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Quarter Turn Rotation of Automobile Wheels: A Revolutionary Change for Automobile

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Abstract
In the rapidly evolving world of transportation, the need for efficient, safe, and innovative automobile solutions is paramount.
The aim of the project is to develop an automobile capable of two-dimensional movement offering multiple functions like enhanced parking solutions, improved balancing, higher speed, increased ground clearance and sustainability for public utility vehicles. Not only this, the vehicle also includes better control, remote operations and serves as a testing platform for driver less technology. Additionally, the vehicle is a four-wheel drive for an efficient drive and better experience.
This vehicle will also act in the favor of the environment due to its simple mechanism and low costing of the model. Also, it will help us reduce pollution due to its electric design and low power consumption.

Keywords: 90^0 Rotation, Parking, Driverless.

1. Need For 90 Rotating of Wheels: -

In today's time each one of us have a car but we do not the realize the problem caused by the increasing number of cars. From our model we solve some of the problems like: -

- Solution for parking issues
- Reduction of pollution with the help of electric model
- Optimizing space used by the cars
- Improved AI

This model is not only designed for cars but can be applied to big and heavy vehicles too. Also, it can be used in the manufacturing of the wheelchairs to make the people self-dependent.
In my opinion this design will completely change the outlook of the automobile industry and will give it a fresh face .

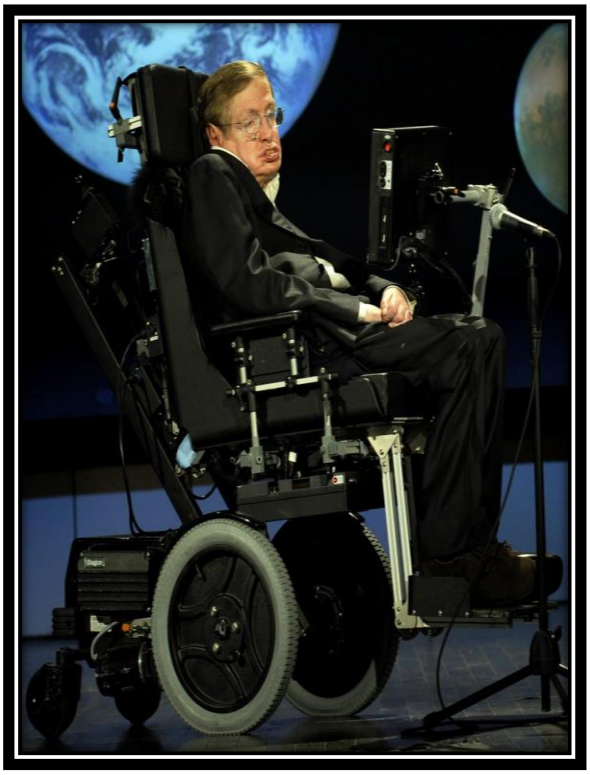
2. Novelty and key Features:

- **Parking Solution**
  Traditional vehicles are constrained to linear or curved paths, limiting parking options in crowded urban areas. A car with two-dimensional movement capability can maneuver side-to-side and diagonally, allowing git to fit into tight spaces without complex steering maneuvers. This feature significantly reduces the time spent searching for parking spots and improves urban space utilization.
- **Better Balancing**
  The vehicle design incorporates an advanced suspension system that ensures optimal weight distribution across all four wheels, improving stability and reducing the risk of tipping or rolling over. This balanced design enhances safety, especially when making sharp turns or driving on uneven terrain.

