

CE Project
Computer Engineering Department
Project ID: BUKC-CE-2021-05
June 2021



Bahria University
Discovering Knowledge

GARBAGE SEGREGATION ROBOT

“Cleanness Is a Half of Faith”

Mahnoor

Saqib Touheed

Arshad Ali

Department of Computer Engineering

Bahria University, Karachi Campus

Submission Performa

Name (1) Mahnoor
(2) Saqib Touheed
(3) Arshad Ali

Address (1) House No. 2/13, Survey No. 89, Golden Town, Karachi
(2) House No. R-126, Pakistan Diamond City Malir 15, Karachi.
(3) House No. C-74, Street 04, Bhittaiabad, Gulistan e Juhar, Khi.

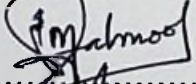
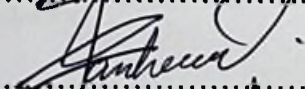
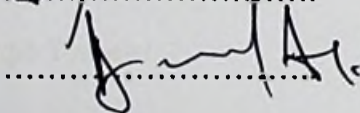
Garbage Segregation Robot

Engr. Naveera Sami

This report is submitted as required for the Project in accordance with the rules laid down by the Bahria University as part of the requirements for the award of the degree of Bachelor of Engineering. I declare that the work presented in this report is my own except where due reference or acknowledgement is given to the work of others.

Signatures of students

Date

(1)  01-07-2021
(2)  01-07-2021
(3)  01-07-2021

Signature of Supervisor

Date

 01/07/2021



Intellectual Property Right Declaration

This is to declare that the work done under the supervision of Engr. Naveera Sami having title "Garbage Segregation Robot" carried out in partial fulfillment of the requirements of Bachelors of Engineering in Computer Engineering, is the sole property of Bahria University and the respective supervisor and is protected under the intellectual property right laws and conventions. It can only be considered/ used for purposes like extension for further enhancement, product development, adoption for commercial/organizational usage, etc., with the permission of the university and the respective supervisor.

This above statement applies to all students and faculty members.

Date: 01-07-2021

Author(s):

Mahnoor

Signature: 

Saqib Touheed

Signature: 

Arshad Ali

Signature: 

Supervisor(s):

Engr. Naveera Sami

Signature: 



Bahria University
Discovering Knowledge

Anti-Plagiarism Declaration

This is to declare that the above publication produced under the supervision of **Engr. Naveera Sami** having title "**Garbage Segregation Robot**" is the sole contribution of the author(s) and no part here of has been reproduced illegally (cut and paste) which can be considered as Plagiarism. All referenced parts have been used to argue the idea and have been cited properly. I/We will be responsible and liable for any consequence if violation of this declaration is proven.

Date: 01-07-2021

Author(s):

Name: Mahnoor

Signature: _____

Name: Saqib Touheed

Signature: _____

Name: Arshad Ali

Signature: _____

Acknowledgments

Firstly, thanks to Almighty Allah (S.W.T) for providing our team the strength and capabilities to understand the roots of Garbage Segregation Robot and giving us the ability to complete this project.

After that we want to express our gratitude to our Project Manager **Dr. Rizwan Iqbal** for helping us in every difficult time of building Li-Fi. Also, we want to express our sincere and generous thanks to Head of CE department **Dr. Shoaib Mughal** making us to do better every single time.

I wish to articulate my heartfelt thankfulness to my supervisor, **Engr. Naveera Sami** for her passion, persistence, perceptive remarks, valuable knowledge, pragmatic guidance that have helped us greatly at all times in our project from the beginning to the end. We would like to thank our PMO for being super helpful throughout the course of the project. Without the help and confidence and trust of our teachers, parents and family support it was not possible to achieve this milestone.

Abstract

This project uses sensors touch sensor, IR sensor along with a and Ultrasonic sensor. The conclusive values help us determine the condition of the Segregation of Garbage by using Claw.

Basically, the idea of Garbage Segregation Robot is to give real time results to the environment and segregate the garbage. As well as we are hoping that this project will be helpful for those who work on garbage station. Also, the other most problematic issue is the child labor, we see under age kids gathering trash from the dustbin arranged in our area, due to no legitimate administration in our trash unloading station. Health issue is also main factor which we focused while working on this project

In each chapter we will be covering details starting from the background of project, covering its literature review, highlighting hardware and software requirements and the requirements that is needed to design the system. Furthermore, it covers the implementation of the system. Highlights the implementation factors in detail and its testing. Lastly, it gives us the results and future work of Garbage Segregation Robot.

Garbage Segregation Robot proved to be a test for our team in utilizing knowledge by reading into different books and different research papers. It helps us to utilize the all the academics and realistic facts of most of the course we have studied throughout our bachelors.

