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Half Humanoid Robot

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Abstract: Mini robots represent a rapidly evolving field in robotics, driven by advancements in microelectronics, sensors, and intelligent control systems. These compact robotic systems are designed to perform tasks in confined or hard-to-reach environments where conventional robots are impractical. Despite their small size, mini robots are capable of autonomous or semi-autonomous operation, incorporating features such as obstacle detection, wireless communication, and energy-efficient motion control.

They are increasingly applied in areas including healthcare, industrial inspection, environmental monitoring, and educational platforms. The development of mini robots emphasizes low power consumption, cost-effectiveness, and adaptability, making them suitable for both research and real-world applications. This abstract highlights the design principles, functional capabilities, and potential applications of mini robotic systems, demonstrating their growing importance in modern technological solutions.

I. INTRODUCTION

Robotics has become an integral part of modern technology, influencing a wide range of fields from industrial automation to healthcare and education.

Among the various advancements in this domain, mini robots have gained significant attention due to their compact size, efficiency, and versatility. Mini robots are small-scale robotic systems designed to perform specific tasks in environments where larger robots cannot operate effectively, such as narrow spaces, complex terrains, or sensitive areas

A. Inconvenient Handling

The development of mini robots is made possible by recent progress in microcontrollers, sensors, actuators, and wireless communication technologies. These components allow mini robots to sense their surroundings, make decisions, and execute actions with a high degree of precision. Despite their limited size, mini robots can perform complex functions such as obstacle avoidance, line following, data collection, and remote operation

1) Abstract.
2) Introduction.
3) Block Diagram.
4) Methodology.
5) Results or Finding.
6) Conclusions**.**
7) Reference.

II. OBJECTIVE

1) To design and develop a compact mini robot capable of performing basic autonomous operations.
2) To integrate sensors and control units for effective environment sensing and decision-making.
3) To implement efficient motor control for accurate movement and navigation.
4) To enable obstacle detection and
5) To ensure safe operation.
6) To achieve low power consumption and cost-effective system design.
7) To test and evaluate the performance of the mini robot in real-time conditions.
8) To demonstrate the practical applications of mini robots in real-world scenarios

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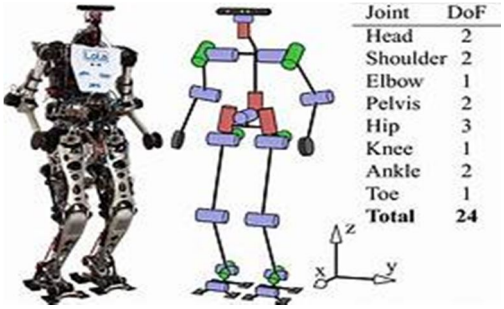
III. BLOCK DIAGRAM



IV. IMPROVEMENT AS PER REVIEWER COMMENTS

Recent advancements in robotics have led to the development of mini robots that are capable of performing complex tasks despite their small size. Several researchers have focused on designing compact robotic systems that emphasize efficiency, mobility, and intelligent control. The integration of microcontrollers such as Arduino, PIC, and ARM-based systems has significantly improved the processing capabilities of mini robots while maintaining low power consumption.

V. PROPOSED SYSTEM OVERVIEW

The proposed system focuses on the design and development of a compact mini robot capable of performing basic autonomous operations with improved efficiency and reliability. The system integrates a microcontroller-based control unit with various sensors and actuators to enable intelligent decision-making and precise movement control.

VI. WORKING PRINCIPLE

The working principle of the proposed mini robot is based on the integration of sensing, processing, and actuation units to perform controlled and autonomous movement. The system is powered by a battery supply, which provides the required voltage to the microcontroller, sensors, and motor driver circuit. When the robot is switched on, the sensors continuously monitor the surrounding environment. Sensors such as ultrasonic or infrared sensors detect obstacles by measuring distance or changes in reflected signals. The sensor data is transmitted to the microcontroller, which acts as the central processing unit of the system.

VII. HARDWARE COMPONENTS

[1] Microcontroller
[2] Motor Driver (L298N / L293D)
[3] DC Motors
[4] Sensors (Ultrasonic / Infrared)
[5] Power Supply (Battery)
[6] Chassis
[7] Wheels and Caster Wheel
[8] Connecting Wires and Breadboard / PCB
[9] Wireless Module (Optional – Bluetooth / Wi-Fi)

VIII. SOFTWARE USED

S. No.	Software Name	Purpose / Description
1	Arduino IDE	Used to write, compile, and upload the program to the microcontroller.
2	Embedded C	Programming language used to develop control logic for the mini robot.
3	Serial Monitor	Used for debugging and monitoring sensor values and system status.
4	Proteus / Tinkercad	Used for circuit design and simulation before hardware implementation.
5	Bluetooth Terminal / Mobile App	Used to send control commands when wireless control is implemented.

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IX. RESULT

The proposed mini robot was successfully designed, developed, and tested under various operating conditions. The robot demonstrated stable movement and accurate navigation based on the programmed control logic. Sensor integration enabled effective detection of obstacles, and the robot responded appropriately by changing direction or stopping, ensuring safe operation.