- **High Speed**
  With the integration of lightweight materials and a streamlined design, the car is engineered to achieve higher speeds without compromising safety. The two-dimensional movement allows for more efficient speed management, minimizing the need for sudden stops and starts, which can lower fuel consumption and reduce wear and tear on the vehicle.
- **Better Ground Clearance**
  The innovative chassis design includes adjustable ground clearance. This adaptability enables the vehicle to handle various terrains, from smooth city roads to rough off-road paths, providing versatility for both urban and rural settings.
- **Public Utility Vehicle Potential**
  The two-dimensional movement system is ideal for public utility vehicles, such as ambulances, fire trucks, and garbage collection trucks. The ability to maneuver in tight spaces and access hard-to-reach locations enhances the effectiveness of public services, especially in densely populated or geographically challenging areas.
- **Better Control**
  The vehicle is equipped with a sophisticated control system that leverages sensor fusion, combining data from cameras and other sensors to provide real-time feedback to the control unit. This setup allows for smoother and more precise movements, reducing the risk of collisions and improving overall safety.
- **Remote Operation – No Need for a Driver**
  The car is designed to be fully operable remotely, using advanced telematics and communication systems. This feature eliminates the need for a human driver, making it suitable for situations where manual operation is impractical or unsafe, such as hazardous environments, delivery of goods in quarantine zones, or for use in driverless car testing scenarios.
- **Testing of Driverless Car Technology**
  This vehicle serves as a platform for testing driverless car technologies, providing valuable insights into autonomous driving algorithms, sensor performance, and system integration. The two-dimensional movement capability presents unique challenges and opportunities for developing robust driverless solutions, particularly in urban settings.

3. Adaptiveness To the Hawking's Wheelchair: -

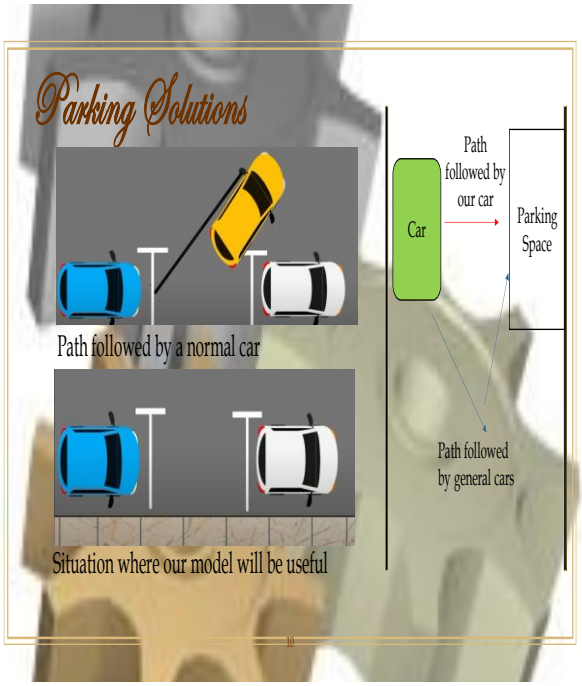
We all know that Stephen hawking has made a great impact on the technology of a wheel chair and automobiles, our model also incorporates the 90-degree rotation for the turning solution. This mechanism of right-angled rotation can also be built-in with wheel chairs for making the transportation of handicapped people easy.



4. Applications of our Model: -

- **Parking Solutions**

When we need to park the car just opposite to the place, we are standing on right now. In our cars which we have now a days we need to first go back and then come back to park the car in the right place as we desire or as per requirement. But in the model of the car which we have created we need not to do this much of work and just simply parallel shift the car from the place we are standing on right now to the place we need to park the car, the help of the feature of 90-degree rotation that we have given in our car.



