

DEVELOPMENT OF INDOOR AMR USING ROS2

By

Tengku Pascal Alamsyah

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SWISS GERMAN UNIVERSITY
The Prominence Tower
Jalan Jalur Sutera Barat No. 15, Alam Sutera
Tangerang, Banten 15143 - Indonesia

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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.



Tengku Pascal Alamsyah

Student

17 July 2023

Date

Approved by:



Dr. Rusman Rusyadi, B.Sc, M.Sc

Thesis Advisor

17 July 2023

Date

Dr. Maulahikmah Galinium, S.Kom., M.Sc

Dean

17 July 2023

Date

ABSTRACT

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By

Tengku Pascal Alamsyah
Dr. Rusman Rusyadi, B.Sc, M.Sc, Advisor

SWISS GERMAN UNIVERSITY

Currently, robots have become increasingly important in the industrial sector, particularly in tasks related to goods transportation. Automated Guided Vehicles (AGVs) have been widely used as a predecessor to Autonomous Mobile Robots (AMRs) for this purpose. However, AGVs have notable limitations, particularly in their inability to navigate dynamically. In contrast, AMRs offer a superior solution by incorporating functionalities such as Simultaneous Localization and Mapping (SLAM), navigation, and obstacle avoidance. The objective of this thesis is to develop an indoor AMR using the Robot Operating System 2 (ROS2) framework, equipped with multiple LiDARs, an Inertial Measurement Unit (IMU), and odometry as sensors. LiDAR is specifically employed for SLAM, which allows the robot to map and navigate its environment simultaneously. Comparing the SLAM Toolbox with Carthographer, the former demonstrates higher accuracy, as reflected in the graph. The average mean value of 3.686 indicates the precision of the odometry system. Ultimately, the AMR is capable of processing SLAM data from the hardware and generating maps accordingly.

Keywords: AMR, Autonomous Mobile Robot, ROS2, LIDAR, SLAM, Carthographer.



DEDICATION

I dedicate this thesis works to my family,
Almighty god, friends,
And
The next successor of this AMR project.



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