

UNIVERSITI TEKNOLOGI MARA

**DESIGN AND FABRICATION OF ARDUINO
POWERED VACUUMING ROBOT
FOR EFFORTLESS CLEANING**

**MUHAMMAD SHAHRUL AIN BIN
SIDER**

Diploma

December 2023

ABSTRACT

This abstract presents an overview of an Arduino-powered vacuuming robot developed as a Final Year Project (FYP). The project aims to design and fabricate a body of robot vacuum with Arduino using cad software which is Solid work . The robot utilizes Arduino as its central control unit, integrating various sensors such as infrared and ultrasonic sensors for obstacle avoidance and floor cleanliness detection. As for the method, a pilot survey has been conducted to gain insight and understand the requirements for the project. The product design specification phase involved using the House of Quality, Pugh Table, Morphological Table, and Failure Modes and Effect Analysis. As for the expectation, the prototype will have an improved cleaning vacuum in small rooms and space. The prototype has an enhanced safety feature. It is equipped with ultrasonic sensor to move a wheel and the suction will absorb all the small dust. The integration of infrared and ultrasonic sensors enables obstacle avoidance, allowing the robot to navigate around furniture and other objects efficiently. This feature ensures that the robot focuses on areas that require more cleaning, optimizing the cleaning process and delivering a higher standard of cleanliness.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Mohd Arzaimiruddin Bin Ariffin .

Finally, this dissertation is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah's.

TABLE OF CONTENTS

	Page
CONFIRMATION BY SUPERVISOR	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	x
CHAPTER ONE : INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	4
1.3 Objectives	4
1.4 Scope of Work	5
1.5 Expected Results	6
CHAPTER TWO : LITERATURE REVIEW	7
2.1 Introduction	7
2.2 Product Dissection	8
2.3 Patent	17
2.4 Benchmarking	22
CHAPTER THREE : METHODOLOGY	22
3.1 Introduction	22
3.2 Flow Chart	26

CHAPTER FOUR : RESULTS AND DISCUSSION	28
4.1 Preliminary Result	28
4.1.1 Customer requirement	30
4.1.2 Survey	32
4.1.3 House of Quality	34
4.1.4 Product Design Specification	36
4.1.5 Physical Decomposition	38
4.1.6 Functional Decomposition	39
4.1.7 Morphological Table	40
4.1.8 Pugh Table	42
4.1.9 Product Architecture	44
4.2 Configuration Design	46
4.2.1 Detail Drawing	47
4.2.2 Assembly Drawing	48
4.2.3 Exploded View	49
4.2.4 Bill Of Materials	50
4.3 Gantt Chart	51
4.4 Result And Discussion	52
CHAPTER FIVE : CONCLUSION AND RECOMMENDATIONS	53
5.1 Conclusions	53
5.2 Recommendations	55
REFERENCES	56
APPENDICES	58