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REGEN ELECTRO SENSING CAR WITH INTELLIGENT BREAKING

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ABSTRACT: In this decade there has been a drastic step taken up to recover the gasoline resources, by introducing Electric cars into the market. We can see an enormous number of Electric Cars coming into the market day by day. But the basic problem with the Electric cars is for recharging the vehicle. It takes a lot of time to recharge the batteries and though when charged the mileage of the vehicle is very minimum. The aim of this model is to regenerate electric current from the wheel by connecting a dynamo to it. The dynamo converts mechanical energy to electrical energy. Thus this is again used to recharge the battery. As the car moves, the battery is recharged due to the rotation of the wheels, simultaneously. The second part of the project is Intelligent Braking. At all times there have been safety measures enrolled in the vehicles to make the Driving experience safer and comfortable. So to overcome the problem of accidents, this model is installed with the automated braking system. Whenever an object approaches the vehicle or suddenly comes in front of the vehicle, the car Decelerates or ceases by the help of the sensor, which applies brakes to avoid the collision.

KEYWORDS:
Sensor (Ultrasonic sensor HC-SR04), Arduino Uno, DC Geared Motor, Dynamo.

I.INTRODUCTION

The Invention of Automobiles has made the daily life of Humans easy. Travel time has reduced, transportation of goods has become faster, driver-friendly vehicles are introduced. But due to high usage of fuels in Automobiles like gasoline, water, charcoal, steam, wood, etc is making the resources to exhaust and the vehicles running on it emits a lot of harmful smoke. To prevent this nowadays Electric cars are introduced into the environment, which is eco-friendly with nature. Although there are some limitations with the Electric vehicles also, Which makes it unyielding for an individual i.e, the time for recharging the vehicle is high, the mileage of the vehicle on a single charge is minimal. Thus to overcome this issue in this model we have installed Regenerative technique. A Dynamo is attached to the wheel of the axel through a chain pulley. Generally, Dynamo gives an electric output when mechanical input is provided. As the vehicle runs on the initially charged batteries, after an instance the Dynamo regenerates electric current which is given as input for recharging the batteries, simultaneously. The other part of the project Intelligent Braking is developed to conquer the problem of accidents occurring due to drowsy driving or when a person or obstacle comes in front of the vehicle suddenly. This is employed by placing an Ultrasonic Sensor, which senses the obstacle and alerts the microcontroller which applies the brake. Hence this avoids the collision and secures the driver and the person. These systems help in convenient driving for an individual. Making it safer, reliable, and provide high mileage.

II.LITERATURE SURVEY

"REGENERATIVE BRAKING"

G. Rizzo, M.Grandone Department of Industrial Engineering, University of Salerno, Via Giovani Paolo II 132, 84084 Fisciano (SA) – Italy: This paper focuses on the development of a braking control strategy that allows the best tradeoff between mechanical and regenerative braking on a hybridized vehicle. The research work is part of a project for the development of an automotive hybridization kit aimed at

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converting conventional cars into Through the Road hybrid solar vehicles. The main aspect of the project is the integration of state-of-the-art components (i.e. in-wheel motors, photovoltaic panels, batteries) with the development of an optimal controller for power management. A mild parallel hybrid structure is obtained by substituting/integrating the rear wheels with in-wheel motors and adding photovoltaic panels and a lithium-ion battery. A hybridizing equipment prototype, patented by the University of Salerno, is installed on a FIAT Grande Punto. A model useful for real-time braking control has been developed, starting from a vehicle longitudinal model and considering dynamic weight distribution in front and rear axles and related wheel slipping effects. Different braking strategies have then been investigated, in order to maximize the benefits of regenerative braking.

"Intelligent Braking System Using Ultrasonic Sensor" International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN: 2349-5162, Vol.5, Issue 9, page no.655-660, September-2018.

Authors- K.Harishwar Reddy, B.Srikanth, D.Sagar, G.Vijay: Now a day's road accident in four-wheeled vehicles goes on increasing rapidly due to various reasons. Some road accidents may cause due to chasing between two vehicles, unconsciousness of driver and failure of the linkages of the braking system. In such cases, we can't control the vehicle by applying the brakes manually. So in order to avoid that difficulty, it is necessary to control brakes automatically through electronic devices to reduce road accidents. In this research paper, we propose an effective methodology for automatic control of the braking system to avoid accidents. In this technology we used Ultrasonic sensor, LED, Buzzer, LCD and Microcontroller is programmed with embedded C Language using PIC C Compiler. This complete system can be fitted on to the dashboard of a vehicle and used for controlling the braking system automatically.

