i-SPiKE 2023

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

"Optimizing Innovation in Knowledge, Education and Design"

EXTENDED ABSTRACT

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Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality . I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH

WELCOME MESSAGE (i-SPiKE 2023 CHAIR)

We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPiKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPiKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail
Chair
3rdInternational Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPiKE 2023)

RIVER CLEANING ROBOT

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ABSTRACT

The River Cleaning Robot is an innovative solution designed to address the challenges of river pollution and environmental sustainability. Rivers play a vital role in supporting ecosystems, biodiversity, and providing water resources for human consumption and agriculture. However, they are often subjected to pollution from various sources, endangering aquatic life and impacting communities. This robotic system utilizes advanced technologies, including artificial intelligence and autonomous navigation, to detect and remove debris, pollutants, and waste from rivers. Equipped with sensors and imaging systems, the robot can identify and classify different types of contaminants, such as plastic, organic matter, or chemical pollutants, enabling targeted cleaning actions. The River Cleaning Robot offers an efficient and proactive approach to river cleaning, contributing to the preservation of natural resources and promoting a healthier environment for both aquatic life and communities dependent on rivers.

INTRODUCTION

River pollution is an escalating environmental concern that poses significant threats to ecosystems and human well-being. The accumulation of pollutants such as industrial waste, agricultural runoff, plastics, and chemical contaminants in rivers has detrimental effects on water quality, aquatic life, and the overall health of the surrounding environment. The introduction of a River Cleaning Robot represents a transformative solution to combat this pressing issue. By efficiently detecting and removing pollutants from rivers, this innovative technology aims to restore the ecological balance and safeguard the invaluable resources that rivers provide to communities and ecosystems alike.

PROBLEM STATEMENT

The existing methods for cleaning and maintaining rivers are inefficient, time-consuming, and costly, hindering effective mitigation of river pollution. Manual cleaning efforts often require significant human resources and are unable to address the scale and complexity of the problem. Therefore, there is a pressing need for an innovative solution in the form of a river cleaning robot that can autonomously and efficiently remove pollutants and debris from rivers, enabling more effective river restoration and protection.

OBJECTIVE

The river cleaning robot offers a viable solution to the challenges posed by river pollution. By

leveraging advanced robotics and autonomous capabilities, the robot can efficiently and effectively clean rivers, leading to improved water quality and ecosystem health. Here's how the river cleaning robot provides a solution:

Cost-effectiveness: Over time, the use of a river cleaning robot can prove cost-effective compared to manual cleaning methods. It reduces the labour-intensive and time-consuming.

Enhanced Efficiency: The robot's advanced technology allows it to navigate through waterways, reaching areas that are difficult to access for humans or traditional cleaning equipment. It can cover larger areas and work continuously, ensuring a more efficient cleaning process.

Pollution Removal: Equipped with sensors and specialized tools, the robot can identify and collect various pollutants, including floating debris, plastics, chemical pollutants, and organic waste. It can remove these pollutants from the water, preventing their further spread and accumulation.

