distance, and so followed by reversing into that area. later position adjustment could need the utilization of forward and reverse gears. Parallel parking is taken into account to be one in every of the toughest skills for brand new drivers to be told. Parallel parking enables the driver to park a vehicle in a smaller space than would be true of forward parking. Driving forward into a parking space on the side of a road is typically not possible unless two successive parking spaces are empty. Reversing into the spot via the parallel parking technique allows one to take 2 International Journal of Pure and Applied Mathematics Special Issue advantage of a single empty space not much longer than the car. New drivers learn to use reference points to align themselves in relation to the car in front of the space, to determine the proper angle for backing, and to determine when to turn the steering wheel while backing. They may find it easier to

briefly stop at each reference point and turn for the next step. Two major types of parallel parking technique differ in whether they will use two or three positions of the steering wheel while backing. A skilled driver may be able to parallel park successfully by backing with the steering wheel turned all the way to the left and then immediately cranking the wheel all the way to the right at a critical point. For beginning drivers, those with larger cars or bad sight lines, this may risk collision with either the car in front of or behind the parking space, or it could also result in the car being parked too far away from the curb. Such drivers may find it easier to include an intermediate step, where after having achieved the ideal angle for backing up they back up with the wheels straight until the rear end of the car is far enough back to allow them to make their final reverse turn. While steering wheel positions in between full-right, straight, and full-left are possible to use, beginners may be able to gauge their progress more effectively by turning the wheel all the way to the right or left.

2. METHODOLOGY

In this project, the working of the auxiliary wheel for assisting easy parallel parking is very simple. The Battery, a device consisting of one or more electrochemical cells with external connection provided to power to dc motor and other appliances is the main source of the power in the project having 12V capacity [1-3]. The Remote controller contains the switches to control the power circuits and controls the motor revolution. In the project, the control unit has two switches and each switch controls the revolution of DC motor. Components which is used in this project is DC Motor – Two in number, Steering ,Power Source, Parking Wheel, Lead Screw, Fixed FrameDC motor is an important device which helps the auxiliary wheel to lift the rear end of the vehicle and then assisting the motion of the wheel. Two DC motor used in this project have 100 rpm revolving capacity but as the project required the less rpm than the 15 to 20 rpm a special type of gear arrangement is used with motor and is reduced accordingly[4-6]. The lead screw is placed vertically to the DC motor's shaft such that when the motor revolves screw rotates and at the same time this screw is revolve in the nut which is connected to the vertical supporter connected with the frame of vehicle model and when the screw rotates, it lifts the whole frame of model like screw jack mechanism. Block diagram shown in fig 1.

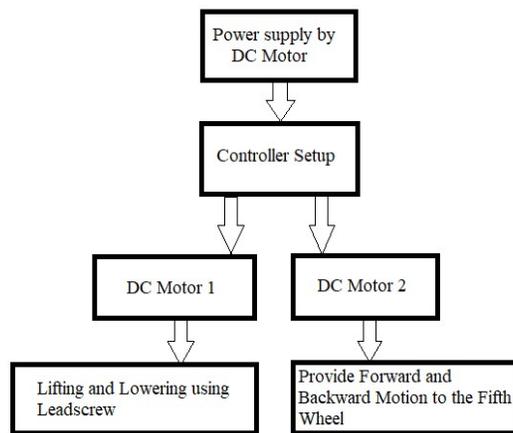


Fig1. Block Diagram of Setup

First motor lifts the frame up to some height as 40mm and then stops and then the second motor is operated with the control unit. Second DC motor is placed at the other end of the screw at the perfectly perpendicular direction. At the shaft of the second DC motor fifth wheel is fixed. The fifth wheel also has the perpendicular direction of motion with respect to the other four wheels and has the back and forward motion with the help of the motor. As the mechanism is placed at the rear end, it displaces the rear end of the frame [6-8]. When the displacement of the rear end is done and the car is placed perfectly the first motor comes into action again revolving in anticlockwise direction and lowers the fifth wheel down to specific height and frame is placed on the other two wheels.

