Mini Electric Robot Car

K.Sakthivel, K.Aravindhan, M.Dineshkumar, R.Jayaprakash, C.Vinothraj.
Assistant Professor, Muthayammal College of EngineeringRasipuram, Namakkal-637 408, Tamilnadu.
Student UG Scholar, Muthayammal College of Engineering

ABSTRACT-There are so many vehicles that came to influence in the existing world. Theiroperating systems are based on usual fossil fuel system. At the present sense the fossil fuel can exceed only for a certain period after that we have to go for a change to othermethods. Thus we have made an attempt to design and fabrication ultimate system (Battery Operated Car) which wouldproduce effective result than the existing system. This will be very useful to the future needs of the world. In By the end of 2020, fuel deposit in the world completely depleted. Then our "MINI ROBOT CAR" is an aspect. The goal of this project was to implement the most efficient and less polluting vehicle. In our project, vehicle is operated by Battery energy. The battery is 12 Volt D.C and then it is used to drive the D.C motor.

I.INTRODUCTION

The IR transmitter and receiver circuit is used for this solar car. The IR receiver circuit is fitted in the solar car. The cordless IR transmitter circuit is used for this project. The IR receiver circuit having four relays. They are used to control

- Relay1 - Forward Direction
- Relay2 - Reverse Direction
- Relay3 - Left Turn
- Relay4 - Right Turn

II.WORKING PRINCIPLE

In our project lead-acid battery is used. The lead-acid batteries output is given tithe IR receiver circuit. IR Receiver having four relays, they are connected to the two D.C motor in Forward and reverse rotation of operation.

- Relay1 - Forward Direction
- Relay2 - Reverse Direction
- Relay3 - Left Turn
- Relay4 - Right Turn

The cordless IR transmitter and receiver circuit is used in our project. The IR transmitter is giving the signal to the receiver. This receiver activates the properrelay .so that the D.C .motor runs.

2.2.1 RACK AND PINION

Rack and pinion animations rack andpinion is a type of linear actuator that comprisesa pair of gears which convert rotational motion into linear motion. The circular pinion engages teeth on a linear "gear" bar the rack. Rotational motion applied to the pinion will cause the rack to move to the side, up to the limit of its travel. For example, in a rack railway, the rotation of a pinion mounted on a locomotive or a rail car engages a rack between the rails and pulls a train along steep slope. A rack is a gear whose pitch diameter is infinite, resulting in a straight line pitch circle. Involutes of a very large base circle approaches a straight line. Used to convertor motion to straight line motion. Usedin machine tools.

2.2.2 D.C MOTOR

The electrical motor is an instrument,which converts electrical energy into mechanical energy. According to faraday's law of Electromagnetic induction, when a current carrying conductor is placed in a magnetic field, it experiences a mechanical force whose direction is given by Fleming'sleft hand rule.

2.2 MAJOR COMPONENTS

1. WHEEL
2. RACKANDPINION
3. DCMOTOR
4. BATTERY
5. SHAFT
6. BEARING
7. CONTROL UNIT

2.2.3 WHEEL

A tire (American English) or tire (British English) is a ring- shaped vehicle component that covers the wheel's rim to protect it and enable better vehicleperformance. Most tires, such as those for automobiles and bicycles, provide traction between the vehicleand the road while providing a flexible cushion that absorbs shock.

The materials of modern pneumatic tires are synthetic rubber ,natural rubber ,fabric and wire, along with carbon black and other chemical compounds. They consist of a tread and a body. . Before rubber was developed,the first versions of tires were simply
Bands of metal that fitted around wooden wheels to prevent wear and tear. Early rubber tires were solid (not pneumatic). Today, thermo jointly of tires are pneumatic in flat able structures, comprising a doughnut-shaped body of cords and wires encased in rubber and generally filled with compressed air to form an inflatable cushion. Pneumatic tires are used on many types of vehicles, including cars, bicycles, motorcycles, buses, trucks heavy equipment, and aircraft.

Fig 2.21 TIRE

Metal tires are still used onlocomotives and railcars, and solid rubber (or other polymer) tires are still used in various non-automotive applications, such as some casters,carts, lawn mowers.

2.2.4

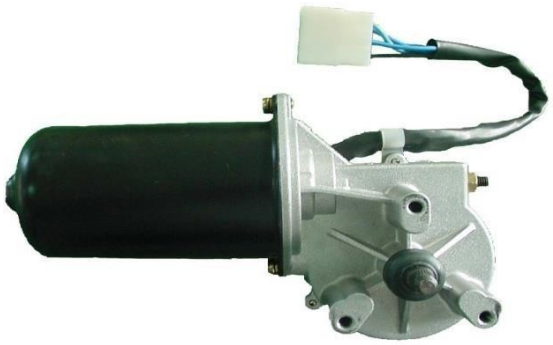

Fig 2.23 D.C MOTOR

Constructional a dc generator and a dc motor are identical. The same dc machine can be used as a generator or as a motor. When a generator is in operation, it is driven mechanically and develops a voltage. The voltage is capable of sending current through the load resistance. While motor action a torque is developed. The torque can produce mechanical rotation. Motors are classified as series wound, shuntwound motors.

2.2.5 BATTERY

In isolated systems away fromthe grid, batteries are used for storage of excess solar energy converted into electrical energy. The only exceptions are isolated sunshine load such as irrigation pumps or drinking water supplies for storage. In fact for small units with output less than one kilo watt. Batteries seem to bethe only technically and economically available storage means. Since both the photo-voltaic system and batteries are high In capital costs. It is necessary that the overall system be optimized with respect to available energy and local demand pattern. To be economically attractive the storage ofsolar electricity requires a battery with a particular combination of properties.