METHODOLOGY

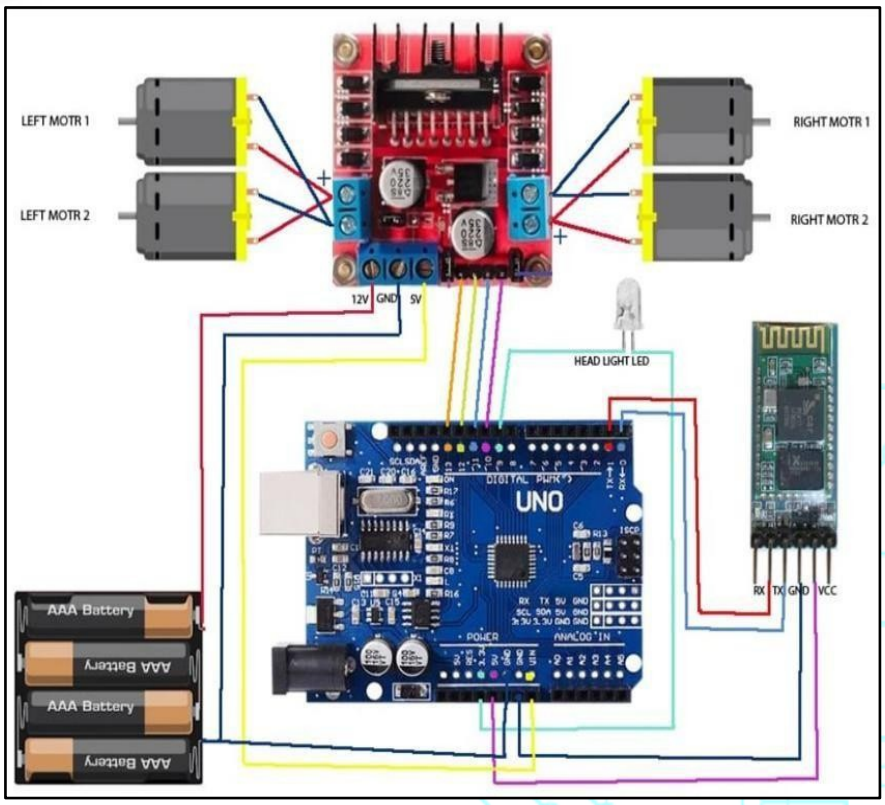

Figure 1. Schematic and components of this project

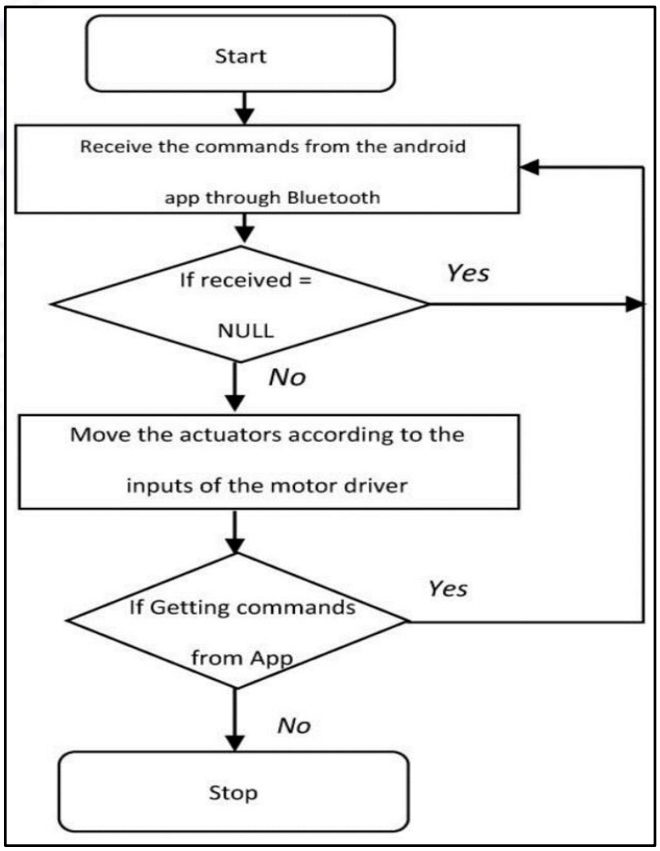

Figure 1.0 Flow Chart of this project

The river cleaning robot, integrated with Arduino, a Bluetooth module, and motors, operates by utilizing the Arduino microcontroller as the central control system. It receives and data from various sensors such as water quality sensors and pollution detectors, which enable it to detect pollutants and assess the water conditions. The Arduino then controls the motors, allowing the robot to move through the water, reach targeted areas, and collect debris and pollutants. The Bluetooth module enables wireless communication, facilitating remote monitoring and control of the robot's operations through a smartphone or computer. This integration ensures autonomous functionality, precise navigation, and real-time data monitoring, making the river cleaning robot an efficient and effective solution for mitigating river pollution.

CONCLUSION

The river cleaning robot provides crucial support to both the economy and the ecosystem. Economically, it offers cost savings through reduced labour requirements and increased productivity, benefiting industries reliant on clean water resources. Ecologically, the robot helps restore habitats, improves water quality, prevents pollution spread, and aids in data collection for informed decision-making. By efficiently and autonomously cleaning rivers, the robot promotes the sustainability of industries, preserves biodiversity, and ensures the long-term health of ecosystems, thus fostering a balance between economic prosperity and environmental well-being.

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