DEVELOPMENT OF INDOOR LOGISTIC AUTONOMOUS MOBILE ROBOT USING BEHAVIOUR TREE IN ROS2

By

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

DEVELOPMENT OF INDOOR LOGISTIC AUTONOMOUS MOBILE ROBOT USING BEHAVIOUR TREE IN ROS2

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Behavior Tree (BT) was first introduced in video game Artificial Intelligence, and now become the world's leading way to structure a sequence where the program can switch between tasks in an autonomous agent such as Autonomous Mobile Robot (AMR). With the behavior tree readability and reusability, AMR could do much more complex tasks. AMR is a wheeled robot that is commonly used in industrial warehouses for logistics purposes, and it can path its way through a given map while avoiding obstacles. This thesis focuses on the use of BT, LIDAR, camera RealSense D435 for safety and Battery Swap. Using BT, three sequences were made to align with trolley, to drop trolley, and move away from trolley whilst moving to a position. LIDAR is more reliable than Navigation 2 for more precise positioning with an error of 0.014 rad compared to 0.126 rad. Camera RealSense has an error distance of 7% at 50cm and 8.26% at 100cm. The battery swap method has a downtime of more than 1 hour for every 5 batteries used. Hopefully, this project could contribute to a more complex use of BT in AMR

Keywords: Autonomous Mobile Robot, Behavior Tree, Navigation 2, LIDAR, Realsense D435, Battery Swap.

DEDICATION

I dedicate this work to for my family, my friends, my university, my country: Indonesia and the development of technology in Mechatronics field of study.

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I have found my coursework throughout the Curriculum and Instruction program to be stimulating and thoughtful, providing me with the tools with which to explore both past and present ideas and issues.

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