

**DESIGN AND IMPLEMENTATION OF AN AUTOMATED DUAL AXIS
SOLAR TRACKING SYSTEM FOR DC MICROGRID INTEGRATION**

By

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12001039

BACHELOR'S DEGREE
in

MECHANICAL ENGINEERING – MECHATRONICS CONCENTRATION
FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY



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Revision after the Thesis Defense 28 January 2025

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

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The objective of this study is to develop an automated solar panel tracking system integrated with IoT technology for real-time monitoring. The system is designed to maximize the efficiency of solar energy collection by continuously tracking the position of the strongest light source throughout the day. The proposed solution involves the design and development of hardware and software, including light sensors for detecting optimal illumination angles, servo motors for panel adjustments, and IoT modules for remote monitoring and data collection. This hands-on project provides a practical application of automation and IoT technologies, aiming to enhance the understanding of renewable energy systems among engineering and science students. The real-time data monitoring feature offers insights into system performance, enabling users to analyze efficiency trends and optimize energy usage. Result, the automated solar tracker with IoT integration demonstrates significant potential to improve the efficiency of solar panels while serving as an innovative educational tool. By combining technology with sustainable practices, it provides practical experience and insights into renewable energy systems, supporting advancements in both learning and environmental sustainability.

Keywords: Automated Solar Tracker, Real-time Monitoring, Renewable Energy, IoT, Efficiency Optimization.

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DEDICATION

I dedicate this thesis work to the One and Only God, Allah SWT

I dedicate this thesis work to my beloved parents, Achmad Tifrodi and Rohmawati.

I dedicate this thesis work to my beloved country

ACKNOWLEDGEMENTS

I extend my heartfelt gratitude to Allah for His blessings and grace, which have allowed me to complete this thesis successfully. I am deeply thankful for the unwavering support of my family. Special thanks go to my mother, Rohmawati, my father, Achmad Tifrodi, and all my family members for their belief in my abilities and their constant encouragement during challenging times.

My sincerest appreciation goes to my advisor, Mr. Hartono, A.Md., S.T., M.T., whose guidance and support have been invaluable throughout the process of writing this thesis. His advice and motivation have played a crucial role in helping me achieve excellence in completing my study and preparing me to embark on a professional career.

I would also like to extend my deepest gratitude to Mr. Erikson Ferry Sinaga, S.T., M.Kom., for his valuable assistance, encouragement, and insightful feedback, which have significantly contributed to the successful completion of this thesis.

Lastly, I am grateful to Swiss German University for equipping me with the knowledge and skills necessary to excel as a mechatronics engineer. I look forward to applying this knowledge to contribute positively to the world and create meaningful impacts.

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