III. METHODOLOGY

There are two basic problems, one is high recharging time of electric cars and low mileage, the second one is difficulty in braking on sudden situations causing accidents.

To overcome the first problem, the idea hit in the mind was wind turbines. It generated an enormous amount of current instead the turbine rotates at very low speed by the external force of the wind, which is capable of supplying current for the whole colony. So this technique was used in the model the dynamo regenerates high current which is capable to restore the batteries.

The solution for the second problem was introduced after an incident, once there was an accident, the driver in the car was sleepy because of long driving and sudden hit a person in front of the vehicle due to lack of consciousness. So the intelligent Braking was introduced to avoid such incidents.

IV.HARDWARE DESCRIPTION:

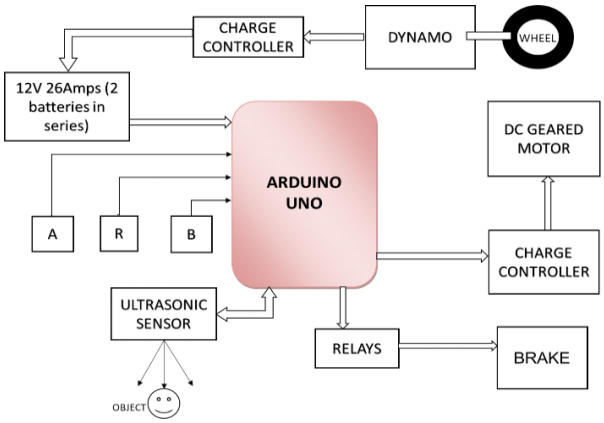


Fig: 1 Block diagram

Required Equipment:

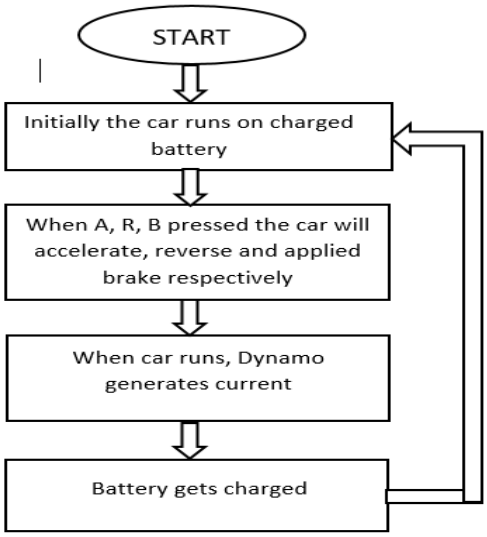
1. Arduino Uno
2. Ultrasonic Sensor (HC-SR04)
3. DC Geared Motor 450w
4. Relays
5. Dc Dynamo 250w Adaptor (12v)
6. Adaptor (5v)

7. Adaptor (12v)
8. Charge Controller
9. 12v 26Ah Batteries
10. Switches

This project consists of a Microcontroller board Arduino Uno, 24V Relay, DC Gear Motor, Dynamo, Ultrasonic Sensor. Here AT89S52 microcontroller is used. It is a microcontroller board based on the ATmega328P and it requires a supply voltage of 5V DC. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. We can use 9V DC battery or 5V, 1A adapter to provide the supply to the Arduino Uno. For the above circuit additionally, it needs to connect Relay for the DC motor to work properly. Vcc pin is connected to the 5V and GND pin is connected to ground. Electrical load (Linear Actuator) is connected to the P2.0 through the relays. Here relays are used to switch AC loads using small DC voltages. Ultrasonic sensor pins trigger is connected to Arduino pin 9, echo pin to 10.

