SMART SURVEILLANCE SYSTEM

A Project Report Submitted to Cotton University in Partial Fulfillment of the

Requirements for the Degree of

Bachelors in Computer Application (BCA)

In the Department of Computer Science and Information Technology

By

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Enrollment Number: BCA1933003

BCA 6th Semester

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UNDER THE GUIDANCE OF
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DEPARTMENT OF COMPUTER SCIENCE & IT

COTTON UNIVERSITY , GUWAHATI

ASSAM-781001, INDIA,

JULY 2022

DEPARTMENT OF COMPUTER SCIENCE AND IT
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CERTIFICATE

This is to certify that the project entitled *"Smart Surveillance System"* submitted by **Saklain Mustak** for the award of the degree of **Bachelors of Computer Application (BCA)** in the Department of Computer Science and Information Technology is the outcome of a bona fide project work under my/our supervision. This work has not been submitted previously for any other degree at this or any other University. It is further certified that the candidate has complied with all the formalities as per the requirements of Cotton University, Guwahati-01. I/We recommend that the project report may be accepted in partial fulfillment of the requirements for the degree of BCA of this University.

Mr. PRAKASH CHAUHAN   **Dr. Jiban Jyoti Das**

Supervisor, Assistant Professor   Head of the Department,

Dept. of Computer Science and IT,   Dept. of Computer Science and IT,

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Date:…………………..

CERTIFICATE

The Project Report entitled *"Smart Surveillance System"* submitted by **Saklain Mustak (BCA1933003)** in partial fulfillment of requirements for the degree of **Bachelors of Computer Application (BCA)** of Cotton University, Guwahati-01 has been examined.

Signature of Internal Examiner   Signature of External Examiner
Date: Date:
Place: Place:

DECLARATION

I, **Saklain Mustak**, bearing BCA Enrollment No.:BCA1933003 hereby declare that the subject matter of the project entitled *"Smart Surveillance System"* is the record of work done by me under the guidance of Mr. PRAKASH CHAUHAN, Department of Computer Science and Information Technology, Cotton University, Guwahati-01, Assam. I further declare that the contents of this project report did not form the basis for the award of any degree to me or to anybody else to the best of my knowledge. The report has not been submitted to any other University or Institution. This report is being submitted to Cotton University, Guwahati-01 for the degree of BCA in the Department of Computer Science and Information Technology.

Place: Saklain Mustak
Date: BCA 6th Semester
                                                          Enrollment no.: BCA1933003

Dept. of Computer Science and IT

Cotton University, Guwahati-01

ACKNOWLEDGEMENTS

Saklain Mustak

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BCA 6th Semester

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LIST OF ABBREVIATIONS

Short Form   **Full Form**

- AI ---------------------------- Artificial Intelligence

- ML ------------------------- Machine Learning

- DL ------------------- Deep Learning

- CV ------------------ Computer Vision

- CCTV --------------- Closed Circuit Television

- IP Camera ----------- Internet Protocol Camera

- GUI ------------------- Graphical User Interface

LIST OF FIGURES

ABSTRACT

IN THIS SYSTEM WE HAVE TO IMPROVE THE SURVEILLANCE SYSTEM TO THE NEXT LEVEL.

WE HAVE IMPLEMENTED AN OBJECT DETECTION, FALL DETECTION, HUMAN DETECTION, AND FACE RECOGNITION SYSTEM THROUGH WHICH WE WILL BE ABLE TO IDENTIFY A OBJECT OR A PERSON WHO HAS ENTERED THE ORGANIZED OR HE OR SHE HAS REGISTERED IN THE DATABASE OR NOT, IF NOT REGISTERED THEN THE SYSTEM ASK HER/HIM FOR IDENTIFICATION AND ALSO SEND THE INFORMATION WITH A PHOTO OF THAT PERSON TO THE OWNER OF THE ORGANISATION. ALSO, IT HELPS TO KNOW IF SOMEBODY FALLS IN FRONT OF THE CAMERA THE SYSTEM AUTOMATICALLY DETECTS AND SENDS A MESSAGE TO THE OWNER SO THAT OWNER OR SYSTEM HANDLER CAN SAVE THE PERSON IMMEDIATELY.