X. APPLICATIONS

1) Educational Purposes
2) Surveillance and Security
3) Search and Rescue Operations
4) Environmental Monitoring
5) Industrial Applications
6) Medical Assistance
7) Entertainment and Hobby Projects

XI. FUTURE SCOPE

1) Advanced Autonomy
2) Improved Navigation
3) Swarm Robotics
4) IoT and Remote Monitoring
5) Medical and Surgical Application
6) Energy Efficiency and Sustainability
7) Educational and Research Expansion

XII. ADVANTAGES

1) Compact Size
2) Cost-Effective
3) Low Power Consumption
4) Ease of Operation and Maintenance
5) Versatile Applications
6) Safe for Human Interaction
7) Scalability and Upgradability

XIII. LIMITATIONS

1) Limited Payload Capacity10
2) Short Battery Life
3) Restricted Speed and Power

XIV. CONCLUSION

The mini robot project successfully demonstrates the design, development, and implementation of a compact, low-cost, and efficient robotic system. The robot effectively integrates sensors, a microcontroller, and actuators to perform autonomous or semi-autonomous navigation with obstacle detection and avoidance.

XV. WHERE & HOW TO PUBLISH (Practical)

You can publish in:
Conference Papers / Journals (Technical/Academic)
Project Portfolios / Repositories
Competitions / Technical Magazines

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Prepare a manuscript with the following sections:

- Title
- Abstract
- Introduction & Literature Review
- Methodology / Proposed System
- Hardware & Software Details
- Working Principle & Flowcharts
- Results & Discussion
- Conclusion & Future Scope
- References

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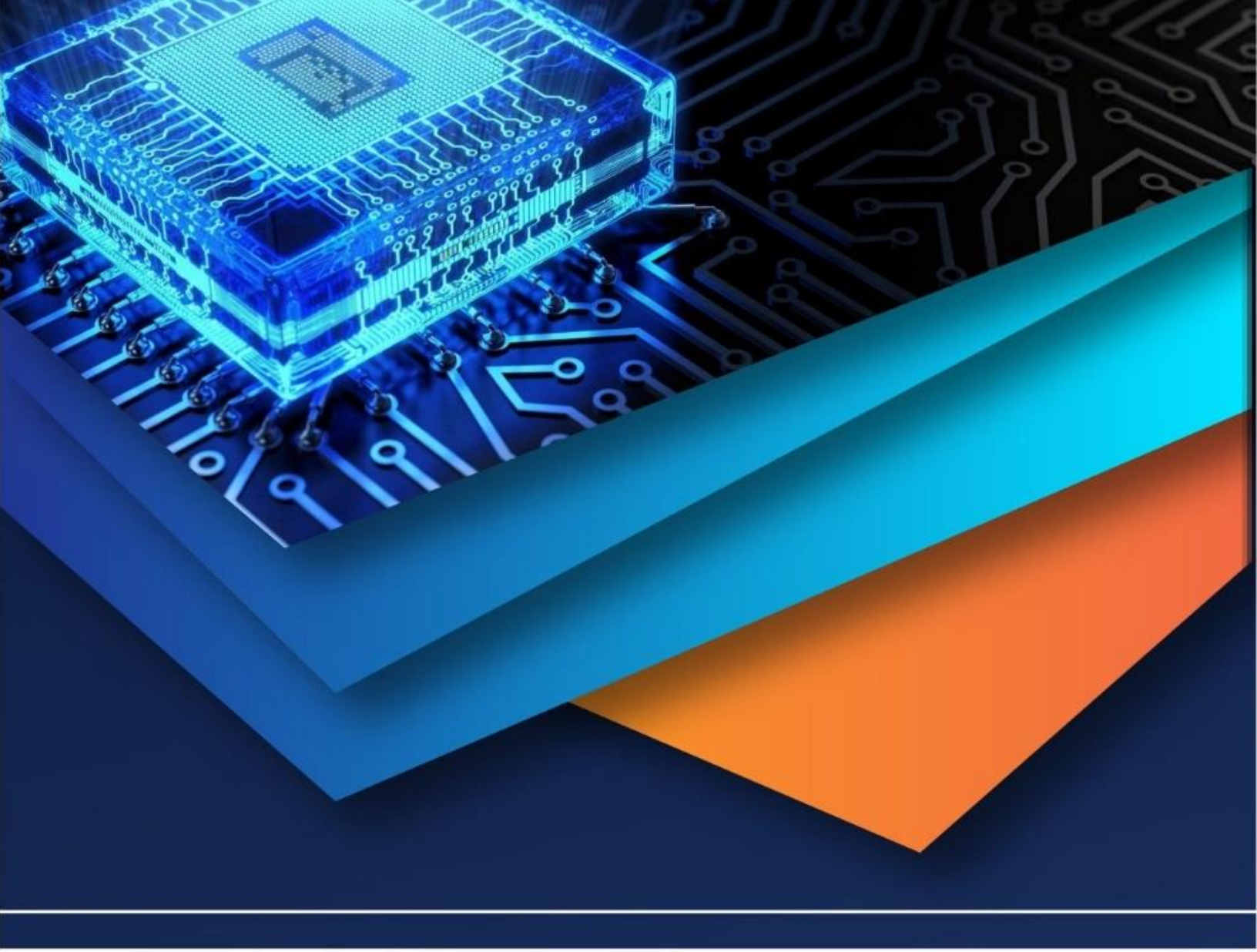

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