IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.414 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 3, March 2026

DOI: 10.17148/IJIREEICE.2026.14358

DUAL POWERED AUTONOMOUS OBSTACLE AVOIDING VEHICLE

Mr. V. Brahmeswara Rao[1], K. Chandu[2], P. Jagadeesh[3], T. Jaideep[4]

Guide, Department Of EEE, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India[1]

B. Tech, Department Of EEE, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India[2-4]

Abstract: The Dual Powered Autonomous Vehicle is designed to demonstrate a smart and energy-efficient transportation system using solar energy and wireless power transfer. An Arduino micro controller controls the vehicle, while ultrasonic and IR sensors detect obstacles and enable automatic navigation. The system represents a sustainable and autonomous solution for future smart transportation.

Keywords: Dual Powered Vehicle, Solar Energy, Wireless Power Transfer, Arduino, Obstacle Avoidance, Smart Transportation.

I. INTRODUCTION

The rapid development of technology has led to major advancements in autonomous vehicles and smart transportation systems. This project presents a Dual Powered Autonomous Vehicle that combines automation with renewable energy. The vehicle uses an ultrasonic sensor for obstacle detection and an Arduino micro controller to control its movement. When an obstacle is detected, the vehicle automatically changes direction, and a motor driver module controls the DC motors. The system uses three power sources: solar energy, wireless power transfer, and a C-type charging supply. The solar panel converts sunlight into electrical energy, wireless charging enables contact less power transfer, and the Type-C supply provides fast and reliable charging.

II. SYSTEM DESIGN

The main components of this project is

- Solar Panel
- Ultra Sonic Sensor (HC-SR04)
- Arduino Uno
- Servo Motor (SG90)
- Charging Module (TP 4056)
- Copper Coils
- Battery
- Motor Module (L293d)
- Dc motor

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

Impact Factor 8.414 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 3, March 2026

DOI: 10.17148/IJIREEICE.2026.14358

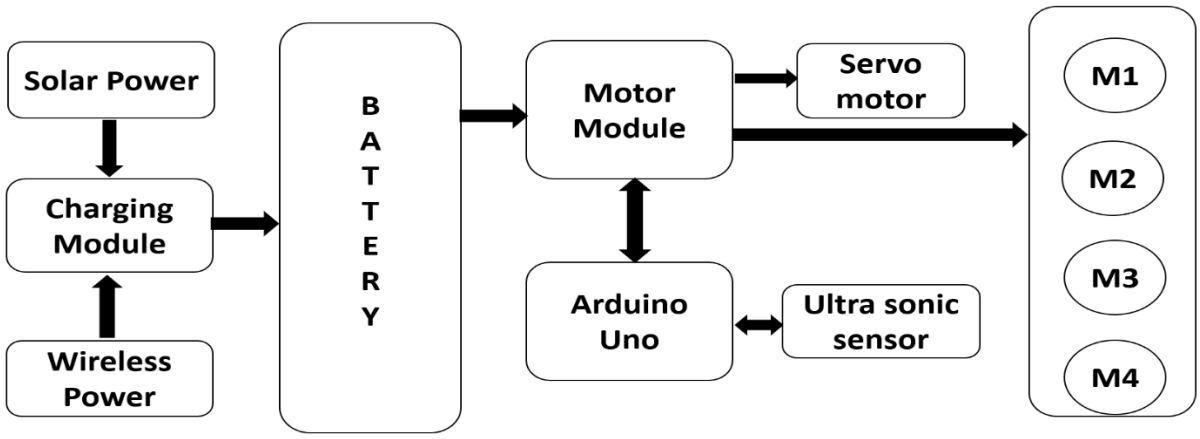

Fig1 Block Diagram

III. WORKING

The Dual-Powered Autonomous Vehicle works automatically using an Arduino Uno micro controller. When the system is powered on, the ultrasonic sensor continuously checks for obstacles in front of the vehicle. The sensor sends distance data to the Arduino, and if no obstacle is detected, the vehicle moves forward. When an obstacle is detected within a set distance, the Arduino automatically stops the vehicle and changes its direction to avoid a collision.

The movement of the vehicle is controlled using an L293D motor driver module, which drives the DC motors based on the signals received from the Arduino. The vehicle operates using three power sources: solar energy, wireless power transfer, and a Type-C charging supply. The solar panel converts sunlight into electrical energy, wireless charging allows contact-less charging, and the Type-C supply provides reliable charging when required.

Thus, the vehicle works by combining obstacle detection, automatic navigation, motor control, and a hybrid power system to operate efficiently and safely.