IT SAVES TIME AND EFFORT, ESPECIALLY IF IT IS AN INSTITUTE OF HUGE NO. OF PEOPLE. THIS SYSTEM CAN BE USED FOR ATTENDANCE PURPOSES ALSO. IT IMPROVES THE GOODWILL OF AN INSTITUTE. IT CAN ALSO HELP TO IDENTIFY THE WANTED PERSON. IT CAN BE USED IN THE MILITARY, BANKS, GOVERNMENT OFFICES, INSTITUTIONS, AND MANY MORE…

CHAPTER 1

INTRODUCTION

Artificial intelligence paves the way for computers to think like human. Machine learning makes the way more even by adding training and learning components. The availability of huge dataset and high performance computers lead the light to deep learning concept, which extract automatically features or the factors of variation that distinguishes objects from one another. Among the various data sources which contribute to terabytes of big data, video surveillance data is having much social relevance in today's world. The widespread availability of surveillance data from cameras installed in residential areas, industrial plants, educational institutions and commercial firms contribute towards private data while the cameras placed in public places such as city centers, public conveyances and religious places contribute to public data
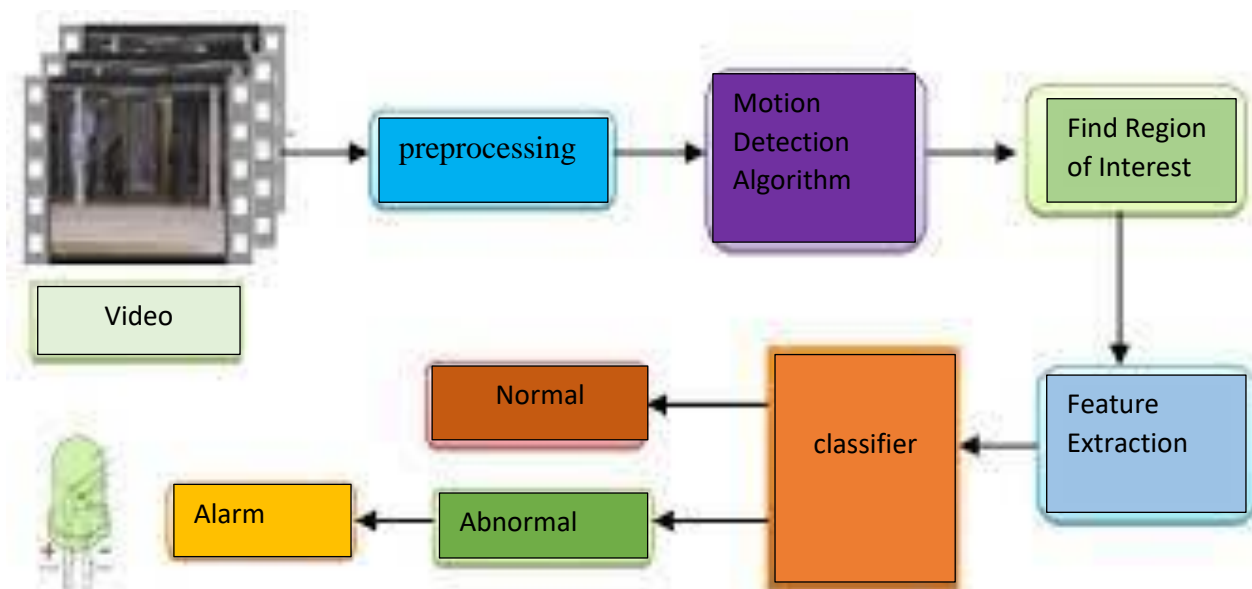
CHAPTER 2

