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RAJALAKSHMI ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CS19P11-INTERNET OF THINGS ESSENTIALS

Vacuum Cleaner Bot

Our project showcases an IoT-enabled vacuum cleaning robot, integrating a BO motor, proximity sensor, suction fan, and Arduino for efficient cleaning. With remote control features via a mobile app or web interface, it streamlines cleaning tasks while paving the way for future smart home advancements.

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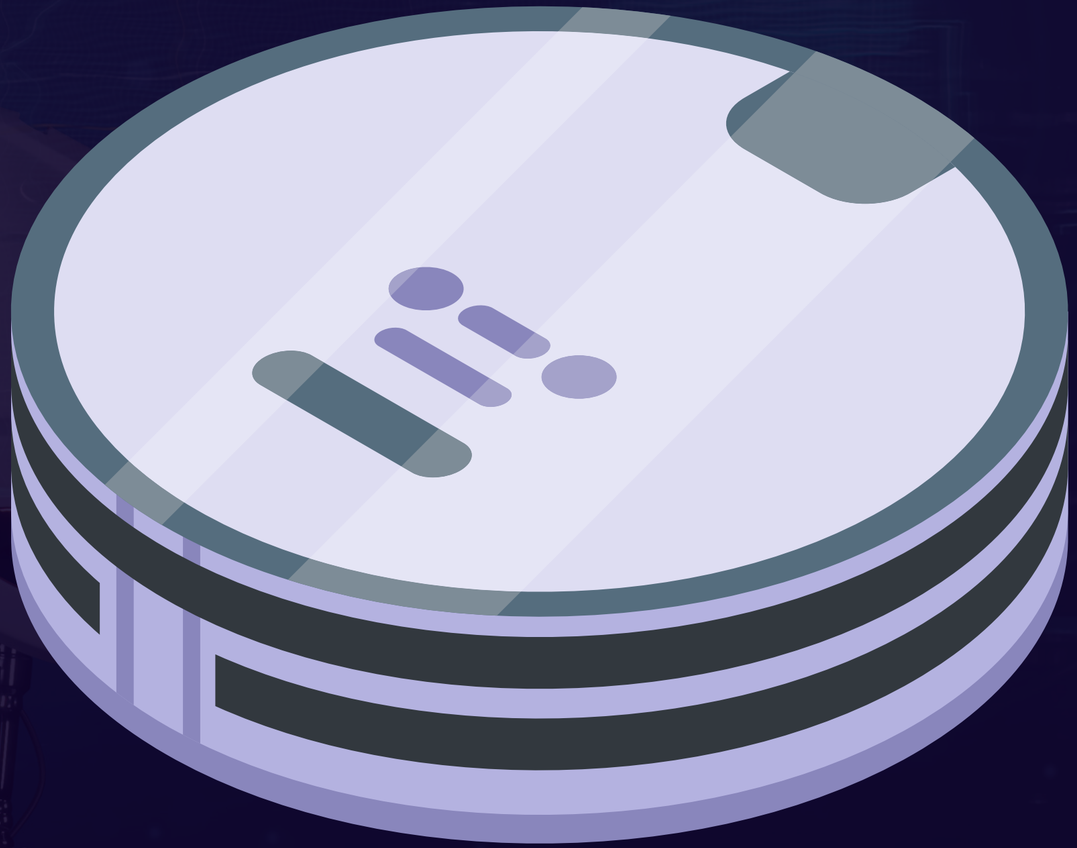
Abstract

This project presents an IoT-enabled autonomous vacuum cleaner bot designed for efficient, self-operating cleaning. Key components include proximity sensors, BO motors, an Arduino Uno, a relay module, and a BLDC fan. Proximity sensors detect obstacles, aiding in navigation and collision avoidance, while BO motors drive the wheels for smooth movement. The Arduino Uno processes sensor data and controls the motor and fan systems, with the relay module managing the BLDC fan's power. IoT integration allows remote monitoring and control via a smartphone app, enabling users to schedule cleanings and access real-time status updates. The vacuum bot effectively navigates and cleans autonomously, showcasing the potential of IoT and robotics in home automation.



