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RF CONTROLLED SOLAR ENERGY CAR

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Abstract:
Day by day there is increase in demand of fossil fuels, also these are conventional sources of energy.
Use of such fuels to drive vehicles is too common but in return we all are left with huge amount of air pollution. Thus one of the best solution to nurture nature and to avail unlimited source of energy is to use solar energy cars. The solar Panels can be mounted on the vehicle to track solar energy and provide it for running the vehicle. Such cars can be controlled or driven from a distance using RF module.
This project makes use of the transmitter and receiver at 433MHz that is available at low cost hence making it very cheap and simple.The Radio Frequency based control proves to be more advantageous compared to the Infrared based control that limits the operating range to only a few meters of distance.

Keywords: Radio Frequency(RF), Solar Panel.

I. Introduction

The most abundant source of energy available on earth can be used to drive vehicles.This idea was earlier implemented with static or fixed solar panel mounted on rooftop of cars.The position of the sun change during day time.It needs the movable solar panel to track sunlight accordingly.As the car cant be driven in same direction,also the position of the sun is not same through out the day.Elaborating this concept this project implements the idea of rotating solar panel.This overcomes the drawback of solar car designed previously.The The LDR sensors are used detect the position or the direction of sun and the solar panel respectively.Its necessary to maintain the inclined angle of solar panel at the angle of 45◦,so as to track maximum amount of solar energy.The solar panel tracks the sunlight and with the help of signal conditioning circuit the power is stored in battery. Here one battery gets charged and is used to drive car energy .
The weather conditions may affect the drive so the backup battery is attached in case of failure of first battery, so we need to compensate it.
One battery charges and supplies energy simultaneously to car according to need.
In case of emergency second battery stands as a backup and thus situations can be handled.This project includes the advanced idea of RF controller in combination with solar car with automated solar panel. RF module is used to control the movement or direction of the car while driving.

Literature Survey:

1."The bachelors of engineering 'Rajeev Piyare and Ranvinesh Singh' has introduced the concept of an automated guided vehicle in their research paper and experimental results of RF based wireless control of PIC microcontroller based AVG i.e automated guided vehicle".

2."The solar powered vehicle was designed by 'Abhay Sinha and Yogesh Wamborikar' in their project of solar powered vehicle.
The solar panel was mounted on the roof of vehicle at slanted position.The trapping was carried out successfully but change in direction of vehicle affected the amount of energy tracking done by stable solar panel".

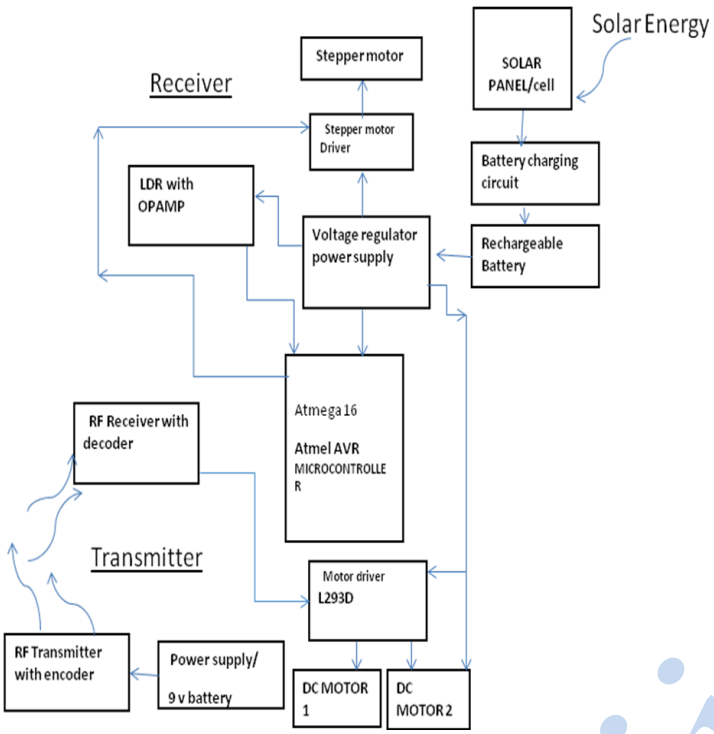
3. "Also 'Dr.Whit Smith' has used wireless telemetry system for solar car.It included solar jackets which are quit expensive.But the flexibility due to use of wireless system has evolved the idea of remote access to the solar car".

Comparison Table:

Table No.1

Research paper by:	Concept/Topic	Merits	Limitations
1.Rajeev Piyare and Ranvinesh Singh	RF controlled car.	Distant operating to drive a vehicle.	Run on electric power supply
2.Abhay Sinha,Yogesh Wambhorikar	Solar car	Runs on renewable source of energy i.e sun	The solar panel is fixed on roof top.
3.Jong Hoon Ahnn	Robt control using wireless communication(IR)	Solar car can be driven with the help of IR frequency.	It comes with the drawback of line of sight.

System Design:Block Diagram:



Working:
The solar energy is trapped by photovoltaic cells of solar panel.The solar energy is converted into electrical energy using converter.LDR sensors are used to detect direction of the sun to rotate the solar panel accordingly.Signal conditioning circuit is used to amplify the signal and is sent to Atmega16 AVR Microcontroller. It gives signal to stepper motor which is used to rotate solar panel.RF module is introduced in this project to drive the car automatically i.e without direct physical contact.AVR Atmega16 is used to drive motors connected to wheels of the car and stepper motor connected to solar panel. The use of ATMEGA16 facilates easy programming and availability of flash memory to store data.Also its cheap in cost and easy to interface with other hardware.

Merits:

1. This vehicle uses solar energy which is non polluting and non conventional source of energy.
2. The advantage of this unit is that to run the system it does not need computer.
3. The Solar car is RF controlled and can be driven from a distance.
4. Implementation of backup battery reduces the risk of conditional failures.
5. Change in direction of sun and car doesn't affect the tracking of solar energy due to automatic rotating solar panel.

Limitations:

1. Extreme weather condition can affect the working of solar car.
2. Implementation of this project on larger scale can cost more because of the use of solar panels.

Applications:

1. This car can be used in campus areas of forest region where non polluting systems are required,as there is very less issues of high driving speed.
2. The small car can also be used in military areas where road tracking is required from distant region.
3. Also this car can be mounted with camera for spying purposes.

Conclusion: Solar technology is an alternative that can be commercialized in order to replace non-renewable fuel sources.
This project will maximize the utilization of solar energy and will avoid the efforts of maintenance and driving vehicle.By using RF we can operate automatic solar car easily which can be run in four direction.

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