Sahar UNIVERSIT

Bahria University

BE Project CE Department Project ID: BUKC-CE-2020-10 June, 2021

# **Final Year Project Report**

## FIRE DETECTION AND EXTINGUISHER ROBOT

Hamza Zamir	51299
Abdus Samad	51265

Department of Computer Engineering

Bahria University, Karachi Campus

### Bahria University (Karachi Campus)

### **Submission Performa**

Name

(1) ..... Hamza Zamir

(2) ..... Abdus Samad

Address

(1) ..... Bahria University Karachi Campus
(2) ..... Bahria University Karachi Campus

Title of Report:

Fire Detection And Extringuisher Robot Engr. Ali Ahmed

Project Supervisor's Name:

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/We declare that the work presented in this report is my/our own except where due reference or acknowledgement is given to the work of others.

Signatures of students

(1)..... (2). Samach (3).....

Date

1st/July/2021

Signature of Supervisor

ARE

Date

01/07/2021

iii



### **Intellectual Property Right Declaration**

This is to declare that the work done under the supervision of Engr. Ali Ahmed having title "Fire Detection And Extinguisher Robot" carried out in partial fulfillment of the requirements of Bachelors of Engineering in Computer Engineering, is the sole property of Bahria University and is protected under the Intellectual Property right laws and conventions. Bahira University asserts legal and beneficial ownership rights over all Intellectual Property developed as a result of support either directly from or channeled through Bahria University, or created at the request or direction of Bahira University, or developed as a result of utilization of Bahria University Resources including copyright in any material. 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 in adherence to its policies.

The above statements apply to all students and faculty members.

Date: June, 18th 2021

Author(s):

Name: Hamza Zamir

Name: Abdus Samad

Signature: Acred

Supervisor(s):

Name: Engr. Ali Ahmed

Signature: -



## **Anti-Plagiarism Declaration**

This is to declare that the above publication produced under the supervision of Engr. Ali Ahmed having title "Fire Detection And Extinguisher Robot" is the sole contribution of the author(s) and no part hereof 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: June 20th, 2021

Author(s):

Name: Hamza Zamir

Signature: Signature:

Name: Abdus Samad

ν

### Acknowledgments

Final Year Project is a demonstration for undergraduate students which is combination of teamwork and implementation of theoretical and practical knowledge. It enhances abilities of students to step up in their field. With this willingness, we affiliated with this project.

In the successful accomplishment of our project, We would like to express our sincere gratitude and appreciate those people who are actively involved in our project.

Foremost, all thanks to Allah (S. W. T) for being able to compete with a great feat in these endeavors and helped out to make our project successful in this pandemic situation. Next, we are highly obliged in taking the opportunity to sincerely thanks our project Coordinator Dr. Rizwan Iqbal for helping us in managing and other project tasks. We also want our deepest thanks to the Head of CE department Dr. Shoaib Mughal for his support and kind cooperation in our difficult phases. Lastly, all of our team express great appreciation and special thanks to our project supervisor Engr. Ali Ahmed for guiding, monitoring, and support us throughout the project lifecycle with his great experience and knowledge.

#### Abstract

In the modern world the need for manual efforts is decreasing as there is a great technological advancement and revolution serving almost all the profession of life. Technology has made lives much easier than it was for e.g. cellphones, robots etc. Robots are now in trend with a number of applications in modern day world and this paper covers how a robot can be helpful to the human.

The aim of "Fire Detection And Extinguisher Robot" here is to build a fireextinguishing robot that can help in-case firebreaks out. As some times, the fire fighters may not covers the congested areas and get late to arrive at the accident spot that may lead to risk of various lives and fire can get out of control. Therefore, to overcome this we are designing fire extinguisher robot that can detect flame beforehand it tempers out of control and due to this, lives of firefighters can be saved.

