IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 4, June 2024

# IOT based QuantumClean SparkSwift

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**Abstract:** *QuantumClean SparkSwift is an innovative IoT-based project focuses in the development automatic vaccum cleaner. Leveraging the IoT technology, the system allows users to remotely control and monitor the vaccum cleaner through a mobile application. The device employs sensors for obstacle detection and obstacle avoidance and mapping, ensuring efficient cleaning. The integration of smart features such as obstacle detection, obstacle avoidance, mapping, Bluetooth control, voice command controlling enhances user convenience, making it a practical and innovative solution for automated home cleaning*

**Keywords:** QuantumClean SparkSwift, IoT, Vaccum Cleaner

## I. INTRODUCTION

In an age where technology is seamlessly twist with standard of living, QuantumClean SparkSwift has confirmed to remain a revolutionary force in home cleaning. Freed from the constraints of traditional methods, QuantumClean SparkSwift is more than just a vacuum cleaner. It represents a paradigm shift, a fusion of cutting-edge technology and the simplicity we crave in our daily lives.

Designed with the philosophy of making cleaning effortlessly efficient, QuantumClean SparkSwift stands as a testament to the transformative power of IoT. As we delve into the era of interconnected devices, QuantumClean SparkSwift emerges as a beacon, promising a streamlined and automated approach to maintaining a pristine living space.

With QuantumClean SparkSwift, the cleaning process itself is about to be transformed. QuantumClean SparkSwift envisions a future where you're no longer limited to just tasks, where mundane tasks seamlessly fade into the background, giving you back your precious time to prepare that really matters. A silent companion that navigates your living space with precision and offers you the luxury of enjoying a clean home without the hassle.

Embark on a journey into the world of QuantumClean SparkSwift and witness a new era in home cleaning. It's more than just a device. This is a revelation and a testament to in what way tools can mend our everyday experiences. Get ready to redefine your perception of cleanliness with QuantumClean SparkSwift. A perfect blend of simplicity and innovation.

In the ever-evolving landscape of industrial growth, the need to improve productivity often overshadows the urgent need for employee health and safety. Various industries face the harsh reality of workplace accidents, which frequently devour thoughtful significance aimed at workers. Given the vital role played by industrial workers, it is imperative that companies prioritize their well-being. To answer this urgent challenge, the QuantumClean SparkSwift is a new solution that is an innovative approach to ensuring a safer and healthier working environment.

## II. LITERATURE REVIEW

H. A. S. H. Prayash, M. R. Shaharear, M. F. Islam, S. Islam and N. Hossain "Designing and Optimization of an Independent Vacuum Floor Cleaning Robot. The paper has described how an operational floor cleaning machine model has been industrialized along with the techniques of the indoor mapping. [1]

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JY. Sung, R.E. Grinter and H.I. Christensen, "My Roomba Is Rambo: Intimate Home Appliances" in Ubicomp 2007: Ubiquitous Computing. The paper has described addressing this omission, by reporting results from an empirical study of Roomba, a vacuuming robot. [2]

A. P. Murdan and P. K. Ramkissoon, "An insolent autonomous floor cleaner with an Android-based controller," The paper describes the proposal and application of a self-directed surface cleanser with an Android-based switch. The execution is grounded on an Arduino MEGA microcontroller, a surface cleaner method and a mobile application with wireless connectivity. [3]

H. Rashid, A. Mahmood, S. Shekha and M. Rasheduzzaman, "Development of a DTMF skillful area cleaner machine with two path-following methodIn this paper, a room cleaning robot which has been industrialized using the Arduino Uno platform with control ability by cell phone from any distance using DTMF technology. It's an electronic device with self- controlled obstacle avoidance capability along with a waste and dust cleaning system. [4]

A. K. Bordoloi, F. Islam, J. Zaman and N. Phukan, "A ground cleaning machine for local environments", This paper presents a mobile robot with sweeping, vacuum suction and wiping capacity for effective cleaning of a domestic floor. The weakness of the work is it cannot detect the absence of floor. [5]

X. Ruan and W. Li, "Ultrasonic sensor based two-wheeled self-balancing robot obstacle dodging control system," This paper describes an stumbling block dodging system for a two- wheeled self-balanced robot, utilizing ultrasonic sensors and a DSP TMS320F28335 controller. MATLAB simulations and practical experiments with the Hominid 3 robot confirm the feasibility and effectiveness of the fuzzy control algorithm for obstacle avoidance. [6]