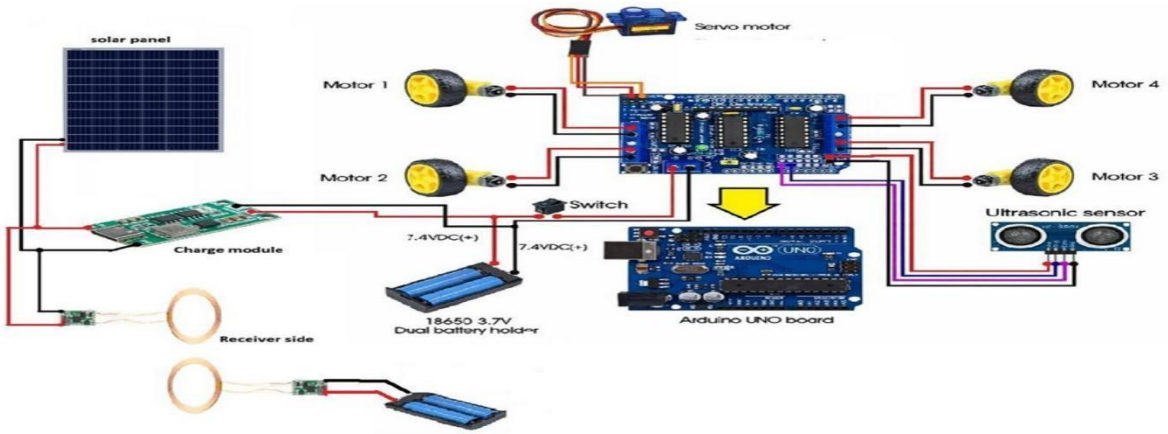

Fig 2 Circuit Diagram

IV. RESULT

The Dual-Powered Autonomous Vehicle was successfully designed, developed, and tested. The vehicle was able to move automatically without human control and detect obstacles using the ultrasonic sensor. When an obstacle was detected, the Arduino Uno processed the signal and changed the direction of the vehicle to avoid collisions. The motor driver module controlled the DC motors efficiently, allowing the vehicle to move forward, stop, and turn smoothly.

The solar panel successfully generated electrical energy to support the system, and the wireless charging system transferred power from the transmitter coil to the receiver coil without using wires. The Type-C charging supply also provided reliable and fast charging when solar or wireless power was not available. During testing, the system worked

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526
International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering
Impact Factor 8.414 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 14, Issue 3, March 2026
DOI: 10.17148/IJIREEICE.2026.14358

continuously and responded quickly to obstacles. Overall, the project demonstrated successful autonomous navigation with renewable energy and wireless charging.