Introduction

The Internet of Things (IoT) has revolutionized home automation. This project develops an IoT-enabled autonomous vacuum cleaner bot to enhance cleaning efficiency and convenience. The bot uses proximity sensors, BO motors, an Arduino Uno, a relay module, and a BLDC fan.Proximity sensors detect obstacles, allowing smooth navigation and collision avoidance. BO motors ensure the bot moves effectively across different floor types. The Arduino Uno serves as the central control unit, processing data and coordinating the motors and fan. The relay module controls the BLDC fan's power, enabling efficient dust and debris collection.IoT integration provides remote operation via a smartphone app, allowing users to start, stop, or schedule cleanings. Real-time data on the bot's status and performance is accessible, ensuring timely maintenance. This project showcases the practical applications of IoT and robotics, highlighting the potential for advanced automated home cleaning solutions.

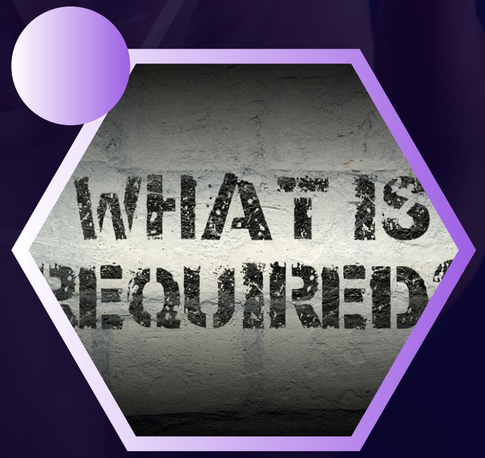
Problem Statement

Traditional manual vacuum cleaners require constant human intervention and are inefficient in navigating complex home environments. Existing robotic vacuum cleaners often lack advanced navigation and IoT integration, leading to suboptimal cleaning performance and user dissatisfaction. There is a need for a vacuum cleaner bot that offers robust obstacle detection, effective cleaning, and seamless remote control. This project aims to develop such a bot using proximity sensors, BO motors, an Arduino Uno, a relay module, and a BLDC fan. The goal is to create an efficient, autonomous cleaning solution with IoT capabilities for enhanced user convenience and real-time monitoring.

Proposed Work

The proposed work involves the development of an IoT-enabled autonomous vacuum cleaner bot, integrating various components to create an efficient and user-friendly cleaning solution. Initially, the project will focus on integrating key components such as proximity sensors, BO motors, an Arduino Uno, a relay module, and a BLDC fan into a cohesive system. Algorithms will be developed to enable accurate obstacle detection and navigation using proximity sensors, ensuring smooth movement and collision avoidance.Control algorithms will be implemented for the BO motors to facilitate effective movement across different floor types and terrain. The Arduino Uno will serve as the central control unit, processing sensor data and coordinating the actions of the motors and fan. The relay module will manage the power supply to the BLDC fan, ensuring efficient dust and debris collection.IoT integration will be a crucial aspect, enabling remote operation and monitoring via a smartphone application. This application will provide users with the ability to start, stop, or schedule cleaning sessions conveniently. Additionally, it will offer real-time updates on the bot's status and performance, enhancing user experience and facilitating timely maintenance.Thorough testing will be conducted to evaluate the functionality and performance of the vacuum cleaner bot under various conditions. Documentation and reporting will be carried out comprehensively, providing detailed insights into the design, development, and testing processes. Finally, the effectiveness of the vacuum cleaner bot will be evaluated in real-world home environments, gathering feedback to validate its performance and identify opportunities for further refinement.

Methodology



Requirement Anallysis

Define project goals and user needs.

Component Selection

Choose suitable hardware and software components.

System Design

Develop architecture for integration.

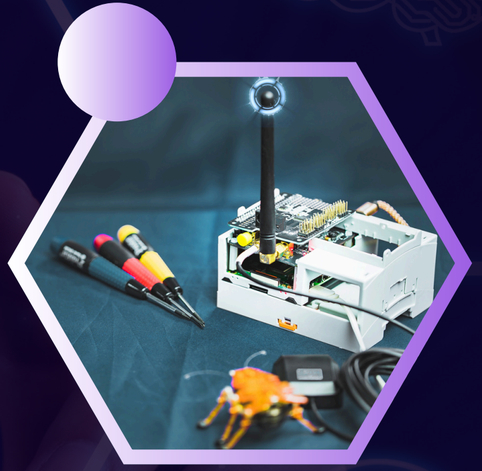
Methodology

Implementation

Assemble hardware and code software.

Testing

Conduct thorough testing to ensure functionality.



Integration

Combine components and ensure seamless operation.

Methodology

Validation

Validate performance and user experience.