REVIEW OF LITERATURE

2.1. Work on Surveillance System

There is a strong demand of smart vision based surveillance system owing to the increase in crime at a frightening rate at various public places like Banks, Airport, Shopping malls and its application in human activity recognition ranges from patient fall detection, irregular pattern recognition or Human computer Interaction. As the crime increases at a disturbing rate, public security violations and high cost of security personals have motivated the author to do the strategic survey of existing vision and image processing based techniques in the past literature. The paper begins with discussing the common approach towards suspicious activity detection and recognition followed by summarizing the supervised and unsupervised machine learning methodologies mainly based on SVM, HMM and ANN classifiers, which were adopted by the researchers previously varying from single human behavior modeling to crowded scenes. Next, this paper discusses system model for human's normal and abnormal activities recognition along with various feature selectors and detectors used in previous literature. This was followed by conducting a review of benchmark researches which covered a comprehensive state of art methodologies in the related fields, key points owned, feature learning and applications. At last experimental aspects of various papers have been discussed with essential performance matrices like accuracy along with the major issues, common problems, challenges and future scope in the related field.

2.2.LIST OF WORK

The main objectives identified which illustrate the relevance of the topic are listed out below.

1. Continuous monitoring of videos is difficult and tiresome for humans.
2. Intelligent surveillance video analysis is a solution to laborious human task.
3. Intelligence should be visible in all real world scenarios.
4. Maximum accuracy is needed in object identification and action recognition.
5. Tasks like crowd analysis are still needs lot of improvement.
6. Time taken for response generation is highly important in real world
7. Prediction of certain movement or action or violence is highly useful in emergency situation like stampede.
8. Availability of huge data in video forms.

2.3.APPLICATION AREAS

The contexts identified are listed as application areas. Major part in existing work provides solutions specifically based on the context.

1. Traffic signals and main junctions
2. Residential areas
3. Crowd pulling meetings
4. Festivals as part of religious institutions
5. Inside office buildings

Among the listed contexts crowd analysis is the most difficult part. All type of actions, behavior and movement are needed to be identified

CHAPTER 3

SOFTWARE AND HARDWARE REQUIREMENTS

3.1.SOFTWARE REQUIREMENT

OPERATING SYSTEM : WINDOWS 7 OR ABOVE
PROGRAMMING LANGUAGE: PYTHON
IDE: PYCHARM
LIBRARIES: OpenCV, face_recognition
FRONT END: TKINTER

3.2.HARDWARE REQUIREMENTS

HARD DISK: 4GB+500MB FOR IDE
RAM: 6GB
PROCESSOR: I3,Ryzen3 OR ABOVE
INTEGRATED WEB CAMERA WITH 1366X768 RESOLUTION

CHAPTER 4

IMPLEMENTATION OR DEVELOPMENT

4.1. IMPLEMENTATION
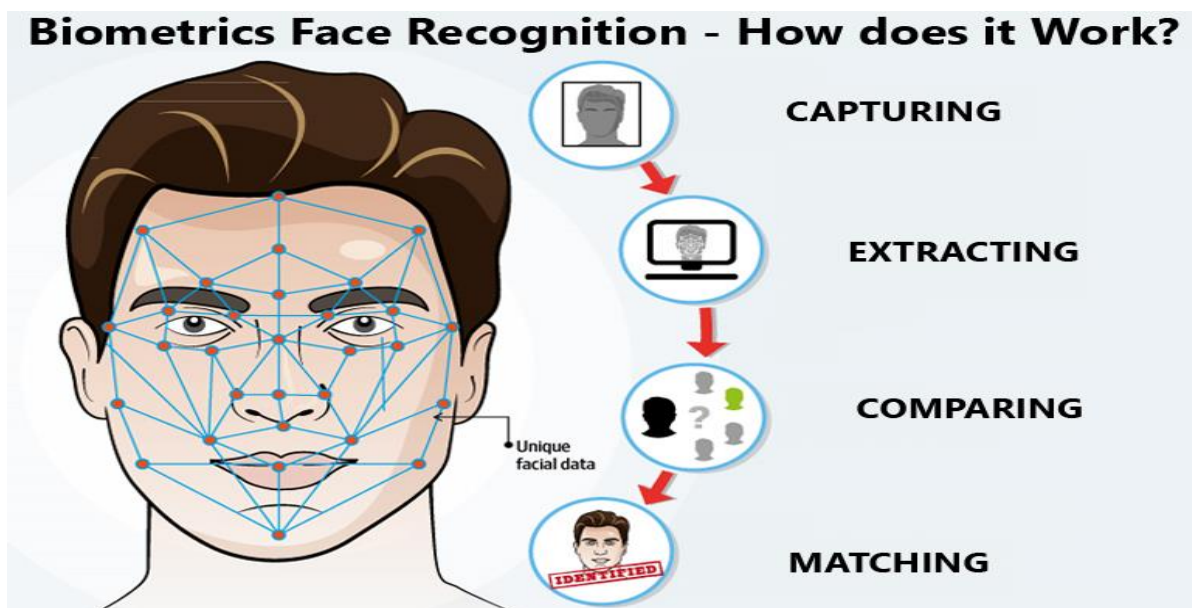
Biometric Face Recognition is the process and ability of a biometric machine to identify and recognise the face of an individual either to grant access to a secured system or to find out the details of a person by matching the face with existing data in the machine's system. What the biometric face reader does, is to map and trace the nodes of a person's face geometrically and stores the data with the identity of a certain individual.

