FINAL YEAR PROJECT REPORT

HURDLE AVOIDANCE SYSTEM USING NEURAL NETWORK

In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)

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DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

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Specially dedicated to

My beloved grandmother, mother and father

Kiran

My beloved grandmother, mother and father

Osama Rashid

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HURDLE AVOIDANCE SYSTEM USING NEURAL NETWORK

ABSTRACT

The evolution of robotics and automation technologies has spurred innovative advancements in autonomous vehicles. The hospitals lost most of its staff during pandemic when they needed them the most and the biggest reason for that was that the virus was contagious and hazardous to life. We came across this idea which aims to contribute to this evolution by developing an autonomous obstacle avoidance system for a four-wheeled vehicle. The system integrates Ultrasonic (US) and Infrared (IR) sensors for comprehensive obstacle detection, a Feed-Forward Neural Network for real-time decision-making, Bluetooth communication for interaction with a dedicated Flutter mobile application, and the potential for future path planning integration. The project's foundation lies in the Sensor Integration Module, where US and IR sensors are strategically positioned to detect obstacles in the vehicle's vicinity. The Neural Network Module involves extensive back propagation training to derive accurate weights, enabling the neural network to process sensor data and generate motor activation commands. The Decision-Making and Control Module translates these outputs into specific motor activations, guiding the vehicle to navigate in response to obstacles. Seamless interaction between the vehicle and users is achieved through the Bluetooth and Mobile App Integration Module. The Flutter mobile application provides real-time tracking, performance metrics, and user input capabilities. The robot utilises several sensors to gather and subsequently communicate data from its surroundings to a central computing core. This core operates a mapping programme that utilises the acquired data to generate a map of the environment.

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