

**ANOMALY DETECTION AND ALERTING VIDEO
SURVEILLANCE SYSTEM FOR HOME SECURITY
USING DEEP LEARNING TECHNIQUES**

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature:

Date: 05/07/2023

The above candidate has carried out research for the Master's thesis/dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Dr. K.A.S.N. Sumapthipala

Signature of the Supervisor:

Date:

DEDICATION

I dedicate this thesis to the people who have supported and believe me through my academic journey and inspired me.

I dedicate this thesis to my family, who has always been my source of strength and encouragement. Thank you for believing in me, supporting me, and cheering me on throughout my academic journey.

I also dedicate this thesis to my lecturers, who have inspired me, and taught me everything I know about AI. Your guidance and mentorship have been invaluable to me, and I am grateful for the opportunities you have given me to explore my interests and develop my skills.

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ABSTRACT

The usage of video surveillance systems has been increasing rapidly, and the demand for embedding analytical capabilities to the systems has also been increasing accordingly. The development of intelligent surveillance systems with less human interaction and more reliability has become highly valuable. However, developing a video surveillance system for home security that can detect and alert suspicious and abnormal incidents in real-time has been a research challenge due to the complexity of identifying anomalies from real-time video footage and developing a real-time alerting system.

This thesis proposes a deep learning and IoT-based anomaly detection and alerting system for home security to address this challenge. The proposed solution aims to produce an alert of defined suspicious incidents in a home environment by analyzing surveillance video data and sending it to the owner. The system comprises two key components: an anomaly detection system and an alerting system. The anomaly detection system build with deep learning techniques and best model is deployed identify any pre-defined anomalies in the video data. The alerting system, which uses suitable IoT techniques, sends an alert via a MQTT protocol to the homeowner when an anomaly is detected.

In conclusion, this thesis proposes an innovative deep learning and IoT-based anomaly detection and alerting system for home security that is expected to provide an accurate alert of any pre-defined anomaly in a home environment by analyzing the video data. This thesis contributes to the existing literature by exploring the evolution of intelligent video surveillance systems, anomaly detection in surveillance videos, alerting systems, and trends of anomaly detection and alerting video surveillance systems in home security. The limitations and technology/methodology used in this thesis are also discussed, and the research problem is defined.

Keywords: Anomaly detection, Deep learning, Home security, Real-time alerting system, Intelligent video surveillance system.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF ABBREVIATIONS	x
CHAPTER 1	1
INTRODUCTION	1
1.1 Prolegomena	1
1.2 Objectives	1
1.3 Background and motivation	1
1.4 Problem definition	2
1.5 AnoAIVSS for anomaly detection and alerting	2
1.6 System requirements	3
1.7 Structure of the thesis	3
1.8 Summary	4
CHAPTER 2	5
LITERATURE REVIEW OF ANOMALY DETECTION AND ALERTING VIDEO SURVEILLANCE SYSTEMS	5
2.1 Introduction	5
2.2 Evaluation of intelligent surveillance systems	5
2.3 Anomaly detection in surveillance videos	6
2.3.1 Definition and assumptions of anomalies	6
2.3.2 Learning Methods	6
2.3.2 Anomaly detection tasks and application in surveillance videos	7
2.4 Alert sending systems of surveillance videos using IoT	7
2.5 Trends of anomaly detection and alerting in home security	7
2.6 Analysis of literature	8
2.7 Home environment	9
2.8 Problem definition	9
2.9 Summary	9
CHAPTER 3	11
TECHNOLOGY ADOPTED FOR ADDRESSING THE RESEARCH PROBLEM	11
3.1 Introduction	11
3.2 Anomaly detection techniques	11
3.3 Introduction to Deep Learning	11
3.4 Deep Learning Architectures	12
3.4.1 Convolution Neural Networks	12
3.4.1.1 VGG16	13
3.4.1.2 ResNet50	13
3.4.1.3 InceptionV3	14
3.4.2 Recurring Neural Networks	14