Table Of Contents

1. INTRODUCTION.....	1
1.1 BACKGROUND.....	1
1.2 PURPOSE OF THIS PROJECT	1
1.3 PROBLEM STATEMENT	2
1.4 FUNCTIONS AND SUBDIVISIONS.....	2
1.5 AIMS AND OBJECTIVES	3
1.6 PURPOSE AND SCOPE.....	4
1.7 PROPOSED METHOD.....	4
1.8 BUSINESS OBJECTIVES	5
1.8.1 Business Need/Opportunities/Objectives 5	
1.9 BUSINESS MODEL.....	6
1.10 REPORT STRUCTURE	7
2. BACKGROUND AND LITERATURE REVIEW	8
2.1 INTRODUCTION.....	8
2.2 LITERATURE BACKGROUND OF GARBAGE SEGRGATION	2
2.3 EXISTING SYSTEM.....	9
2.3.1 Waste Segregating Machine Using Conveyor	9
2.3.2 Waste Segregation Using Smart Robotic Arm.....	10
2.4 PROBLEMS IN THE EXISTING SYSTEM	11
2.4.1 Waste Segregating Machine Using Conveyor	11
2.4.2 Waste Segregation Using Smart Robotic Arm.....	12
2.5 RELATED WORK.....	12
3. SYSTEM ANALYSIS.....	13
3.1 INTRODUCTION.....	13
3.2 HARDWARE REQUIRMENTS	14
3.2.1 Microcontroller	14
3.2.2 IR Sensor	15
3.2.3 Touch Sensor.....	16

3.2.4	Servo Motors	17
3.2.5	Gear Motors.....	18
3.2.6	L298NDriver.....	19
3.2.7	Lipo Battery.....	20
3.3	SOFTWARE REQUIRMENTS.....	21
3.4	WORK ANALYSIS	21
3.4.1	Hardware Work Analysis	22
3.4.2	Hardware Work Flow.....	23
3.4.3	Software Work Analysis.....	24
3.4.4	Software Work Flow	25
3.4.5	Integrated System Work Analysis.....	26
3.4.6	Integrated Work Flow of the System.....	27
3.5	DATA ANALYSIS	28
3.5.1	Data Flow	29
4.	SYSTEM DESIGN.....	30
4.1	INTRODUCTION.....	30
4.2	SYSTEM REQUIRMENTS	31
4.2.1	Resource Requirements.....	32
4.2.2	Data Requirements.....	33
4.2.3	Non-Functional Requirements.....	34
4.2.4	Circuitry And Design	35
4.3	DESIGN CONSTRAINTS	36
4.3.1	Hardware and Software Environment.....	37
4.4	ARCHITECTURAL STRATEGY.....	38
4.4.1	Algorithm to be used	39
4.4.2	Architectural Design	40
4.4.3	Logical View	41
4.4.4	Hardware Architecture	42
4.4.5	Software Architecture	43
4.5	USE CASE	44

4.6	CONTEX - DIAGRAM	45
4.7	DEPENDENCIES	46
4.8	CRITICAL SUCCESS FACTORS	45
4.9	GANTT CHART	46
4.10	MEASEAURES OF PROJECT SUCCESS	47
4.11	CLASS DIAGRAM	48
5.	IMPLEMENTATION	49
5.1	INTRODUCTION	49
5.2	HARDWARE IMPLEMENTATION	50
5.3	SOFTWARE IMPLEMENTATION	59
5.4	APPLICATION PHASE	62
6.	TESTING.....	63
6.1	INTRODUCTION.....	64
6.2	FUNCTIONAL TESTING	65
6.2.1	Task/Risk Issues	66
6.2.2	Items to be Tested	66
6.2.3	Test Approaches	67
6.2.4	Test Regulation / Mandate Criteria	67
6.2.5	Test Pass / Fail Criteria.....	68
6.2.6	Test Entry / Exit Criteria	69
6.2.7	Test Deliverables.....	70
6.2.8	Test Resumption / Suspension Criteria	71
6.3	PERFORMANCE TESTING	72
6.3.1	Load Testing	73
6.3.2	Stress Testing.....	74
6.4	SYSTEM TESTING.....	75
6.4.1	Test Risk/Issues.....	75
6.4.2	Test Approaches	75
6.4.3	Test Regulation / Mandate Criteria	76

6.4.4	Deliverables	76
6.4.5	Test Environmental/Staffing/Training Needs	76
7.	RESULTS AND DISCUSSION	77
7.1	INTRODUCTION.....	77
8.	CONCLUSIONS AND FUTURE WORK.....	78
8.1	CONCLUSION	78
8.2	FUTURE WORK	78
	REFERENCES.....	79
	APPENDICES.....	80