



FINAL YEAR PROJECT REPORT

AUTOMATED TRAFFIC CONTROL SYSTEM FOR AMBULANCE

**In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)**

By

SM. SHEERAZ NADEEM

67700 (BSCS)

SM. KHIZAR HUSSAIN

65255 (BSCS)

MUHAMMAD AFFAN

67701 (BSCS)

SUPERVISED

BY

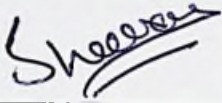
DR. SAMEENA JAVAID

BAHRIA UNIVERSITY (KARACHI CAMPUS)

FALL-2023

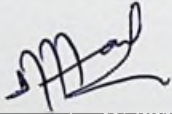
DECLARATION

We affirm that the project report is a product of our original efforts, with proper acknowledgment of citations and quotations. Furthermore, we assert that this work has not been previously submitted for any degree or recognition at Bahria University or any other academic institution.

Signature : 

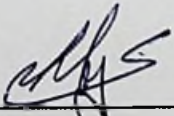
Name : Syed Muhammad Sheeraz Nadeem

Reg No. : 67700

Signature : 

Name : Muhammad Affan

Reg No. : 67701

Signature : 

Name : Syed Muhammad Khizer Hussain

Reg No. : 65255

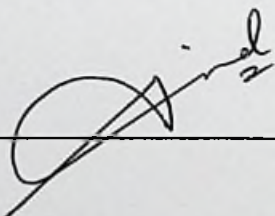
Date : 18 - Jan - 23

APPROVAL FOR SUBMISSION

We certify that this project report entitled “**AUTOMATED TRAFFIC CONTROL SYSTEM FOR AMBULANCE**” was prepared by **Syed Muhammad Sheeraz Nadeem, Syed Muhammad Khizar Hussain and Muhammad Affan** has satisfied the necessary criteria for submission as part of the fulfilment of the requirements for obtaining a Bachelor of Science degree in Computer Science at Bahria University, Karachi.

Approved by,

Signature :



Supervisor : Dr. Sameena Javaid

Date :

12/01/24

The intellectual property rights of this report are owned by Bahria University in accordance with the intellectual Property Policy BUORIC-P15, revised in April 2019. Proper recognition must always be given for the utilization of any material found in or derived from this report.

© 2023 Bahria University. All right reserved.

Dedicated with special affection to

My beloved grandmother, grandfather, mother and father

Syed Muhammad Sheeraz Nadeem

My beloved grandmother, grandfather, mother and father

Muhammad Affan

My beloved grandmother, grandfather, mother and father

Syed Muhammad Khizar Hussain

AUTOMATED TRAFFIC CONTROL SYSTEM FOR AMBULANCE

ABSTRACT

In busy city traffic, it's super important to quickly spot emergency vehicles like ambulances. That's what our project is all about – making traffic lights smarter by detecting ambulances in real-time. We want to create a clever traffic signal system that can see when an ambulance needs to get through. When that happens, the signal changes from red to green so the ambulance can keep going without any delays on its way to the hospital. To make this happen, we went out on the streets of Karachi and collected data about all kinds of ambulances. This big set of information is the core of our project, helping us train and check how well our system can spot ambulances. We made an important choice to switch from YOLOv5 to YOLOv8, a move we carefully thought about. YOLOv8 has some cool improvements that match what we need, making our system really good at spotting ambulances accurately. Our project is not just about technology; it's like a journey into the world of computers and learning machines. All our hard work paid off, and we now have results showing our system is more than 90% accurate in spotting ambulances during practice and testing. But our goal is not just numbers – we want to make things easy for people to understand. So, the next step for us is to create a simple interface that shows how our system works in real life. This way, people can see for themselves how our system spots ambulances in videos, proving that our traffic signal idea is practical and useful. In the end, our project is a mix of technology, new ideas, and making city traffic better. We're using the latest computer tricks to help traffic lights work smarter, especially in emergencies. Switching to YOLOv8, gathering data in Karachi, and focusing on making things simple for everyone are all part of our commitment to improve how traffic is managed.

TABLE OF CONTENTS

DECLARATION	ii
APPROVAL FOR SUBMISSION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF APPENDICES	xi

CHAPTER

1	INTRODUCTION	12
	1.1 Background	12
	1.2 Problem Statement	13
	1.3 Scope of Project	14
	1.4 Aims and Objectives	14
	1.5 Outcome	14
2	LITERATURE REVIEW	15
3	REQUIREMENT SPECIFICATION	19
	3.1 System Overview	19
	3.2 Functional Requirements	19
	3.2.1 Ambulance Detection	19
	3.2.2 Traffic Signal Adjustment	19
	3.2.3 User Interface	19
	3.2.4 Data Collection and Pre-processing	20
	3.2.5 Accuracy and Speed	20
	3.3 Non-Functional Requirements	20
	3.3.2 Scalability	20

3.3.3 Community Support	21
3.3.4 User Acceptance	21
4 DESIGN AND METHODOLOGY	24
3.1 Fundamentals of Object Detection:	24
3.2 Object Detection:	24
3.3 Image Classification:	24
3.4 Segmentation:	25
3.5 Object localization	25
3.6 It's time to look at the two primary models of object detection	25
3.7 YOLO (You Only Look Once)	25
3.8 YOLO v5:	26
3.9 In-Depth Analysis of Transitioning to YOLOv8	27
3.10 Dataset	30
5 SYSTEM IMPLEMENTATION	35
5.1 Data Collection and Pre-processing	35
5.2 Object Detection Model Selection	35
5.3 Model Training and Testing	35
5.4 User Interface Development	35
5.5 Transition to YOLOv8	35
5.6 Future Considerations	35
5.7 Real-time Ambulance Detection and Signal Adjustment	36
5.8 User Acceptance Testing	36
5.9 Monitoring and Optimization	36
6 SYSTEM TESTING AND EVALUATION	38
7 CONCLUSION	47
REFERENCES	49