Department of Electrical and Computer Engineering
North South University

Senior Design Project

Development of a Low-Cost Autonomous Vehicle System Using COTS for Obstacle Detection and Collision Avoidance

Abrar Mahir Uddin Sahil **ID# 2013786043**

Nuzhat Jabeen Haque **ID# 2031730643**

Faculty Advisor:

Dr. Shahnewaz Siddique

Associate Professor

Department of Electrical and Computer Engineering

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APPROVAL

Abrar Mahir Sahil (ID # 2013786043) and Nuzhat Jabeen Haque (ID # 2031730643) from the Department of Electrical and Computer Engineering at North South University, have worked on the Senior Design Project entitled "**Development of a Low-Cost Autonomous Vehicle System Using COTS for Obstacle Detection And Collision Avoidance**" under the supervision of Prof. Dr. Shahnewaz Siddique's partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering has been accepted as satisfactory.

Supervisor's Signature

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Dr. Shahnewaz Siddique

Associate Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

Chairman's Signature

.....

Dr. Rajesh Palit

Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project-related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

1. Abrar Mahir Uddin Sahil

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2. Nuzhat Jabeen Haque

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ABSTRACT

Development of a Low-Cost Autonomous Vehicle System using COTS for Obstacle Detection and Collision Avoidance

In response to the prevalent issue of traffic accidents in Bangladesh, a low-cost autonomous vehicle prototype is developed utilizing readily available resources. In this study, we explore the feasibility of low-cost autonomous vehicles in reducing traffic accidents prevalent in Bangladesh, where an average of 11 accidents occur daily. The prototype utilizes an Arduino UNO microcontroller, an ESP32 WiFi camera module, and a combination of sensors, like, an ultrasonic sensor and servo motor, for obstacle detection and collision avoidance. Sensor fusion techniques allow the system to identify everyday objects, such as water bottles, furniture, and electronics, using datasets trained via Edge Impulse software. Additionally, YOLOv3 and OpenCV software contribute to object identification. This resource-efficient approach presents a potentially viable solution for enhancing road safety in developing nations.