During the initiation of this system, there is the basic procedure that must be undertaken to ensure that in a group of people, all their data is fed into one system and can be accessed easily to run the facial recognition tests. Where this data is stored is highly sealed to avoid leakage of this sensitive data of any individual. First, a photo has to be taken by a camera. This is to ensure that future scans will find some data to match with

4.2. ALGORITHM USED

4.2.1. OpenCV Method

In the field of Artificial Intelligence, Computer Vision is one of the most interesting and Challenging tasks. Computer Vision acts like a bridge between Computer Software and visualizations around us. It allows computer software to understand and learn about the visualizations in the surroundings. OpenCV is an image and video processing library and is used for image and video analysis, like facial detection, license plate reading, photo editing, advanced robotic vision, optical character recognition, and a whole lot more

4.2.2Face Recognition

Recognize and manipulate faces from Python or from the command line with the world's simplest face recognition library. Built using dlib state-of-the-art face recognition built with deep learning. The model has an accuracy of 99.38% .

4.2.3computer vision

Object identification and face detection are probably the most popular applications of computer vision. This technology finds applications in various industries, such as security and social media
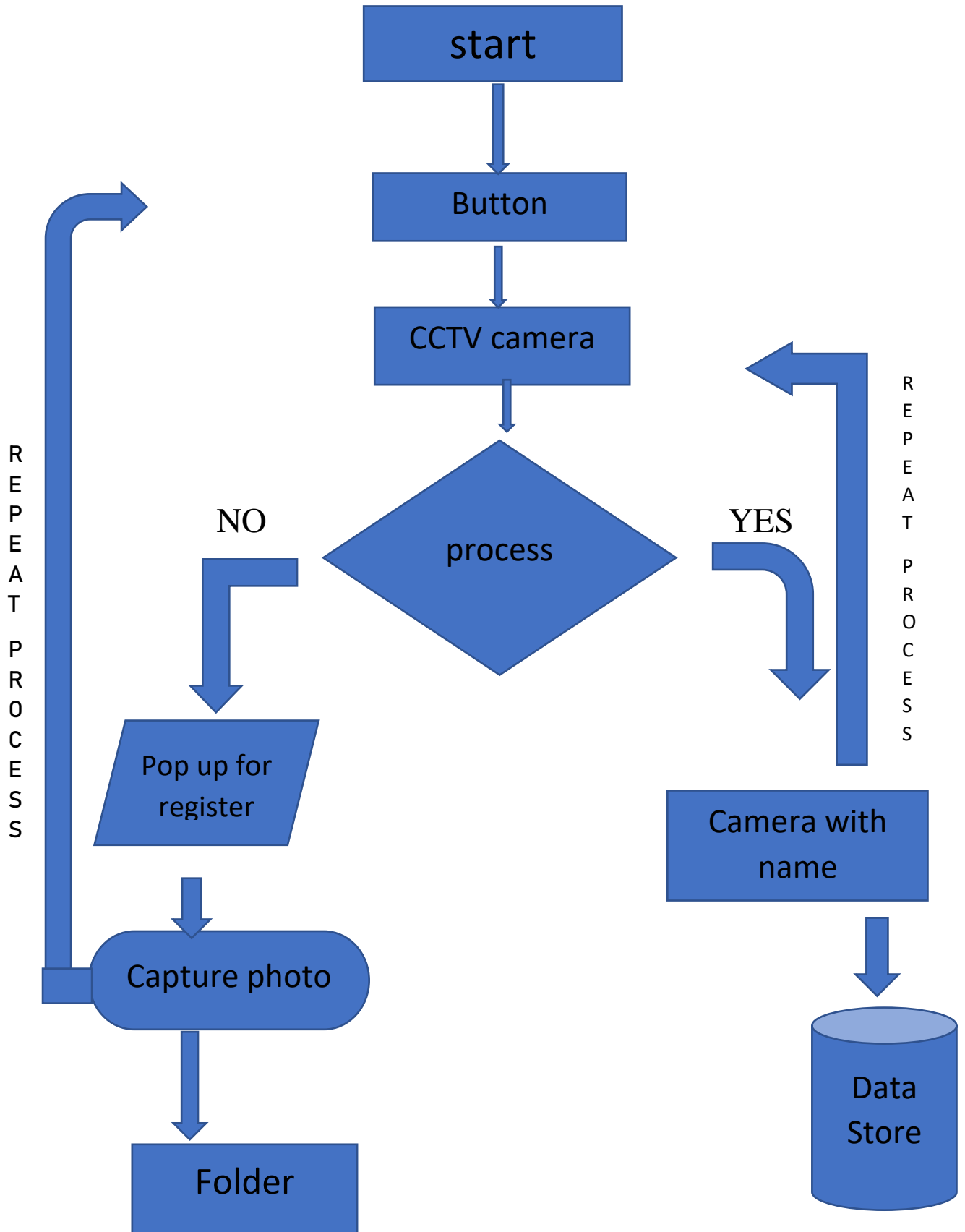
4.2.4.MOTION DETECTION Algorithm

the **Frame Subtraction method** is the most used easy approach for motion detection. In this method, the presence of moving objects is determined by comparing 2 successive frames. The previous frame is compared and then subtracted with the current frame

4.2.5.SMTP

Simple Mail Transfer Protocol (SMTP) is used as a protocol to handle the email transfer using Python. It is used to route emails between email servers. It is an application layer protocol which allows to users to send mail to another

Fig 4.3.**FLOW CHART**

start

↓

Button

↓

CCTV camera

↓

process

NO ← (left branch)   YES → (right branch)