J. H. Lilly, "Evolution of a Negative-Rule Fuzzy Obstacle Dodging Controller for an Self- directed Vehicle," This abstract describes an evolved stumbling block dodging system for autonomous vehicles efficiently navigates with fewer rules, enhancing interpretability and performance. [7]

## III. EXISTING SYSTEM

The current implementation of QuantumClean SparkSwift as an IoT-based project operates primarily operates through manual controls, lacking advanced features such as Bluetooth or voice command control. Users must physically engage with the vaccum cleaner to operate it, limiting convenience and ease of use. Additionally, the absence of floor detection technology means the cleaner may not optimize its cleaning patterns based on varying floor types, potentially resulting in less efficient cleaning capabilities, without the added convenience of modern control methods.

## IV. PROPOSED SYSTEM

The proposed system for the automatic vacuum cleaner aims to significantly enhance user experience and cleaning efficiency through advanced features. With Bluetooth control, users can remotely operate the vacuum cleaner using their smartphones or other compatible devices, offering greater flexibility and convenience. Integration of voice command control further streamlines operation, allowing users to simply issue verbal instructions for starting, stopping, or adjusting cleaning settings. Incorporating floor detection technology enables the vacuum cleaner to intelligently adapt its cleaning approach grounded on the surface it encounters, ensuring thorough and effective cleaning across various floor types. Together, these enhancements constitute a comprehensive upgrade, elevating the automatic vacuum cleaner to a more sophisticated and user-friendly appliance.

## V. IMPLEMENTATION

The proposal of the automatic vacuum cleaner project begins with assembling the hardware components, including the Arduino Uno, Arduino Motorized Shield, ultrasonic sensors, infrared sensors, and Bluetooth HC-05 module. The sensors are meticulously calibrated to ensure precision in distance measurements and accurate obstacle detection during the cleaning process. With the hardware in place, the next crucial step involves programming the Arduino Uno with intelligent logic. This programming encompasses algorithms

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that interpret data from the sensors, guiding decisions related to the vacuum cleaners' navigation, obstacle avoidance, and overall cleaning strategy.

The Arduino Motorized Shield, an integral portion of project, is employed for precise control of the vacuum cleaners' motors. The code implemented adjusts motor speediness and path grounded on the decisions made by the Arduino Uno, resulting in coordinated and effective movements.

The incorporation of Bluetooth communication using the HC-05 module adds a layer of user interaction, enabling remote control and real-time status updates via a connected device.

Additionally, optional features, voice control or advanced environmental sensing can be implemented to provide users with manual control options or visual feedback on the vacuum cleaner's operational status. Rigorous testing and debugging follow, allowing for iterative refinement of the code and system behavior. Through this systematic implementation strategy, the automatic vacuum cleaner project materializes as a sophisticated and intelligent cleaning solution.

The design is conceived with future enhancements in mind, ensuring scalability and adaptability to accommodate potential upgrades.

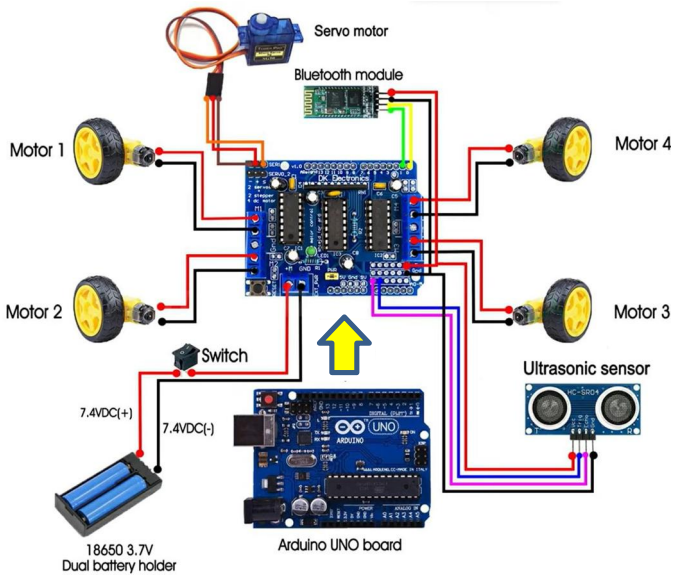


Fig 1.1

## VI. RESULTS

We have conducted some experiments to know the quality of performance of all the modules. Tested in multiple ways. Several Experiments were conducted as part of project to evaluate the performance of the system. We evaluated the various functions that the project should fulfill.

