

Energy Efficient River Surface Floating Plastic Trash Cleaning and Oil Soaking Robot

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Abstract

The haphazard industrial waste management of the industries located on the banks of the rivers is seen as a cause of the South Asian region's rivers becoming polluted. Densely populated areas also get polluted from improper management of trash collection by the government. There on the rivers, the Energy Efficient River Surface Floating Plastic Trash Cleaning and Oil Soaking Robot can be used to clean the floating trash from the river surface and can simultaneously soak the oil from the river water. This robot uses river skimmer technology to filter floating trash from the river's edge. The robot's forearms are attached to an oil-absorbing hydrophobic melamine sponge material, which allows the floating robot to absorb oil from river water. The design and construction of this robot for cleaning and soaking up oil are discussed in this paper. The floating trash that comes with the tide is blocked by the hands of this machine. The filtered trash is then collected by a cleated conveyor belt controlled by an Arduino UNO R3 SMD microcontroller. Using a CM30-25NPP-EC1 Capacitive Proximity Sensor, this cleated conveyor belt separates plastic waste. The sensing end of the sensor emits an electrical field from 4mm up to 25mm, in order to detect the plastic trash. Throughout this experiment, the design of hardware orientation and software operation for the robot's operation is explained with construction. The eminent idiosyncrasies can also be used for future skimmer technology based robots, which will be capable of completing tasks with complex functionality.

Keywords

River, Clean, Soak, Oil, Plastic.

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Biographies

Anika Nawar is an undergrad student currently studying BSc in Mechatronics Engineering from Faculty of Science and Engineering, World University of Bangladesh. She is an affiliated engineer of Institutions Mechanical Engineers and acting as Secretary in Industrial Engineering and Operation Management Society World University of Bangladesh Student Chapter since June 2021. Before that she also served as a Director of Media in the same chapter (January 2021-May 2021). In 2019 she participated in a competition organised by IEOM Bangladesh and co-organised by World University of Bangladesh and was a joint champion. She is the Former President of Mechatronics Club, World University of Bangladesh from January 2022 to July 2023. She has done an industrial attachment under Automobile Engineering Course (credit course) as a Service and Maintenance Engineer trainee in Mahindra and Mahindra Ltd, Ranks Workshop Ltd, Rangs Group. She has completed workshops organised by Japan Bangladesh Robotic Society and NASA Solve Bangladesh. Currently she's performing the role of president in Mechatronics Club World University

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Jowad Md Madha (Professional Member, IEOM Society International) is currently pursuing Bachelor of Science (BSc) degree in Mechatronics Engineering from Faculty of Science and Engineering, World University of Bangladesh. He is acting as the President of Industrial Engineering and Operations Management (IEOM) Society World University of Bangladesh Chapter from January 2021 to now and Former Vice President of Mechatronics Club, World University of Bangladesh from January 2022 to July 2023. He also served as the Head of Executives in Mechatronics Club from May 2020 to December 2021. He also completed an attachment training under Automobile Engineering Course (Credit Course) as a Service and Maintenance Engineer in Mahindra & Mahindra Limited, in Ranks Motor Workshop Limited, Rangs Group from March 2022 to June 2022. He was also an Affiliate Ambassador of Bohubrihi Technologies Limited from November 2021 to April 2022 and a Campus Ambassador of Bunon - Mirror of Bangladeshi Textile and RMG Sector from June 2020 to May 2021. He also completed a virtual remote internship in Microsoft Corporation, InsideSherpa Virtual Program of Marketing during COVID-19 Pandemic. He completed Workshops in 2019 on Robotics & IoT from Japan-Bangladesh RATR Center, Ground Station Making of Satellites from NASA Solve Bangladesh. He was a Joint Champion of Green Technology and Innovation Contest 2019 by IEOM Society World University of Bangladesh. He was the Runner-up of 9th National Astro Olympiad 2014. He completed 5 technical projects and published 1 Bluetooth control Android Mobile Application named BluJo in Amazon App Store in 2019.

Shahed Rahman completed his Bachelor of Science (BSc) degree in Mechatronics Engineering from Faculty of Science and Engineering, World University of Bangladesh. He is designated as Junior Lab Assistant in the same institution.

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