

**DEVELOPMENT OF PROTOTYPE SEMI-AUTOMATIC THREAD WINDER
MACHINE**

By

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12101004

BACHELOR'S DEGREE
in

MECHANICAL ENGINEERING – MECHATRONICS CONCENTRATION
FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY



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Revision after the Thesis Defense on 3 July 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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This thesis continues a previous project on a semi-automatic thread winder machine made for small textile industries. The earlier design improved productivity but still lacked features like real-time monitoring, cone loading, and flexible input. This research upgrades the system by adding a numeric keypad and LCD for thread mass and length input, an automatic cone feeder using a servo motor, and a sensor to detect thread snaps.

The system is controlled using Arduino Mega and Uno, and includes indicator lights and an emergency stop for safety. Performance tests were done to measure accuracy, cone loading success, and sensor response.

Performance testing was conducted to test each system including keypad accuracy, cone feeding mechanism, and sensor response time. The machine was tested using various thread mass and length inputs. The results showed that the system was able to perform thread winding based on both mass and length with a feeder and monitoring system within acceptable range of accuracy and functionality. The average error for winding by mass was around 7.5%, and by length was 6.4%. The cone feeder system showed unreliable performance due to positional alignments. Meanwhile, the thread monitoring system functioned successfully, detecting thread presence accurately and enabling the system to respond correctly during operation.

This prototype aims to be a more practical and low-cost solution for small-scale industries looking to adopt automation, and also aligns with the goals of Industry 4.0 by reducing manual labor and increasing production efficiency.

Keywords: Industry 4.0, IOT, automation, Microcontroller, thread winding, textile industry, mass production



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DEDICATION

I dedicate this work for my parents, my university, and my future.



ACKNOWLEDGEMENTS

I am deeply thankful to my advisor, Erikson Ferry Sinaga, S.T., M.Kom, and my co-advisor, Dr. Yunita Umniyati, S.Si., M.Sc, for their continuous support, encouragement, and guidance throughout the course of this thesis. Their insights, patience, and constructive feedback have been crucial in leading and completing this work.

I also wish to express my sincere gratitude to all the lecturers and staff of the Mechanical Engineering Department at Swiss German University. The knowledge and skills I have gained through the courses and discussions have played a vital role in completing this thesis.

Lastly, I would also like to thank my parents, my friends, and my classmates for always supporting and encouraging me throughout this journey. Their help and motivation have meant a lot to me and kept me going during difficult times.

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