

## AUTONOMOUS FIRE FIGHTING ROBOT WITH LIVE STREAMING

# SYED MUHAMMAD MAAZ AZAM SYEDA HUMERA TANWEER AZIZ UR REHMAN ASAD WAHEED

A project report submitted in partial fulfilment of the Requirements for the award of the degree of Bachelor of Electrical Engineering

> Department of Electrical Engineering Bahria University, Karachi Campus

#### **ACKNOWLEDGEMENTS**

We would like to thank everyone who had contributed to the successful completion of this project. We would like to express our gratitude to our research supervisor, Mr BURHAN AHMED for his invaluable advice, guidance and his enormous patience throughout the development of the research.

In addition, We would also like to express our gratitude to our loving parents and friends who had helped and given us encouragement.

## INTELLIGENT FIRE FIGHTING ROBOT WITH LIVE STREAMING

#### **ABSTRACT**

As we know that in our daily life the fire accidents are very common and prevalent, sometimes it becomes very difficult for a fireman to save human lives. There are many chances that a fire can erupt in an institution, hospital, industry; or in any remote area. i.e. In garment factory, fuel storages etc. Hazards caused by an electric can lead to huge damage & it's a worst case scenario causing heavy damages not only financially but also destroying areas surrounding it. Robotic is the incipient solution to protect human lives and environments. Our main objective is to design a Robotic vehicle motivated by a system that can detect fire and take appropriate actions without any human interventions.

A water jar will be used to extinguish the fire. we are using Raspberry Pi 3 for Digital Image Processing technique while Arduino is used for motor controlling. The robot is placed in a room and in case of fire, the robot determines the location of the fire using Digital Image Processing technique, reaches it and extinguishes the fire. Moreover an IP camera is used to monitor the movement of the robot from a remote station.

### TABLE OF CONTENTS

DECLAR	ATION			ii
APPROV.	AL FOR	SUBMISSIO	N	iii
ACKNOV	VLEDGE!	MENTS		v
ABSTRA	CT		Error! Bookmark not defined.	
TABLE O	F CONT	ENTS		vii
LIST OF	FIGURES	3	Error! Bookmark not defined.	
LIST OF	APPEND	CES		xiv
CHAPTE	R			
1	INTRODUCTION			1
	1.1	Backgroun	d	1
	1.2	Problem St	tatements	1
	1.3	Aims and (	Objectives	1
	1.3	Scope of the	ne project	2
2	LITERATURE REVIEW			3
	2.1	Introduction	n	3
	2.2	Backgroun	d	3
	2.3	Types of ro	obot	4
		2.3.1 Pr	re-programmed re	obots 4
		2.3.2 To	eleported robots	Error! Bookmark not defined.
		2.3.3 A	augmenting robot	ts 5
		2.3.4 I	Legged robots	6

					VIII
		2.3.5	Wheel	ed robots	7
			a) l	Four wheeled robots	7
		2.3.6	Autor	nomous robots	8
			a) Ad	vantages of autonomous robots	9
			b)	Disadvantages of autonomous robots	10
			c)	Applications in fire fighting	10
3	DESIG	SN AND	METHOI	OOLOGY	11
	3.1	Design	of experim	ient	11
		3.1.1	Block dia	ıgram	11
		3.1.2	Hardware	e components	12
			3.1.2.1	Aurduino mega 3560	12
			3.1.2.2	Raspberry pi	12
			3.1.2.3	Webcam	13
			3.1.2.4	H-bridge	14
			3.1.2.5	Power bank	15
			3.1.2.6	Servo motor	16
			3.1.2.7	Battery	16
			3.1.2.8	Flame sensor	18
			3.1.2.9	DC motors	20
			3.1.2.10	IP camera	21
			3.1.2.11	Acrylic sheet	22
	3.2	Experi	mental setu	p	<u>23</u>
		3.2.1	3.2.1 Schematic diagram		
		3.2.2	Live strea	ming technique	25
		3.2.3	Flow cha	rt	25
	3.3	Equipr	nent and ma	aterials	26
		3.3.1	Tools and	d platform	26

			1X		
4	IMPI	IMPLMENTATION			
	4.1	Hardware	27		
		4.1.1 Design phase 1	27		
		4.1.2 Design phase 2	28		
		4.1.3 Design phase 3	29		
		4.1.4 Design phase 4	30		
		4.1.5 Network configuration	32		
	4.2	Software	35		
		4.2.1 Coding algorithm	35		
5	DECI	ULTS AND DISCUSSIONS	36		
5	RESU	DLIS AND DISCUSSIONS	30		
6	CON	CLUSION AND RECOMMENDATIONS	41		
	6.1	Conclusion	41		
	6.2	Recommendations	41		
			4.0		
APPE	NDICES		43		
REFE	ERENCE	CS	60		