REPEAT PROCESS

Pop up for register

↓

Capture photo

↓

Folder

Camera with name
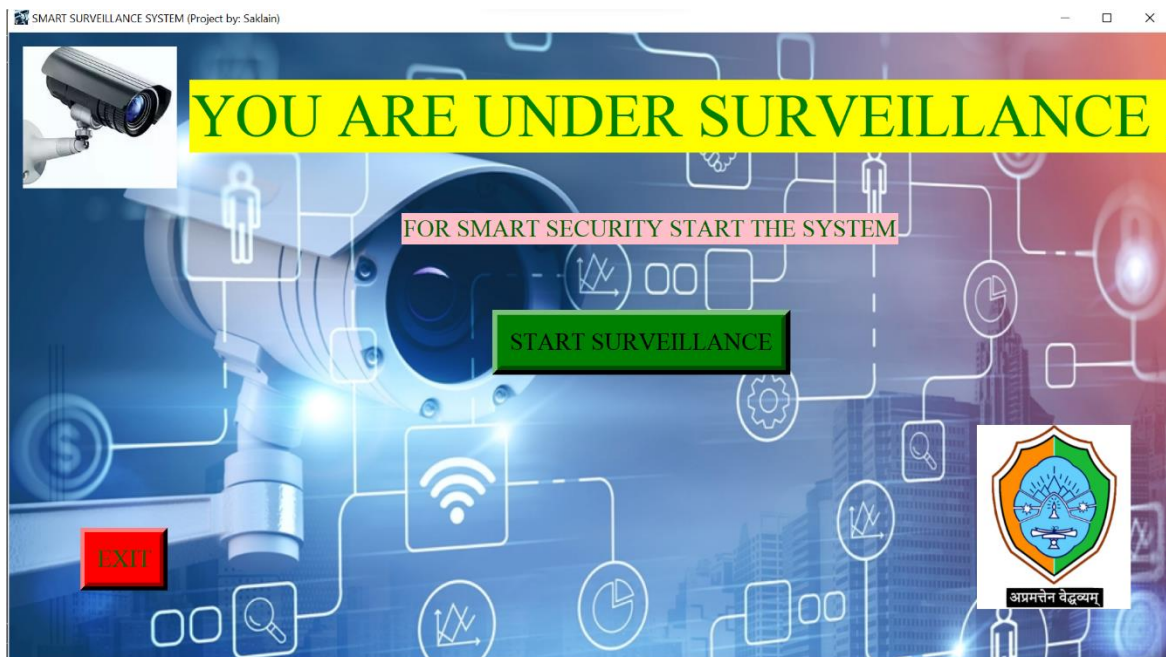
↓

Data Store

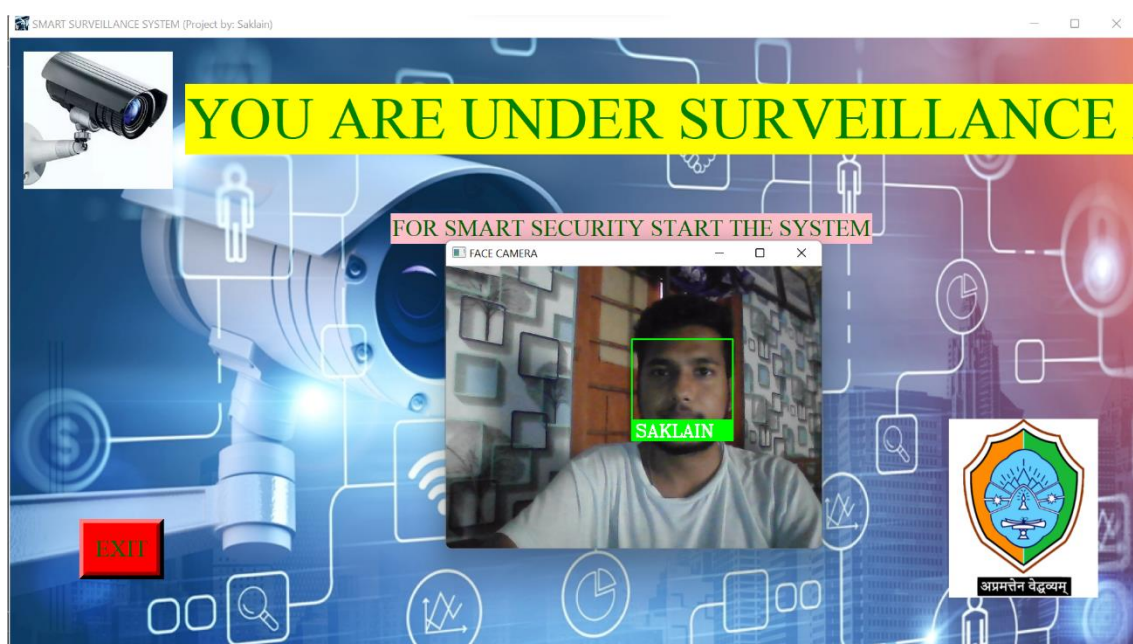REPEAT PROCESS

CHAPTER 5

RESULT

5.1. RESULT

The WORK reviews smart surveillance system. Reviewed papers cover wide variety of applications. The techniques, tools and dataset identified were listed in form of tables. Survey begins with video surveillance analysis in general perspective, and then finally moves towards crowd analysis. Crowd analysis is difficult in such a way that crowd size is large and dynamic in real world