

**DESIGN AND FABRICATION OF INTEGRATED LAUNDRY SCALE AND
COUNTING MACHINE WITH POINT OF SALE SOFTWARE**

By

Fernando

11801003

BACHELOR'S DEGREE

In

MECHANICAL ENGINEERING - MECHATRONICS
FACULTY OF BACHELOR OF INFORMATION TECHNOLOGY




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

January 2023
Revision after Thesis Defense on 18 January 2023

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.



•Fernando

Student

Date: 02/01/2023

Approved by:



Leonard P. Rusli, M.Sc., Ph.D

Thesis Advisor

Date: 02/01/2023

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

Dean

Date: 02/01/2023

Fernando

ABSTRACT

DESIGN AND FABRICATION OF INTEGRATED LAUNDRY SCALE AND COUNTING MACHINE WITH POINT OF SALE SOFTWARE

By

Fernando
Leonard P. Rusli, M.Sc., Ph.D., Advisor

SWISS GERMAN UNIVERSITY

There are 4 basic needs of a human and that is clothing, food, water, and shelter. Food and water is key to our live, Shelter is a place to keep us save, to have a place to rest, and clothing its main purpose is help protect our body from the element whether it is the summer heat or the winter cold and our clothing is also a barrier for our body from infectious and toxic material. But For society clothing is an expression of the person that wears it is how people represent Them self. Thus, for both reason people need to keep Their clothing comfortable for them to wear. Since clothing is a daily usage thing clothes will get dirty. While not only is unpleasant to wear and to be seen. It is also a health hazard. That is why we need to keep it clean. People wash their clothes on the daily and with today society people has less time to do basic house chores like doing their laundry. That is why laundry businesses has been increasingly growing. With the invention of the washing machine this laundry businesses can wash many clothe in one service and since every washing machine has a limit to how much it can wash it is limited by the weight. Thus, this laundry businesses presents their pricing not by the number of clothing they are washing but by the weight of clothing they'll be washing. The objective with this thesis is to create a device that would provide a better system for the laundry industry. This device will have a counter that is able to count the number of clothing, while simultaneously weigh the amount of clothing that is about to be wash. A POS (point of sales) system would calculate the total price amount.

Keywords: *Counter, Weight, POS (Point of Sale)*



DEDICATION

I dedicate this work towards myself and towards the company in which this device would be used for the better and growth of the company.



ACKNOWLEDGEMENTS

I wish to thank my friends and family for their support, patience and good humor. Their presence has given me the strength and motivation to finish my thesis work in this semester. I am very great full for all of the support and caring that all of the people around me gave.

I would also like to thank my advisor Mr. Leonard Rusli, Ph.D. and Mr. Rusman Rusyadi for their guidance and their time, that made this thesis project possible. I would also like to acknowledge and give my thanks to Mr. Yohanes Fredhi, and Michael Jonathan. For their comments, their suggestion and their help with this project. Without their help this project would not be able to be completed.

And last but not least for those I haven't mentioned, I would like to give my deepest gratitude in helping me finished my thesis project both directly and indirectly.


SWISS GERMAN UNIVERSITY

TABLE OF CONTENTS

	Page
STATEMENT BY THE AUTHOR.....	2
ABSTRACT.....	3
DEDICATION.....	5
ACKNOWLEDGEMENTS.....	6
TABLE OF CONTENTS.....	7
LIST OF FIGURES.....	9
LIST OF TABLES.....	10
CHAPTER 1 - INTRODUCTION.....	11
1.1 Background.....	11
1.2 Research Problems.....	12
1.3 Research Objectives.....	12
1.4 Significance of Study.....	12
1.5 Research Questions.....	12
1.6 Hypothesis.....	12
CHAPTER 2 - LITERATURE REVIEW.....	13
2.1 Object Sensor and Counter using Arduino Nano.....	13
2.2 Serial Communication via RS232.....	13
2.3 REST API.....	14
CHAPTER 3 – RESEARCH METHODS.....	15
3.1 Materials and Component.....	15
3.1.1 Microcontroller and Power Supply.....	15
3.1.2 Frame.....	16
3.1.3 Weighing.....	17

3.1.4	Display	18
3.1.5	Sensor.....	19
3.1.6	Push Button.....	19
3.2	Flowchart.....	20
3.3	Frame assembly	23
3.4	Calculation.....	24
3.5	Performance Test.....	25
CHAPTER 4 – RESULTS AND DISCUSSIONS.....		26
4.1	Assembly And Mechanical Design Fitting.....	26
4.1.1	Frame assembly	26
4.1.2	IR Sensor placement	26
4.1.3	Display box	27
4.2	Program	27
4.2.1	RS 232 serial communication.....	28
4.2.2	Counter.....	29
4.2.3	ESP 32 to API end point.....	30
4.3	Data analysis.....	31
4.3.1	Counter data.....	31
4.3.2	ESP 32 Rest API endpoint.....	33
CHAPTER 5 – CONCLUSIONS AND RECCOMENDATIONS		34
5.1	Conclusions	34
5.2	Recommendations	34
GLOSSARY		35
REFERENCES		36
CURRICULUM VITAE.....		37

LIST OF FIGURES

Figures	Page
<i>ESP32 DEV MODULE</i>	15
<i>220V AC to 9VDC 1A</i>	16
<i>Aluminium Profile 30x30</i>	16
<i>Aluminium Profile 60x30</i>	16
<i>Sayaki ACS 30kg</i>	17
<i>4 digit TM1637 display</i>	18
<i>6 Digit TM1637 Display</i>	18
<i>E18-D80NK Infrared Sensor</i>	19
<i>12-24 VDC Stainless Steel LED Push Button</i>	19
<i>Wiring Diagram for the Device</i>	21
<i>Wiring Of Connector for RS232</i>	22
<i>Frame CAD Design With Solidworks</i>	23
<i>SW FEA 2D Frame</i>	24
<i>: SAP 2000</i>	24
<i>: Clothes Counter covered</i>	26
<i>Display box design</i>	27
<i>Scale Program Setup</i>	28
<i>Scale Data Reading Program</i>	28
<i>Program Loop</i>	29
<i>Counter program Loop</i>	29
<i>Data Read Through Postman</i>	30

LIST OF TABLES

Table	Page
<i>100ms Delay test Result</i>	31
<i>500ms delay Test Result</i>	32
<i>1000ms Delay Test Result</i>	32