Babria University Karachi Campus

### Fire Detection And Extinguisher Robot

# Table of Contents

1. IN'I	IRODUCTION1	
1.7	PURPOSE OF THIS PROJECT.2COMPLEX ENGINEERING PROBLEM STATEMENT.2OBJECTIVES OF THE PROJECT.2SCOPE OF THE PROJECT3PURPOSE OF THE DOCUMENT.3MODULES IN THE PROJECT.4GENERAL OVERVIEW AND DESIGN GUIDELINES/APPROACH4	
2. BAG	CKGROUND AND LITERATURE REVIEW	
2.2 2.2. 2.2.2	2 Existing Systems Description	
3. SYS	TEM ANALYSIS9	
3.1.1 3.2.1 3.2.1 3.2.2 3.2.3 3.2.4 3.2.5 3.2.6 3.2.7 3.2.8 3.2.7 3.2.8 3.2.1 3.2.1	Work Breakdown Structure11DATA ANALYSIS11Data Flow Diagram12System Requirements13Clients, Customer and Users13Clients, Customer and Users13Data Requirements13Data Requirements13Value13Value14Reliability Requirements14Verformance Requirements14	
I. SYS	TEM DESIGN16	
4.1.1 4.1.2	End-user Characteristics	

Bahria University Karachi Campus

.

viii

.

4.2.2	Project Management Strategies	. 19
4.2.3	3 Gantt Chart	
4.2.4	Development Method	.21
4.3	PERFORMANCE	.21
4.4	ARCHITECTURE DESIGN	.21
4.4.1	Logical View	. 22
4.4.2	ARDUINO DESIGN	23
4.4.3	RASPBERRY-PI STRUCTURE	.24
4.4.4	Security Architecture	. 25
5. IMP	LEMENTATION	.26
5.1	RASPBERRY PI	26
5.2	JSB CAMERA	.20
5.3 8	Sensors	.27
5.4	ARDUINO	27
5.5 \	VATER PUMP	20
5.6 L	298N MOTOR DRIVER	28
5.7 V	VI-FI	20
5.8 I	DC MOTOR	29
5.9 P	OWER SUPPLY	20
	۲ING	
	URPOSE OF THE TEST PLAN DOCUMENT	
6.2 F	UNCTIONAL TESTING	.30
6.2.1	Test Risks / Issues	
6.2.2	Items to be Tested / Not Tested	31
6.2.3	Test Approach(s)	
6.2.4	Test Regulatory / Mandate Criteria	31
6.2.5	Test Pass / Fail Criteria	
6.2.6	Test Entry / Exit Criteria	32
6.2.7	Test Deliverables	32
6.2.8	Test Suspension / Resumption Criteria	
6.2.9	Test Environmental / Staffing / Training Needs	33
6.3 P	ERFORMANCE TESTING	33
6.3.1	Load Testing	
6.3.2	Test Risks / Issues	
6.3.3	Items to be Tested	
6.3.4	Test Approach(s)	
6.3.5	Test Regulatory / Mandate Criteria	
6.3.6	Test Pass / Fail Criteria	
6.3.7	Test Entry / Exit Criteria	
6.3.8	Test Deliverables	
6.3.9	Test Suspension / Resumption Criteria	
6.3.10		
	RESS TESTING	
6.4.1	Test Risks / Issues.	
6.4.2	Items to be tested	

Babria University Karachi Campus

Fire Detection And Extinguisher Robot

6.4.3 Test Approach(s)	27
0.4.4 I Cal Regulatory / Mandale Criteria	27
6.4.5 Test Pass / Fail Criteria	·····
6.4.6 Test Entry / Exit Criteria	
6.4.7 Test Deliverables.	
6.4.8 Test Suspension / Resumption Criteria	
6.4.9 Test Environmental / Staffing / Training Needs.	
6.5 SYSTEM TESTING	
0.J.I I EST RISKS / ISSUES	10
6.5.2 Items to be tested	
0.3.3 $Test Approach(s)$	11
0.3.4 Test Regulatory / Mandate Criteria	11
0.3.3 Test Pass / Pall Criteria	<u> </u>
0.5.0 Test Entry / Exit Criteria	12
0.5.7 Test Deliverables	42
6.5.8 Test Suspension / Resumption Criteria	43
6.5.9 Test Environmental / Staffing / Training Needs	43
3. CONCLUSIONS AND FUTURE WORK	51
8.1 CONCLUSIONS	51
8.2 FUTURE WORK	
SIBLIOGRAPHY	52
APPENDICES	

..