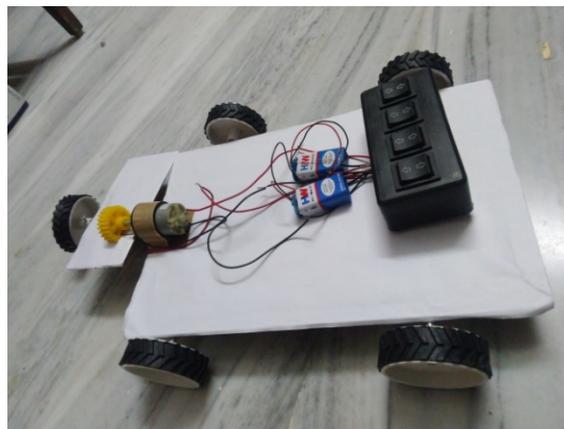


Fig 2. Prototype of the Project

3. Results and Discussion

The prominent objective that is achieved is obtaining better parking in narrow space and at multiplexes. To obtain 0 to 360 degree turning with zero turning radiuses. Resolve Traffic

Problems: By changing the lane of travel to avoid being struck in the traffic for very long hours. Vehicle parking and driving in city conditions with heavy traffic in tight spaces. It is very much economical as components like sensors; ECU, hydraulic pump etc need not be used. Construction of mechanism is easy due to absence of any complex circuits. They can also be used in industrial trucks for carrying heavy loads. The more significant the 5th wheel, the larger the truck you will need. It's easy to get excited about a 5th wheel with multiple slide outs and a full-size fridge until you have to pull it. Large trucks can be very expensive, and it is easy to under buy to save money. You lose your truck bed when traveling. Once you connect your 5th wheel, the back of your truck is full. If you hoped to carry a motorcycle or boat, the loss of space could be frustrating. You can't tow a car. Fact is, trucks are rarely fuel efficient. Without a small car, you may spend more than you intended on gas. Unfortunately, most states prohibit triple toe, which means your truck becomes your main around town vehicle. Expensive when new. 5th wheel setup can cost upwards of Rs.200,000 with the average being Rs.125,000. When you add the cost of a Rs.60,000 truck into the mix, this RV option can be expensive.

4. CONCLUSION

A vehicle featuring low cost and user friendly steering mechanism for Auxiliary wheel has been introduced and This report focused on a steering mechanism which offers feasible solutions to a number of current maneuvering limitations. A prototype for the proposed approach was developed by introducing separate mechanism for normal steering purpose and 360 degree steering purpose. This prototype was found to be able to be maneuvered very easily where limited space is available , also making 360 deg steering possible. Our project on the Angular rotation of wheel using auxiliary wheel is to improve the parking system with less cost and is defined as the time saving while car parking in the crowded area. It also introduce a method to eliminate the complex mechanism which is used in recent cars with number of sensors and complicated microcontrollers. This project is not only for parking of vehicle but also to change the lane in a heavy traffic areas. They can also be used in industries where heavy load carrying trucks can load and unload the goods without any effort.

5. FUTURE SCOPE

According to the current scenario of increasing traffic and limited parking spaces, people face problems for parking in the Multiplexes, commercial areas where people regularly visit, require a lot of space to park the vehicle which at present is not available and cannot be promised even in the future. Our project helps overcome this problem. Time required for parking the vehicle between the two vehicles is significantly more and the driver should be conscious otherwise the vehicle may directly hit the vehicle behind where the fifth wheel car parking mechanism, determined by our project, is time efficient and safe. This parking mechanism is economical because it does not require any sensors and costly ECU and is just a simple mechanism. Aim for development of a system to useful in the automotive sector Four bar mechanism will be

implementing for working of fifth wheel, our aim is to fold the fifth wheel axel for better space adaptability.Hence whenever needed operated must have unfold the fifth wheel axel by actuating dc motor and Arrange conventional steering system at front side.

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