Design and Construction of an Obstacle Avoiding Line Follower Luggage Carrying Robot

Jowad Md Madha, Anika Nawar, Enamul Hoq
Department of Mechatronics Engineering, Faculty of Science and Engineering
World University of Bangladesh
Avenue 06 Lake Drive, Sector 17H, Uttara, Dhaka, Bangladesh
jowad.madha@icloud.com

Abstract

The Obstacle Avoiding Line Follower Luggage Carrying Robot can be used in airports for boarding the baggage of passengers and will reduce human haphazard in airport management. It is a Photodiode and Sonography Technology based autonomous robot, which can be used in Airports. This self-explanatory machine generally follows the predefined line drawn on the floor, which is a high contrasted black colour line on a white surface or a white colour line on a black surface. If an obstacle comes in its following line, it can detect it by emitting ultrasonic sound waves. This sound wave measures the distance by the reflection and avoids the obstacle by converting the gleamed wave into an electrical signal and continues following the line using radiation-sensitive optoelectronic components. This paper presents the design and construction of a small Obstacle Avoiding Line Follower Luggage Carrying autonomous Robot based on Arduino UNO R3 SMD Microcontroller, L298N Motor Driving Shield, LM393 Chipped Infrared Sensor, HC - SR04 Ultrasonic Sonar Sensor and Direct Current (DC) Motor. In this experiment, the robot will detect its trajectory with a spectral sensitivity in the infrared wavelength signal to the microcontroller. If an obstacle blocks the trackway, the burst of ultrasounds will detect it with echo to turn the robot to avoid and will follow its route again. Throughout this experiment, the design of hardware orientation and software operation for the robot's mobility is explained with construction. The eminent idiosyncrasies can also be used for future industrial and domestic robots, which will be capable of completing tasks with complex functionality without getting stuck for obstacles.

Keywords
Construction, Autonomous, Detection and Robot.

Acknowledgements
The authors wish to thank Prof. Dr. Md Mizanur Rahman, the Professor and Head of Department of Mechatronics Engineering, Faculty of Science and Engineering, World University of Bangladesh; for providing us such mental support while working on it.

Biographies
Jowad Md Madha (Affiliate Engineer, IMechE) 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 Vice President of Mechatronics Club, World University of Bangladesh from January 2022 to now. 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.

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 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 of Bangladesh (January 2022-present) before that she was also an executive board member of the same club (January 2021-December 2021).

Enamul Hoq joined the Mechatronics Engineering Department, World University of Bangladesh in June, 2013. Now he is Senior Lecturer and Course coordinator in the Department. He was an active member of Institutional Quality Assurance Cell (IQAC) in the Department of Mechatronics Engineering at WUB. His research interest in field of Automation and Robotics , Mechatronics, Fluid Mechanics, CNC Programming.