scenarios. Identifying each entity and their behavior is a difficult task. Methods analyzing crowd behavior were discussed. The issues identified in existing methods were listed as future directions to provide efficient solution.
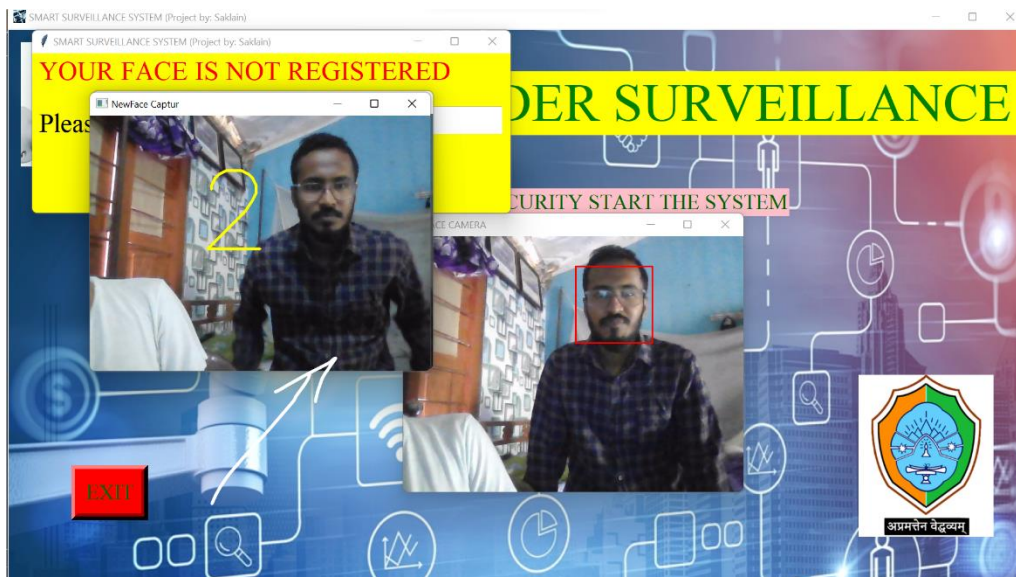
5.2. SCREENSHOT

5.2.1. **HOME PAGE**

5.2.2. KNOWN PERSON

5.2.3. UNKNOWN PERSON DETECT

5.2.4. FACE REGISTERED

5.2.5. DATA STORED

	A	B	C	D	E	F	G	H
1	Name	Time	Date					
2	SAKLAIN	17:10:18	08-05-2022					
3	MIRAJ	11:09:51	11-05-2022					
4	SABBIR	12:11:52	21-05-2022					
5	AMANULL.	12:45:14	26-05-2022					
6								
7								
8								