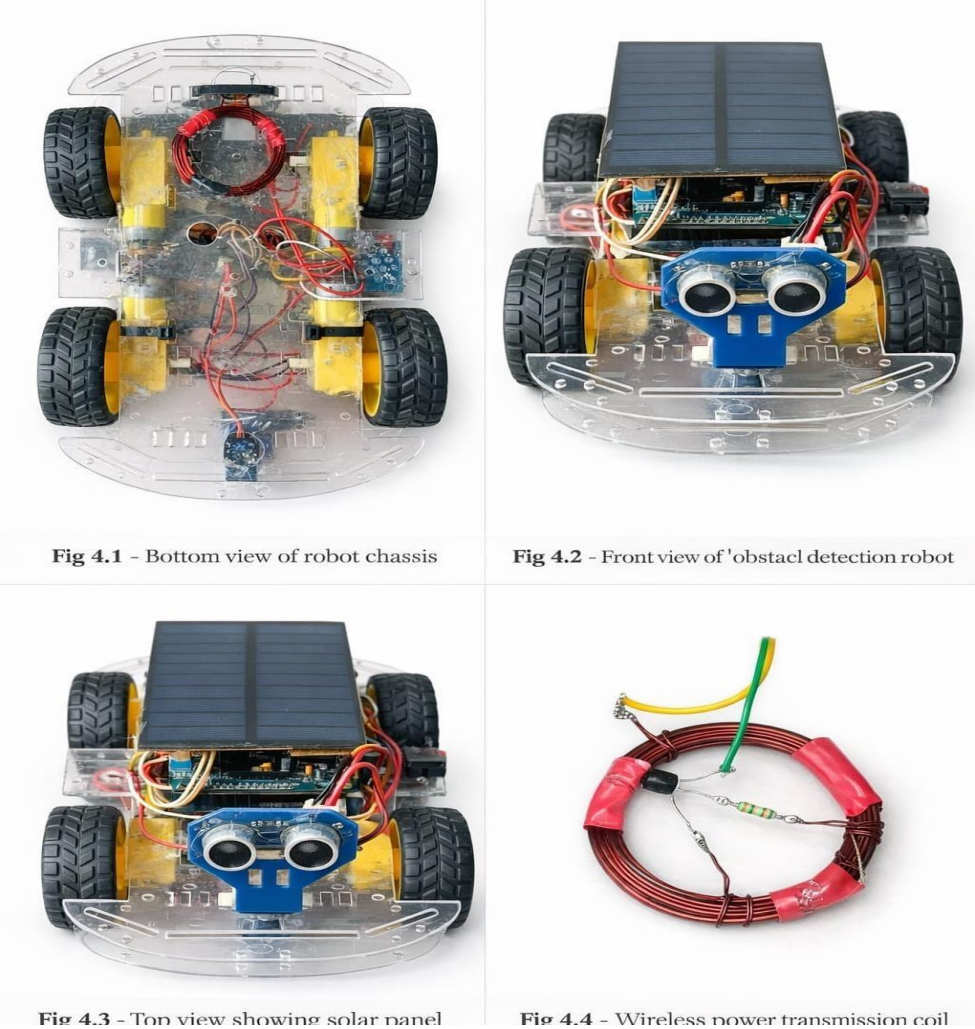

Fig 3. Result of the project

V. CONCLUSION

The Dual-Powered Autonomous Vehicle was successfully designed and implemented using an Arduino Uno micro controller, ultrasonic sensor, and motor driver module. The vehicle was able to move automatically and detect obstacles in real time. When an obstacle was detected, the system changed the direction of the vehicle without any collision, ensuring safe and smooth operation.

The project also demonstrated the use of a hybrid power system that includes solar energy, wireless power transfer, and Type-C charging. The solar panel generated electrical energy, the wireless charging system transferred power without wires, and the Type-C supply provided reliable charging when needed. Overall, the project proved that autonomous navigation combined with renewable energy can be used to develop smart and energy-efficient vehicles for future transportation systems.

ACKNOWLEDGMENT

We would like to express our sincere gratitude to the management and faculty of Andhra Loyola Institute of Engineering and Technology, Vijayawada, for providing the necessary facilities to carry out this project.

DOI: 10.17148/IJIREEICE.2026.14358

We would also like to thank our project guide **Mr. V. Brahmeswara Rao** for their valuable guidance, support, and encouragement throughout the development of this work. Finally, we extend our thanks to our friends.

REFERENCES

[1]. M. R. Ahmed and M. F. Rahman, "Obstacle Avoidance in a Solar Powered Autonomous Vehicle," *2016 IEEE International Conference on Computational Intelligence and Computing Research (ICCIC)*, 2016.
[2]. S. Y. R. Hui, W. Zhong, and C. K. Lee, "A Critical Review of Recent Progress in MidRange Wireless Power Transfer," *IEEE Transactions on Power Electronics*, vol. 29, no. 9, pp.
[3]. 4500–4511, 2014.
[4]. P. P. Ray, "Internet of Things for Smart Autonomous Systems," *IEEE Internet of Things Journal*, vol. 4, no. 1, pp. 1–12, 2017.
[5]. S. S. Subashka Ramesh, T. Keshri, S. Singh, and A. Sharma, "Solar Powered Obstacle Avoiding Robot Using Arduino," *International Journal of Emerging Technologies in Engineering Research*, Vol. 6, Issue 4, April 2018.
[6]. Mohammad Fraiwan, Ahmad Alsaleem, Hashem Abandeh, Omar Aljarrah, "Obstacle
[7]. Avoidance and Navigation in Robotic Systems: A Land and Aerial Robots Study," *International Journal of Computer Applications*, Vol. 93, No. 2, April 2014.
[8]. B. Vasu Naik, E. Bhavana, P. Manideep, and S. Dinesh Kumar, "Integration of Wireless Charging into Road Networks for Electric Vehicles," *IJRASET*, 2025.
[9]. Harpreet Kaur Channi, Meena Malik, Chin-Ling Chen, Ramandeep Sandhu, and Chander
[10]. Prabha, "A Solar-Integrated Wireless Charging System for Electric Vehicles," *Engineering, Technology & Applied Science Research*, Vol. 15, Issue 1, pp. 19349–19353, Feb 2025.
[11]. Kaustav Ray, Debjit Biswas, Surajit Basak, Koushik Pal, and Kaushik Roy, "Automatic Wireless Vehicle Charging System Using Solar Energy," *IJRASET*, 2025.