



# **ARDUINO BASED REAL-TIME VIOLENCE DETECTION SYSTEM USING DEEP LEARNING**



## **PROJECT PHASE II REPORT**

*Submitted by*

KISHORE S	(6113211161021)
PRAVIN B	(6113211161034)
THAMIZHMANI V	(6113211161052)

*in partial fulfilment for the award of the degree*

*of*

**BACHELOR OF TECHNOLOGY**

*in*

**ARTIFICIAL INTELLIGENCE & DATA SCIENCE**

**DEPARTMENT OF ARTIFICIAL INTELLIGENCE &  
DATA SCIENCE**

**MAHENDRA ENGINEERING COLLEGE**

**(AUTONOMOUS)**

**Mahendhirapuri, Mallasamudram, Namakkal-637 503.**

**MAY - 2025**

# **MAHENDRA ENGINEERING COLLEGE**

**(AUTONOMOUS)**

**Mahendhirapuri, Mallasamudram, Namakkal-637 503.**

## **DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE**

### **BONAFIDE CERTIFICATE**

Certified that this project report “**ARDUINO BASED REAL-TIME VIOLENCE DETECTION SYSTEM USING DEEP LEARNING**” is the bonafide work of **KISHORE S (211161021), PRAVIN B (211161034), THAMIZHMANI V (211161052)**, who carried out this project work under my supervision.

#### **SUPERVISOR**

**Mrs.P.JAYAPRIYA,M.E.**

#### **HEAD OF THE DEPARTMENT**

**Dr.S.ANANTH,M.E.,Ph.D.,MBA**

Submitted for the end semester Project Viva Voce Exam held on \_\_\_\_\_  
at \_\_\_\_\_

#### **INTERNAL EXAMINER**

**Date:**

#### **EXTERNAL EXAMINER**

**Date:**

## ACKNOWLEDGEMENT

We express our earnest thanks with deepest respect and gratitude in our honourable chairman **Shri.M.G.BHARATHKUMAR.,M.A.,B.Ed.,** and Respected managing Directors **Er.Ba.MAHENDHIRAN, B.E., M.I.S.T.E.,** and **Er.Ba.MAHA AJAY PRASATH.,B.E.,M.S.,** who have provided excellent facilities for us.

We feel happy to convey our kind regards and sincere thanks to our beloved Principal **Dr.V.SHANMUGAM., M.E., Ph.D., MBA.,** who provided his kind concern for carrying out this project work and providing suitable environment to work.

We wish to express out sincere thanks to our respected **Dr.S.ANANTH,M.E.,Ph.D.,MBA.,** Associate Professor and Head, Department of Artificial Intelligence & Data Science, for the continuous work and excellent support over the period of project work.

We are indebted to our internal guide **Mrs.P.JAYAPRIYA.,M.E.,** Assistant Professor, Department of Artificial Intelligence & Data Science, for her constant help and creative ideas over the period of the project work.

We specially thank all our Friends, Parents, Teaching & Non-Teaching Staff, and out well-wishers for their constant support all the time.

KISHORE S	(6113211161021)
PRAVIN B	(6113211161034)
THAMIZHMANI V	(6113211161052)

## ABSTRACT

In our work, we develop a simplified real-time violence detection and alarm system using an Arduino board, integrated with essential sensors and communication modules. As violence in public and private spaces remains a significant concern, our system aims to enhance safety by providing timely alerts when violent activities are detected. The system employs a PIR motion sensor and a sound sensor module connected to an Arduino board to monitor a specific area for signs of violent behavior. The Arduino board serves as the central processing unit, analyzing data from the sensors to detect abnormal movements and loud sounds indicative of violence. When such activities are detected, the system triggers an alarm through an active buzzer module and sends alerts to a mobile app or web interface using an ESP32 Wi-Fi module. This real-time communication ensures that responsible individuals are promptly notified, enabling swift response and intervention. The hardware components include the Arduino UNO or MEGA, a USB camera for video monitoring, sound and motion sensors for environmental sensing, and a Wi-Fi module for network connectivity. The software implementation involves writing Arduino sketches to read sensor data, process it, and implement logic for alert generation. The simplicity of the hardware setup and the straightforward software development make this system cost-effective and easy to deploy. Extensive testing and validation are conducted to ensure the system's accuracy and reliability. By integrating AI and IoT with basic Arduino functionalities, this project offers an accessible solution to violence detection, contributing to enhanced safety and security in various environments.