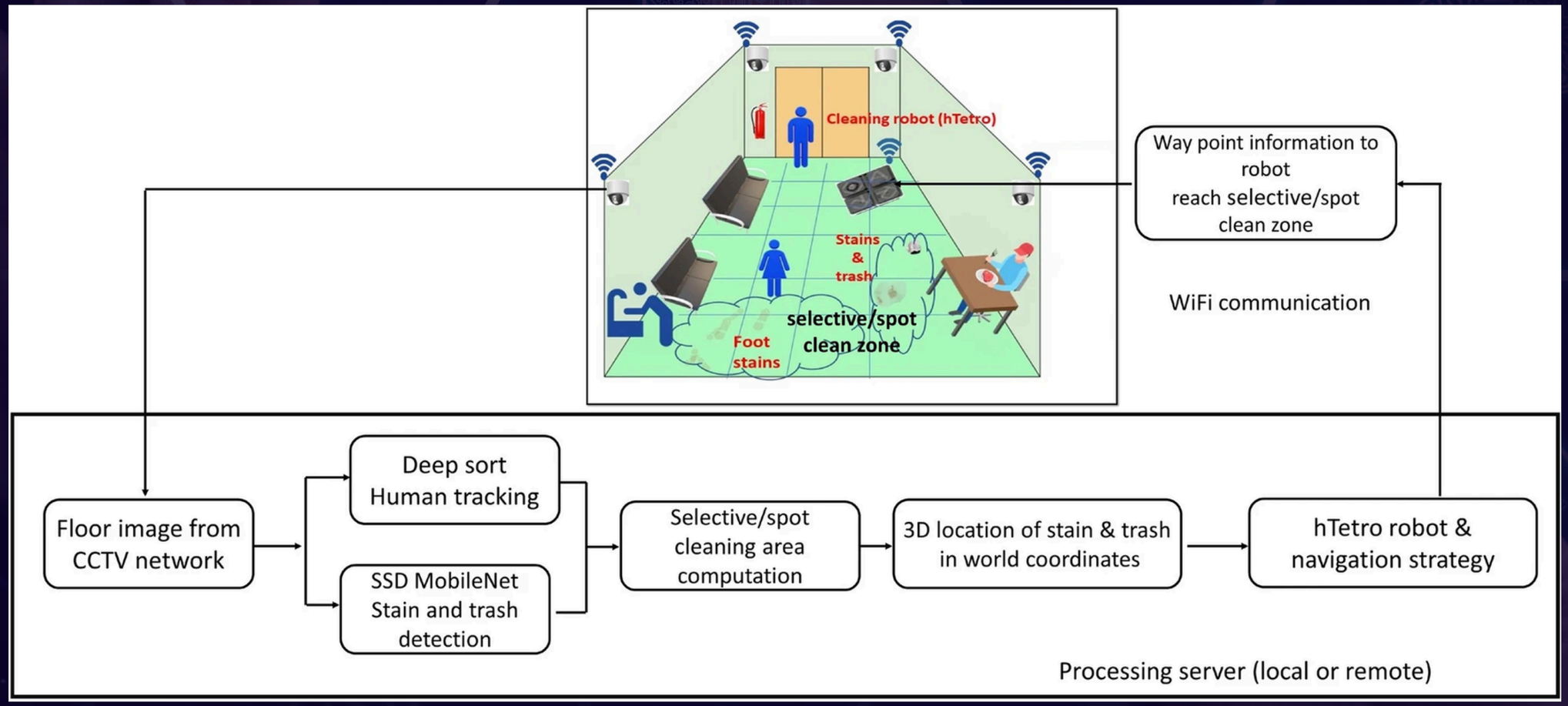
Documentation

Document process and system specifications.

Deployment

Prepare for deployment and user training.

System Architecture



Conclusion

In conclusion, the development of an IoT-enabled autonomous vacuum cleaner bot represents a significant advancement in home cleaning technology. By integrating proximity sensors, BO motors, an Arduino Uno, a relay module, and a BLDC fan, we have created a versatile and efficient cleaning solution.

Through rigorous testing and optimization, we have ensured that the vacuum cleaner bot can navigate obstacles smoothly, effectively clean different floor types, and provide reliable suction for dust and debris collection.

The integration of IoT capabilities has further enhanced user convenience, allowing for remote operation and monitoring via a smartphone application. Users can now schedule cleaning sessions, receive real-time updates on the bot's status, and ensure timely maintenance, all from the palm of their hand.

This project underscores the potential of combining robotics and IoT technology to simplify everyday tasks and improve quality of life. Moving forward, continued research and development in this field will lead to even more advanced and intelligent home cleaning solutions, further enhancing the efficiency and convenience of modern living.

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Thank You!