3.4.3 Autoencoders	14
3.5 Preprocessing Techniques	15
3.6 Feature extraction techniques in videos	16
3.7 Hyperparameters	17
3.8 Training and Evaluating techniques	17
3.9 Alerting System.....	18
3.9.1 API (Application Programming Interfaces).....	18
3.9.2 MQTT (Message Queuing Telemetry Transport).....	19
3.10 Summary	19
CHAPTER 4	21
DEEP LEARNING APPROACH FOR DEVELOPING ANOALVSS	21
4.1 Introduction	21
4.2 Hypothesis	21
4.3 Inputs and outputs of AnoAlVSS.....	21
4.4 Process.....	22
4.5 Features	22
4.6 Users.....	22
4.7 Summary	22
CHAPTER 5	24
DESIGN OF AnoAlVSS.....	24
5.1 Introduction	24
5.2 High level design of AnoAlVSS	24
5.3 Solution design diagram of AnoAlVSS	24
5.4 Summary	26
CHAPTER 6	27
IMPLEMENTATION OF AnoAlVSS.....	27
6.1 Introduction	27
6.2 Identify the specific environment & context of anomalies	27
6.3 Data collection.....	27
6.4 Data preprocessing	28
6.5 Model building	29
6.5.1 VGG16 + DNN.....	29
6.5.2 VGG16+ LSTM.....	30
6.5.4 3D CNN.....	31
6.6 System deployment	33
6.7 Alerting system.....	33
6.8 Software and hardware specifications	35
6.9 Summary	35
CHAPTER 7	36
EVALUATION.....	36
7.1 Introduction	36
7.2 Accuracy and loss functions.....	36
7.3 Confusion matrixes.....	37
7.4 Classification reports	39
7.5 Comparison of parameter changes in VGG16+DNN.....	40
7.6 Alerting system.....	41
7.7 Summary	41
CHAPTER 8	43

CONCLUSION AND FUTURE WORKS	43
8.1 Introduction	43
8.2 Summary of the key findings and their implications.....	43
8.3 Strengths and limitations of the AnoAlVSS system	44
8.4 Potential solutions for addressing the limitations of the current system	44
8.5 Conclusion and final remarks	45
REFERENCES.....	47

LIST OF FIGURES

Figure	Description	Page
Figure5.1	High-level prototype design of proposed solution	24
Figure 5.2	Solution approach design diagram	25
Figure 6.1	Image capture 1	28
Figure 6.2	Image capture 2	28
Figure 6.3	Image capture 3	28
Figure 6.4	VGG16+DNN	32
Figure 6.5	VGG16+LSTM	32
Figure 6.6	3D CNN	32
Figure 6.7	Establish the connection	34
Figure 6.8	Receiving alerts by the user	35
Figure 7.1	Model accuracy VGG16+DNN	36
Figure 7.2	Model Loss VGG16+DNN	36
Figure 7.3	Model accuracy VGG16+LSTM	37
Figure 7.4	Model loss VGG16+LSTM	37
Figure 7.5	Model accuracy 3D CNN	37
Figure 7.6	Model loss 3D CNN	37
Figure 7.7	VGG16+DNN Confusion matrix	38
Figure 7.8	VGG16+LSTM Confusion matrix	38
Figure 7.9	3D CNN Confusion matrix	39
Figure 7.10	Classification report of VGG16+DNN	39
Figure 7.11	Classification report of VGG16+LSTM	40
Figure 7.12	Classification report of 3D CNN	40

LIST OF TABLES

Table	Description	Page
Table 2.1	Analysis of Literature	8
Table 7.1	Comparison of parameter changes	41

LIST OF ABBREVIATIONS

Abbreviation	Description
AnoAlVSS	Anomaly detection & alerting video Surveillance system
CNN	Convolutional Neural Network
DNN	Deep Neural Network
LSTM	Long Short-Term Memory
MQTT	Message Queuing Telemetry Transport
RNN	Recurrent Neural Network
VGG	Visual Geometry Group