- **Making transport easy for handicapped people**

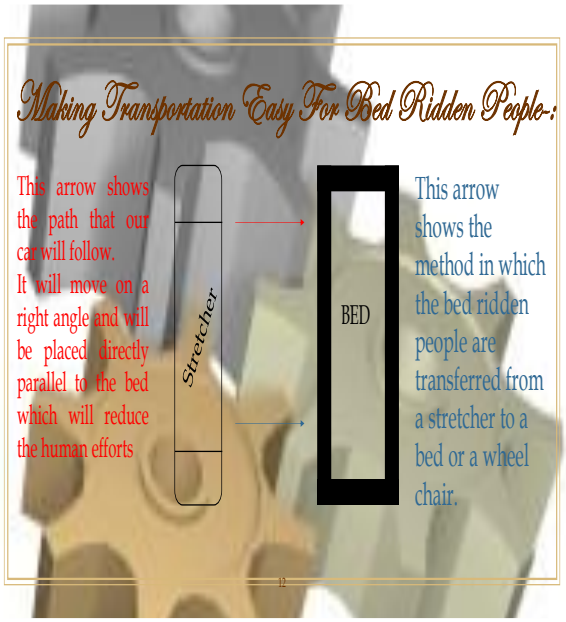
Like when a bed ridden person or a person who is physically disabled needs to travel from a vehicle we face many issues in completing the task and transporting the person from a place to another. But using our model of the car we need to just add a ramp to our door of the four-wheeler then we can parallelly shift the vehicle and load that person onto the vehicle easily and also the transport process becomes easier.

- **Space optimization**

In our day-to-day life we see that when big vehicles need to make turns or needed to be parked, they take a lot of space and also create long traffic jams. But if we use our model of car the big vehicles will not create any disturbance to the traffic moving besides them but they will pass smoothly by making a turn of 90 degree and turning as per their requirement. Which makes less usage of space as compared to the today's cars.

- **Making Transport easy for bed ridden people: -**

For example whenever a physically challenged person is to be transferred from a stretcher to a bed, we need the support of a belt and a lot of human efforts in performing this task. But if we use our model, we can minimize the human efforts by just shifting the wheel chair or the bed parallelly to the stretcher then we can easily shift the patient with minimal human efforts. Also, this will help us to increase the efficiency of the working of the hospitals in emergency situations.



- **Rovers in Space**

Our model can also be helpful in the rovers which are sent to space for exploration and discoveries. Taking example of India's Chandrayaan 2, one of the major reasons for its failure was the tilting of the Vikram lander due to the presence of a crater. It did not have any tech for moving sideways. If we could have incorporated this model there, there may have been chances for our Chandrayaan 2 to be a success. It is not only in the case of Chandrayaan 2 but it can be also incorporated into rovers to easily surpass the craters and not get stuck at one place.

5. Scope For Addition of Things: -

Things that can be added to make this project more useful: -

- **Hydraulic Crane** for picking and keeping the materials easily

- **Hydraulic Lift** which can be used in super markets for keeping the material on high racks easily and which can be transported easily.
- **Factor of Safety** for avoiding accidents and making the drive safer and more comfortable for the driver.
- The electric circuit can also be converted to **manual controls** so as to make the controls easy for the user
- We can use this concept in **wheel chairs and hospital beds** so as to make the transport of the patients easy and also it can be controlled by the patient itself and does not require any other person for the same
- We may also make the addition of **AI** in this to test the driver less technologies and make the transport system more efficient