**Keywords:** *Arduino, Violence Detection, Real-Time Monitoring, PIR Motion Sensor, ESP32 Wi-Fi Module.*

## TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
	<b>ABSTRACT</b>	<b>IV</b>
	<b>LIST OF FIGURES</b>	<b>VIII</b>
	<b>LIST OF ABBRIVATION</b>	<b>IX</b>
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Domain	1
	1.2 Project Needs	2
	1.3 Field	3
	1.4 Methods	4
<b>2</b>	<b>SYSTEM STUDY</b>	<b>5</b>
	2.1 Introduction	5
	2.2 Literature Survey	6
<b>3</b>	<b>SYSTEM ANALYSIS</b>	<b>8</b>
	3.1 Existing System	8
	3.2 Drawbacks in Existing System	8
	3.3 Proposed System	9
	3.4 Problem Definition	10
	3.5 Objective of proposed system	11
	3.6 Features of Proposed System	12
	3.7 Cost Estimation	13

<b>4</b>	<b>SYSTEM REQUIREMENTS &amp; SPECIFICATION</b>	<b>14</b>
	4.1 Hardware Requirements	14
	4.2 Software Requirements	15
	4.3 Integrated Development Environment	16
	4.4 Packages and Libraries	16
<b>5</b>	<b>SYSTEM DESIGN</b>	<b>17</b>
	5.1 Introduction	17
	5.2 Primitive Symbols	18
	5.3 Data Flow Diagram	20
	5.4 System Architecture	22
	5.5 Dataset	25
	5.6 Violence Detection Modules	26
	5.7 Alert Client	27
	5.8 Alert Response	27
<b>6</b>	<b>SYSTEM TESTING</b>	<b>32</b>
	6.1 Introduction	32
	6.2 Types of testing	32
	6.3 Unit Testing	33
	6.4 Integration Testing	33
	6.5 Regression Testing	34
	6.6 Performance testing	35

<b>7</b>	<b>SYSTEM IMPLEMENTATION</b>	<b>36</b>
	7.1 Computer Vision Libraries	36
	7.1.1 Contextual Understanding	36
	7.1.2 Real-Time Incident Detection	36
	7.2 Integration of External APIs	37
	7.2.1 Emergency Services integration	37
	7.3 Continuous Improvement and	37
	Maintenance	
	7.3.1 Performance Monitoring	38
	7.3.2 Bug Fixing and Issue Resolution	38
	7.3.3 Iterative Development and Updates	38
<b>8</b>	<b>CONCLUSION</b>	<b>40</b>
<b>9</b>	<b>FUTURE ENHANCEMENT</b>	<b>41</b>
<b>10</b>	<b>APPENDIX</b>	<b>42</b>
	10.1 Source code	42
	10.2 Screenshots	47
<b>11</b>	<b>REFERENCES</b>	<b>49</b>

## **LIST OF FIGURES**

<b>FIGURE NO</b>	<b>NAME OF FIGURE</b>	<b>PAGE NO</b>
5.3	Data Flow Diagram	20
5.4	System Architecture	21
6.2	Types of testing	31
10.2.1	Arduino Hardware Setup	47
10.2.2	Violence Detection System	47
10.2.3	Telegram Notification	48
	Received Page	



## LIST OF ABBRIVATION

S.NO	ACRONYMS	EXPANSION
1	CNN	Convolutional Neural Network
2	RNN	Recurrent Neural Network
3	IoT	Internet of Things
4	RAM	Random Access Memory
5	ROM	Read Only Memory
6	ESP32	Espressif System 32 Chip
7	LSTM	Long Short-Term Memory