5.2.6 Fall Detection
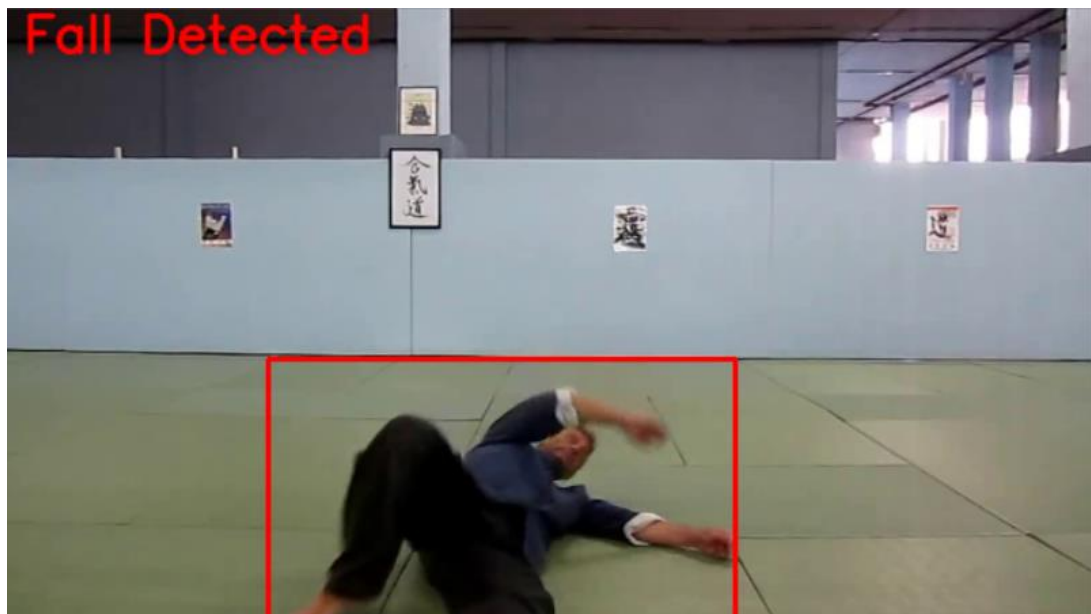
5.2.7 PHOTO FILE

5.2.8 SEND ALERT MESSAGE

Fall Alert   Inbox ×

Saklain.program@gmail.com
Saklain108@gmail.com

Fall Detected. Send HELP
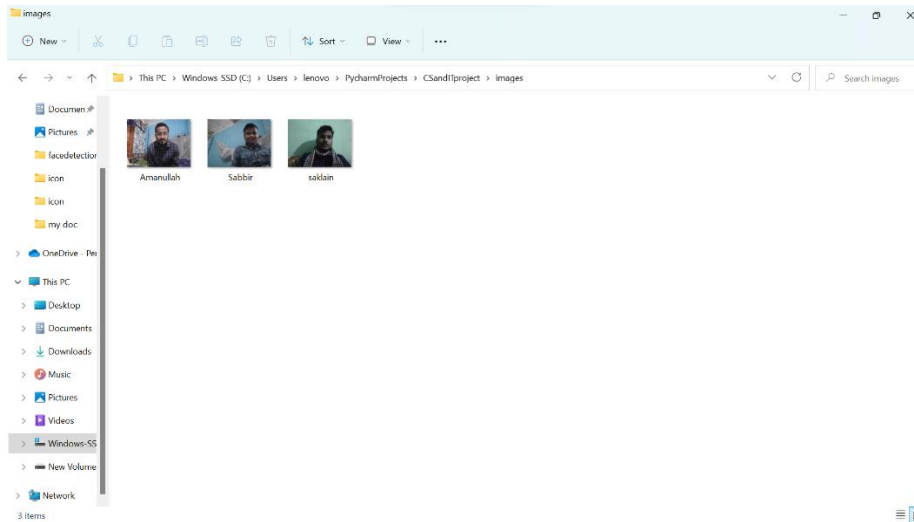
CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1. CONCLUSION and FUTURE WORK

In this WORK, general overview of smart surveillance systems has been presented. Such intelligent systems are promising to be implemented in various environments and applications. This WORK also has discussed some possible sensor modalities and their fusion scenarios to improve the system performance. Numerous techniques have been proposed to tackle several main processing steps: background-foreground segmentation, object detection and classification tracking, and behavioral analysis. Although several promising results have been obtained, further studies are needed for real implementation with more complex settings. For example, in the background-foreground segmentation process, different combination of sensor modality should be explored to make the system robust or to simplify the processing process. Current studies in behavior analysis are still considering simplified scene, and thus more realistic and complex scene should be investigated. researchers should also consider investigating and developing a low cost smart surveillance system

LIST OF REFERENCES

a. https://www.geeksforgeeks.org/python

b. https://www.python.org/

c. https://www.tutorialspoint.com/python/index.htm

d. https://youtu.be/L4IvZokt7Hg

e. https://github.com/jloh02/dlib/releases

f. Kardas K, Cicekli NK. SVAS: surveillance video analysis system. Expert Syst Appl. 2017;89:343–61