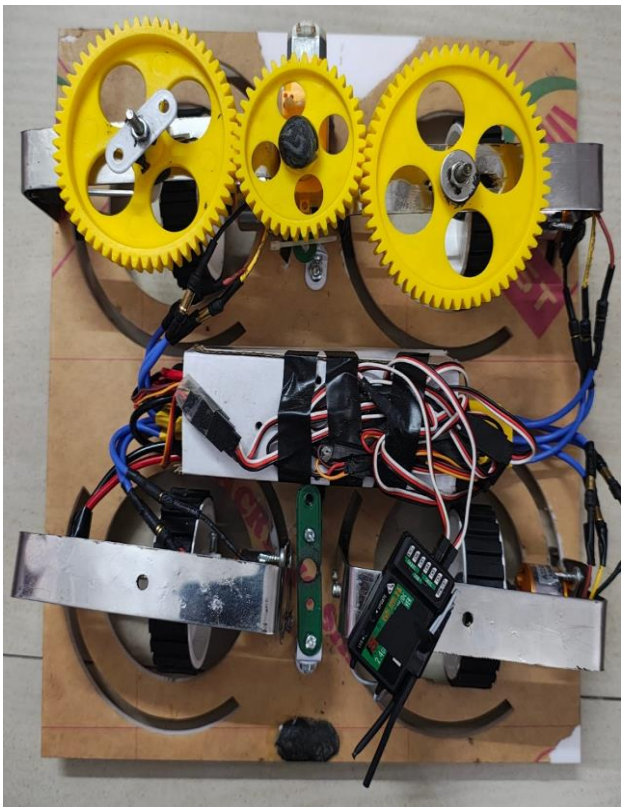
6. Benefits of the Model: -

There are various benefits of using this model of car. Some of them are: -

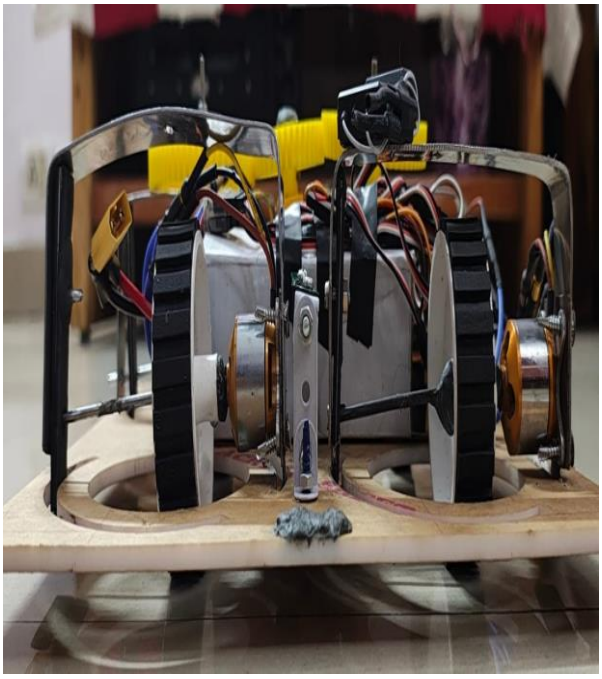
- Electric model reduces pollution
- Use of bio degradable materials in the chassis
- A novel solution to the problems of physically challenged people
- User friendly car
- Testing of driverless technology which reduces human efforts

7. Design of our car :-

Top view



Front view



8. Chassis design of the car

9. Effectiveness Of our Model: -

a. Cost effectiveness:

Using our model the fuel used by the car in parking can be save.

1. On every parking our can save approximately 50 ml of fuel and talking about Ghaziabad the city has approximately 8,000 cars according to the data recorded by the RTO. So
   If we save 50 ml fuel x 8000 = 4,00,000 ml = 400 liter
   Cost of 1 liter fuel = 94.86 x 400 = 37,944 Rs per parking by car in Ghaziabad/ per day.

It saves fuel consumption and reduce financial burden and also reduce pollution and save environment. So, it will have huge impact when calculated at national level and international reduce pollution substantially.

2. **According to Ghaziabad RTO Every parking 2/10 ratio is their for every parking, so cars will have dents.**
   Cost of removing dents from small to large scale ranges from =200 -10,000 and further
   So it will save dent cost in Ghaziabad = 200 x 1600 – 10,000 x 1600 = 3,20,000 – 1,60,00,000 and further per parking So, it will have huge impact when calculated at national level and international reduce pollution substantially in terms of monetary benefits.

b. **Impact on life due to our Model:**

According to survey as shown

Table1. Frequency table depicted different road killed vertebrate species at Desert national Park at Jaisalmer.

