Abstract

The development of Artificial Intelligence (AI) technology has significantly impacted various aspects of modern life, particularly in object detection crucial for enhancing accuracy across various technological applications. This research explores the use of 3D environmental simulation to design and test autonomous lawn mower models in household environments. Collaboration between Leading International Home Robotics and Bifrost.Ai aims to ensure optimal performance in increasingly complex environments. This simulation not only supports the development of object detection technology but also builds the necessary training datasets for future AI development. The use of object detection technology in automated devices such as AI cameras for navigation and object detection in complex household environments underscores the importance of 3D environmental simulation in optimizing the performance of autonomous lawn mowers under near-real conditions, leveraging realistic 3D engines. Synthetic data obtained from these simulations accelerates the development of object detection algorithms and ensures the implementation of this technology in real-world scenarios. This research has the potential to enhance efficiency, security, and convenience in object detection technology applications across various sectors, while also opening new opportunities for using 3D environmental simulations in AI technology evaluation.

Key Word: *AI, Synthetic Data, 3D Environment*