Fig 2.24 BATTERY

1) Low cost
2) Long life
3) Higher liability
4) High overall efficiency
5) Low discharge
6) Minimum maintenance

We use lead acid battery for storing the electrical Energy from the solar panel for lighting the street and so about the lead acidcells are explained below.

2.2.6 SHAFT

Shaft is a common and importantmachine element. It is a rotating member, in general, has a circular

Cross-section and issued to transmit power. The shaft maybe hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission. The shaft is generally acted upon by bending moment, torsionand axial force. Design of shaft primarily involves in,

Determining stresses at critical point inthe shaft that is a rising due to a for mentioned loading. Other two similar forms of a shaft are axle and spindle. Axle is a non-rotating member used for supporting rotating wheels etc. and do not transmit any torque. Spindle is simply defined as a short shaft. However, design method remains the same for axle and spindle as that for a shaft. It standardizes of Shafts Typical sizes of solid shaft that are available in the market are, Up to 25 mm 0.5 mm increments 25 to 50 mm 1.0 mm Increments 50 to 100 mm 2.0 mm Increments 100 to 200 mm 5.0 mm increments Material for Shafts The ferrous, non-ferrous materials and nonmetals are used as shaft material depending on the application. Some of the common ferrous materials used for shaft are discussed below. Hot rolled plain carbon steel. These materials are least expensive. Since itis hot rolled, scaling is always present on. The surface and machining is required to make the surface smooth.
Since it is cold drawn it has got its inherent characteristics of smooth bright finish .Amount of machining therefore is minimal. Bette yield strength is also obtained

2.2.7 BALL BEARING

A ball bearing is a type of rolling-
Element bearing that uses balls to,

Maintain these parathion between
The bearing races. The purpose of a ball bearing is to reduce rotational friction and support a dial an axial loads. It achieves this by using at least three racesto contain the balls and transmit the load

Ball bearings tend to have lower load capacity for their size than other kindsof rolling-element bearings due to the smaller contact area between the balls and races. However, they can tolerate some misalignment of the

2.2.1 *CONTROL UNIT*
ARDUINO

I was surprised to see a twelve year old boy giving life to his electronic gadgets. He was trying his hands on building his own creative toys which involved hard electronics and software skills. My zeal was on its peak to know the magical power inside the young chap. How did he understand the concepts of electronics so early? How did he develop the software? Anxiously I went down and asked him about the magic he was doing.The answer was “ARDUINO”.

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Fig 2.26 ARDUINO

III.APPLICATION

i) Pen fieldwork.
ii) Using replaceable battery, and panel, itcan be used in indoors.
iii) Also used in assemblysection.

IV.CONCLUSION

This is indeed a cost-effective and efficient project. The novelty lies in the fact that it is a cost-effective project with a simple and easy to use interface compared to existing ones. Also theBluetooth RC Controller application is more user friendly. The robot is small in size so it can be used in spying purpose. With few additions and modifications, this robot can be used in army for detecting and disposing hidden land mines. The robot can be used for surveillance. In future we can interface sensors to this robot so that it can monitor some parameters and we can improve the efficiency using Internet of Things (Iota) technology. We can also add wireless camera, in order to incorporate other security features.

REFERENCES

[1] Laode Ma’mun Ambia, Fakhrul Riesel Djumingin, Faizal Arya Samman and Zulfajri B. Hasanuddin. (2014). “Design and Built Under water Vehicle with Wireless Controlling Based on Arduino Microcontroller. The 2014 Makassar International Conference

on ElectricalEngineering and Informatics (MICEEI) Makassar, Nov.2014.
[2] Gregory Dudek, 2007,"AQUA: AnAmphibious Autonomous Robot", McGill University, York University.
[3] Boxer Baum, Alexander S, July 2005,
[4] "Design of an Autonomous Amphibious Robot for Surf Zone Operation: Part I Mechanical Design for Multimode Mobility". IEEE/ASME International Conference on Advanced Intelligent Mechatronics Monterey, California, USA.
[5] Harkins, Richard, Alexander S. BoxerBaum, July 2005, "Design of an Autonomous Amphibious Robot for Surfone Operations: Part II-Hardware, Control.
[6] Ding, Rui, Junzhi Yu, Qinghai Yang, and Min Tan, 2013, "Dynamic Modeling ofa CPG-Controlled Amphibious Bio mimetic Swimming Robot". International Journal of Advanced Robotic Systems.
[7] Hon, TeeYu. 2013, "Development ofAutonomousAmphibious Vehicle Maneuvering System Using Wheel-Based Guided Propulsion Approach.
[8] Divya, V., S.Dharanya, S.Shaheenand, A.Umamakeswari, 2013, "Amphibious Surveillance Robot with Smart Sensor Nodes". Indian Journal ofScience and Technology.
[9] D. Quinn, Richard Harkins, and Ravi Vaidyanathan, "Design Simulation Fabrication and Testing of a Bio-Inspired Amphibious Robot with Multiple Modes of Mobility".Journal of Robotics and Mechatronics Vol.24 No.4.,2012
[10] G.Neelakrishnan, K.Anandhakumar, A.Prathap, S.Prakash "Performance Estimation of cascaded h-bridge MLI for HEV using SVPWM" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:750-756
[11] G.Neelakrishnan, S.N.Pruthika, P.T.Shalini, S.Soniya, "Performance Investigation of T-Source Inverter fed with Solar Cell" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:744-749
[12] C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of ELECTRICAL ENGINEERING, Vol.63 (6), pp.365-372, Dec.2012.
[13] C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011.
[14] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor & Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011.
[15] Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.