Sl. No.	Common Name	Scientific Name	Road kill frequency			IUCN Global Status
			Jan-Apr.	May-Aug.	Sep.-Dec.	
		Frogs				
1	Marbled Asian Toad	*Duttaphrynus stomaticus*	1	6	2	LC
2	Indian Skittering Frog	*Euphlyctis cyanophlyctis*	0	2	0	LC
		Lizards				
3	Oriental Garden Lizard	*Calotes versicolor*	5	8	5	NA
4	Brilliant Rock Agama	*Trapelus agilis*	1	7	2	NA
5	Yellow Bellied House Gecko	*Hemidactylus flaviviridis*	0	0	1	NA
6	Bark Gecko	*Hemidactylus leschenaultii*	0	1	0	NA
7	Sindh Sand Gecko	*Crossobamon orientalis*	3	2	2	NA
8	Punjab- Snake Eye Lacerta	*Ophisops jerdonii*	0	1	0	LC
9	Indian Spiny Tailed Lizard	*Saara hardwickii*	35	65	25	NA
10	Bengal Monitor Lizard	*Varanus bengalensis*	3	6	2	LC
11	Desert Monitor Lizard	*Varanus griseus*	1	1	0	NA
		Snakes				
12	Red Sand Boa	*Eryx johnii*	2	3	5	NA
13	Common Wolf Snake	*Lycodon aulicus*	0	1	0	NA
14	Glossy Bellied Racer	*Platyceps ventromaculatus*	1	4	0	NA
15	Afro Asian Sand Snake	*Psammophis schokari*	0	2	0	NA
16	Red-Spotted Royal Snake	*Spalerosophis arenarius*	1	1	0	NA
17	Spectacled Cobra	*Naja naja*	0	0	1	NA
18	Saw Scaled Viper	*Echis carinatus carinatus*	1	2	3	NA
19	Sochurek's Saw Scaled Viper	*Echis carinatus sochureki*	0	1	0	NA
20	Sindh Krait	*Bungarus sindhanus*	0	1	0	NA
		Birds				
21	Egyptian Vulture	*Neophron percnopterus*	0	0	1	EN
22	Savanna Nightjar	*Caprimulgus affinis*	1	0	0	LC
23	Laughing Dove	*Spilopelia senegalensis*	0	0	1	LC
24	Indian Roller	*Coracias benghalensis*	1	0	1	LC
25	House Crow	*Corvus splendens*	0	0	1	LC
26	Green Bee Eater	*Merops orientalis*	0	0	1	LC
27	Black Crowned Sparrow Lark	*Eremopterix nigriceps*	0	1	1	LC
28	House Sparrow	*Passer domesticus*	0	0	1	NA
29	White Eared Bulbul	*Pycnonotus leucotis*	2	2	2	NA
30	Common Babbler	*Argya caudata*	1	0	3	LC
		Mammals				
31	Chinkara	*Gazella bennettii*	0	0	1	LC
32	Dog	*Canis familiaris*	2	3	4	NA
33	Desert Fox	*Vulpes vulpes pusilla*	4	1	2	NA
34	Jungle Cat	*Felis chaus*	0	0	2	LC
35	Indian Pale Hedgehog	*Paraechinus micropus*	1	0	0	LC
36	Indian Grey Mongoose	*Herpestes edwardsii*	0	0	1	LC
37	Indian Hare	*Lepus nigricollis*	0	0	1	LC
38	Indian Desert Gerbil	*Meriones hurrianae*	0	1	1	LC
39	House Rat	*Rattus rattus*	0	1	0	LC
40	Indian Gerbil	*Tatera indica*	2	7	2	LC
41	Five-striped Palm Squirrel	*Funambulus pennantii*	5	4	2	LC
42	Domestic Sheep	*Ovis aries*	0	5	0	NA
43	Camel	*Camelus dromedaries*	0	1	0	NA

Number of animal Died is 240 in an year in Jaisalmer during the parking by vehicles. Either they have gone down for shelter or food etc. So by imbibing the ultrasonic sensors we can save their live s in a city .
So we can estimate its impact over national and internation al for saving the animal life and reducing animal mortality ratio effectively.

10. Conclusion:

The development of a two-dimensional movement vehicle represents a significant leap forward in automotive technology, offering novel solutions for parking, control, speed, and balancing, along with enhanced ground clearance and suitability for public utility use. By enabling remote operation and serving as a testbed for autonomous driving, this innovative project addresses both current and future challenges in urban mobility, making transportation safer, more efficient, and more sustainable.

11. References:

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