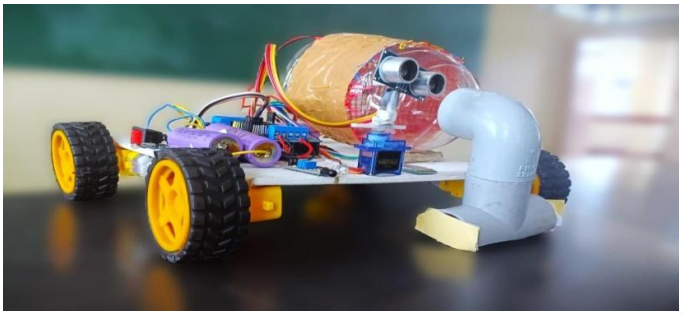

Fig 2.1

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Automatic vacuum cleaners have brought significant improvements in terms of comfort and cleaning efficiency. Thanks to Bluetooth control, users can easily connect their smartphone to the vacuum cleaner and control it remotely. Start, stop, and schedule cleaning from anywhere within reach. Voice control makes it even more convenient, allowing hands-free operation with simple commands like "start" and "stop."

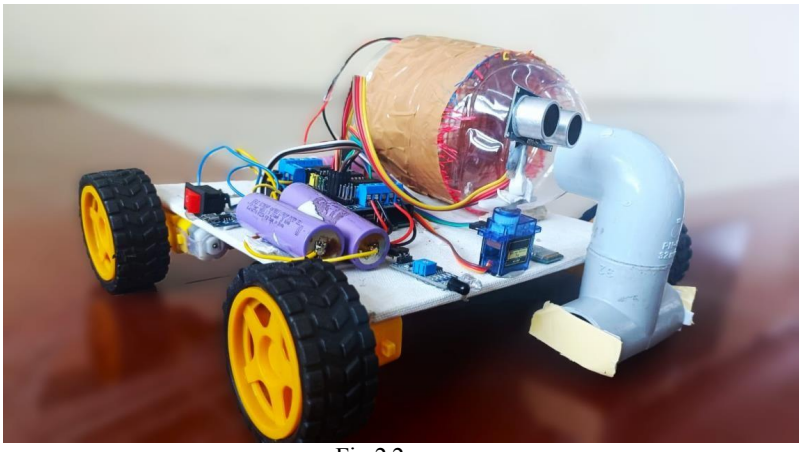

Fig 2.2


Fig 2.3

Floor detection technology improves cleaning performance by detecting different floor types and adjusting cleaning modes accordingly. The combination of remote control and intelligent floor detection makes vacuum cleaners easier to use and

## VII. CONCLUSION AND FUTURE WORK

In conclusion, the buildout of this mini IoT project, the automatic vacuum cleaner, signifies a successful integration of cutting-edge technologies to introduce a smart and compact cleaning solution. The meticulous implementation process involving the Arduino Uno, Arduino Motorized Shield, ultrasonic and infrared sensors, and Bluetooth HC-05 module has occasioned in a compact yet sophisticated system. The compact vacuum cleaner autonomously navigates spaces, avoids obstacles, and precisely controls its motors, enhancing its efficiency in household cleaning tasks.

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The emphasis on user-friendly features, including Bluetooth-enabled remote control and potential manual interaction through a user interface, underscores the project's commitment to accessibility and convenience. Rigorous testing and debugging have been pivotal in refining the project iteratively, ensuring optimal performance in various environments. The scalability of the design offers scope meant for potential future enhancements or adaptations, supporting by the means of dynamic nature of IoT projects.

In accumulation to its current capabilities, upcoming future effort could encompass incorporating fire detection sensors to enhance safety features. This would enable the vacuum cleaner to detect and respond to fire hazards, providing an added layer of protection for users and their homes. Furthermore, the inclusion of a camera module could facilitate image capture during cleaning sessions. This would allow users to review images to identify valued things that have inadvertently picked up during cleaning, providing a valuable reference for retrieval. These enhancements would elevate the functionality and utility of the automatic vacuum cleaner, further positioning it as a versatile and indispensable household appliance in the era of smart home technologies.

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