V. IMPLEMENTATION

FLOWCHART:



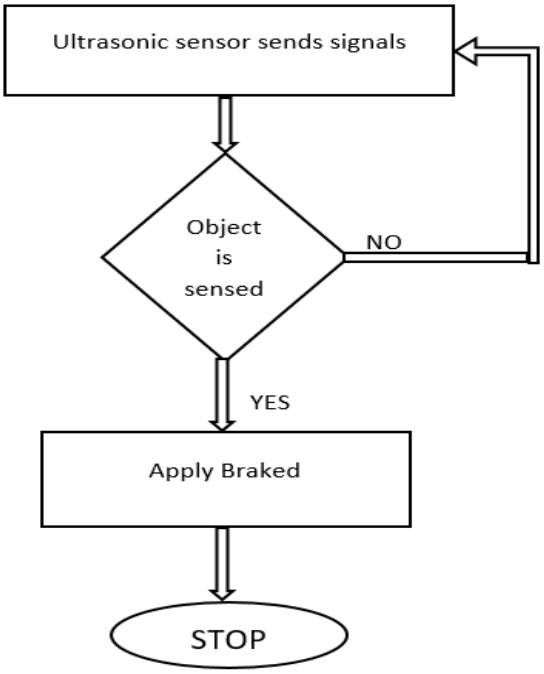


Fig: 2 Flowchart

VI.RESULTS

- Initially, the car runs on charged 24v 26ah batteries.
- The Dynamo connected to the wheel of the car axle experiences a rotational force due to the motion of the vehicle (Forward or Reverse). And produces electric current, which recharges the batteries.
- As there is a number of teeth on dynamo gear compared to axel gear. I,e Axel gear has 24 toots and the dynamo gear has 50 toots. Which rotates the dynamo mini gear which has 11 toots. Thus these near multiples the current to four times.
- In this project, the generation of current (i,e. charging of the batteries) is shown by connecting the dynamo to the dc bulb, which lits while driving.
- Now coming to the Braking part of the project, whenever either of the Ultrasonic sensors 1 or 2 senses any obstacle it triggers the relay.

- The relay is directly connected to the brake system of the motor through a charge controller, thus applies the brake.

Advantages:

- The electric current is generated whenever the wheels are rotated.
- Eco-friendly.
- It can be easily operated.
- Prevents accidents using ultrasonic sensors.

Disadvantages:

- It is complicated to fix the dynamo in the wheels of the cars because the front wheel is connected to steering and when the steering is turned then the wheel gets turned hence the dynamo should be fixed in the way that it should be moved where the wheel moves
- By considering the cost of electric cars the dynamos cost is low but if the cost of the car is low then, by comparison, the cost of the four dynamos will be slightly greater.
- The ultrasonic sensor senses the obstacle during traffic, which results in unnecessary apply of brakes, so it should be switched off when in traffic.

Applications

- Very efficient for Electric vehicles.
- Serves when Emergency, if the batteries are discharged.
- For Public transport, it provides long and safer journey.
- Can be used in heavy load vehicles like: Buses or Lorries, for safe Braking.

Fig: 3 Front view of the vehicle

Fig: 4 Back view of the vehicle

Fig: 5 Connection and placement

VIII. CONCLUSION

Electric vehicles are the best alternative to the gasoline vehicles. But the recharging time of the vehicles are high. It take nearly 10 to 12 hours to recharge. Further the vehicle has a minimal mileage, for example it can run for 100km-150km on single charge. As the engineering in gasoline vehicles, small electrical equipment drive on battery, which is recharged by adding a Dynamo to the Engine. Whereas in Electrical vehicles there is no Regeneration of current,

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electrical equipment are drive directly from the main battery. For an existing project (Regenerative Braking) current was generated by converting the mechanical force into Electric energy which is produced while Braking. The current regenerated here is very limited which is nearly 15%. In this model, the Regeneration of current is terminated by the Dynamo and utilizing it for recharging the batteries, gives an extra mileage due to simultaneous recharging. This model produces high amounts of current which is roughly 50%-60%, due to this technique a vehicle having a mileage of 100km on single charge, can be upgraded to 198km. Every time the battery is recharge nearly 50-60% which makes it more efficient.

The Automated Braking aids to effortless driving. The sudden approach of an obstacle or person and faraway driving makes immediate braking complicated. Due to this technique the driver need to apply brakes manually and the collision is prevented.

IX. FUTURE SCOPE

There are related works. We can enlist them as follows:-

1. Instead of placing Dynamo for single Wheel of the vehicle, it can be placed for multiple wheels. This provides more amount of current, and can be used for several purposes.
2. Controlled Shock absorbers, for balancing the vehicle when the sudden Braking, due to Intelligent Braking.
3. The Gear ratio can be set in such a way that it increases the RPM of the dynamo, thus increasing the amount of current produce.
4. By using high end equipment the number of seating can be increased, from single seater to multiple seater.

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