BE Project CE Department Project ID: BUKC-CE-2020-01 June 2021



Bahria University Discovering Knowledge

VEHICLE OVER SPEEDING SURVEILLANCE AND DETECTION THROUGH AI

Asra Zaman Osama Hasan Sana Tufail

Department of Computer Engineering

Bahria University, Karachi Campus

CE Department

nicle Over Speeding Surveillance And Detection Through AI

Bahria University (Karachi Campus)

Submission Performa

N	ame

Address

(1) Asra Zaman (2) Osama Hasan (3) Sana Tufail (1) BUKC (2) BUKC (3) BUKC

Vehicle Over Speeding Surveillance and Detection Through AI Title of Report: Project Supervisor's Name: 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. We declare that the work presented in this report is our own except where due reference or acknowledgement is given to the work of others.

Signatures of students

(1).(3)..... Signature of Supervisor

Date

 $\begin{array}{c} 01 / 07 / 2021 \\ 01 / 07 / 2021 \\ 01 / 07 / 2021 \\ \end{array}$ Date $\begin{array}{c} 01 / 07 / 2021 \\ 01 / 07 / 2021 \end{array}$



Intellectual Property Right Declaration

This is to declare that the work done under the supervision of Engr. Naveera Sami having title "Vehicle Over Speeding Surveillance and Detection Through AI" 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. Bahria 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 Bahria 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: Asra Zaman

Name: Osama Hasan

Name: Sana Tufail

Supervisor(s):

Name: Engr. Naveera Sami

Aim One Signature:

Signature:

Signature:

Signature

Anti-Plagiarism Declaration

produced under the publication This declare that the above is to supervision of Engr. Naveera Sami having title "Vehicle Over Speeding Surveillance and Detection Through AI" 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: Asra Zaman

Aim and Signature:

Signature:

Signature:

Signature:

Name: Osama Hasan

Name: Sana Tufail

Supervisor(s):

Name: Engr. Naveera Sami

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 thank 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. Naveera Sami** for guiding, monitoring, and support us throughout the project lifecycle with his great experience and knowledge.

Abstract

Today, road accidents are relatively widespread, with irresponsible driving being the primary reason. The need to check this has been critical, and various ways have been employed thus far. However, as technology advances, various regulating organizations are requesting some form of computerized technology to combat the problem of excessive speeding.

There are three parts to the project: speed detection, image acquisition and transfer, and picture processing. The speed detection gadget is based on the Radar Functionality principle. The speed is compared to the predetermined threshold, and if the speed restriction is exceeded, the camera is activated. A high-definition camera connected to a microcontroller captures and transmits images Which is connected to the server. An image processing application on the server isolates the license plate from the picture frame. The characters on the number plate are digitized and forwarded to the authority in charge of the next station the vehicle will pass through. 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 Vehicle Over Speeding Surveillance and Detection Through AI.

Vehicle Over Speeding Surveillance and Detection Through AI 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.	INTRO	DDUCTION	1
1.1	BA	CKGROUND	1
1.2	2 PU	RPOSE OF THIS PROJECT	2
1.3	PR	OBLEM STATEMENT	3
1.4	4 FƯ	NCTIONS AND SUBDIVISONS	4
1.	5 AII	MS AND OBJECTIVES	4
1.0	6 PU	RPOSE AND SCOPE	4
1.1	7 PR	OPOSED METHOD	5
1.	8 RE	PORT STRUCTURE	6
2.	BACK	GROUND AND LITERATURE REVIEW	9
2.	IIN	TRODUCTION	9
2.:	2 LII	TERATURE BACKGROUND	9
2.		ISTING SYSTEM	
3.	SYSTE	EM ANALYSIS	11
3.		TRODUCTION	11
3.		ARDWARE REQUIRMENTS	
у.	3.2.1	Microcontroller	
	3.2.2	Laser Sensor	
	3.2.3	Battery	
3.		OFTWARE REQUIRMENTS	
3.	4 W	ORK ANALYSIS	
	3.4.1	Hardware Work Analysis	
	3.4.2	Hardware Work Flow	
	3.4.3	Software Work Analysis	
	3.4.4	Software Work Flow	
	3.4.5	Interneted System Work Analysis	23
	5.4.5	Integrated System Work Analysis Integrated Work Flow of the System	

Vehicle Over Speeding	g Surveillance	And Detection	Through AI	CE Department
-----------------------	----------------	---------------	------------	---------------

3.5	DATA ANALYSIS	
3.5.	.1 Data Flow	25

4.	S	YSTE	M DESIGN	. 26
	4.1	INT	TRODUCTION	.26
	4.2	SY	STEM REQUIRMENTS	.26
	4.:	2.1	Resource Requirements	.27
	4.:	2.2	Data Requirements	
	4.:	2.3	Non-Functional Requirements	
	4.:	2.4	Circuitry And Design	
4	1.3	DE	SIGN CONSTRAINTS	
	4.:	3.1	Hardware and Software Environment	.31
	4.3	3.2	End-user Characteristics	. 32
	4.4	AR	CHITECTURAL STRATEGY	. 32
	4.4	4.1	Algorithm to be used	.33
	4.4	4.2	Architectural Design	.35
	4.4	4.3	Logical View	
	4.4	4.4	Hardware Architecture	. 36
	4.4	4.5	Software Architecture	.37
	4.5	USI	E CASE	. 39
	4.6		TABASE DESIGN	
	4.7	DA	TA CONVERSIONS	41
	4.8	Р	ERFORMANCE DESIGN	42
	4.8	8.1	Gantt Chart	42
				4.4
4.8.2			Development Method	.44
	4.	8.3	Quality Management	.45
5.	IN	APLE	MENTATION	46
	5.1		TRODUCTION	

6.3.2 S	tress Testing
6.4 SY	STEM TESTING
6.4.1	Test Risk/Issues
6.4.2	Items to be Tested
6.4.3	Test Approaches

Vehicle Over Speeding Surveillance And Detection Through AI

6.

6.1

6.2

6.2.1	Task/Risk Issues	50
6.2.2	Items to be Tested	51
6.2.3	Test Approaches	51
6.2.4	Test Regulation / Mandate Criteria	
6.2.5	Test Pass / Fail Criteria	
6.2.6	Test Entry / Exit Criteria	
6.2.7	Test Deliverables	53
6.2.8	Test Resumption / Suspension Criteria	53
6.3 PE	RFORMANCE TESTING	53
6.3.1	Load Testing	53
6.3.2 St	ress Testing	56
6.4 SY	STEM TESTING	59
6.4.1	Test Risk/Issues	59
6.4.2	Items to be Tested	59
6.4.3	Test Approaches	60
6.4.4	Test Regulation / Mandate Criteria	62
6.4.5	Test Pass / Fail Criteria	63
7. RESUI	LTS AND DISCUSSION	
7.1 INT	FRODUCTION	
8. CONC	LUSIONS AND FUTURE WORK	
8.1 CO	NCLUSION	67
	TURE WORK	
REFEREN	CES	
	YFS	70