

Home Security Surveillance using Face Detection Technique

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Abstract— In today's society, privacy has become a major problem, Human face acknowledgment is a fundamental piece of biometric check and has been commonly used in various applications, for instance, video screen framework, human-PC correspondence and door control framework and framework security. The purpose of this home automation surveillance technique is it is used to protect the privacy of a person. When a person is entering the house, there we can use this surveillance system to identify the information about the person. Many techniques were introduced to detect the identity of a person and many require a pre enabled dataset path for that purpose. In this paper we have enhanced a new way to detect the face of a human being in real-time environment in different situations.

Keywords— Opencv, IDLE, Detection, Dataset, LBPH, Numpy, PIL.

I. INTRODUCTION

Face recognition technique is as old as Computer vision, as a result of the practical importance and theoretical interest from subjective researchers. Despite the fact that different techniques are present for the recognition of the identity of a person (for example, fingerprints, or iris filters) can be progressively accurate, face acknowledgment has face recognition has been a more dependable technique and remains a noteworthy focal point of research due to its noninvasive nature and in light of the fact that it is individuals' essential strategy for individual recognizable proof. Face acknowledgment procedure is a technique which is developing as a universal biometric solution since it requires basically zero exertion from the customer end when compared to other biometric alternatives [1]. To deal with the multimedia information for research and application, feature extraction is an essential advance. In any case, directly preparing of the first multimedia information needs large data-sets, particularly for huge data-sets, which is frequently hard to be fulfilled for the authority of multimedia information.

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The methodology works by examining face pictures and processing Eigen-face which are faces made out of eigenvectors. The correlation of Eigen-face is used to recognize the closeness of a face and its character. There is a five phase process required with the framework made by Turk and Pentland.

To start with, the system should be introduced by bolstering it with a lot of incoming pictures of about the appearance of the person. This is utilized to discriminate the face space which can be achieved by a set of pictures that are face like. Next, when a face is experienced it figures an Eigen-face for it. By differentiating it and having known faces and using some quantifiable examination it might be known whether the image displayed is a face using at all means. By then, if an image is set out to be a face the system will choose off any chance that it knows its identity or not. The optional last development is that if a dark face is seen more than once, the framework can make sense of how to recollect it.

In this paper we are going to elaborate an improved technique for the detection of face of a person in a real-time environment. In this technique, we need to set a path for the creation of the dataset where the photos can be saved and compared later when required based on the ID that needs to be different for the creation of different datasets in real-time environment systems and once the comparison is done with respect to the IDs, the result will be displayed to the master and if the face is not detected then there will be no ID/result displayed. Here the face detection and comparison is mainly done by using LBPH (Local Binary Pattern Histogram). Local Binary Pattern (LBP) is an essential yet extremely proficient texture administrator which denotes the pixels of an image by thresholding the region of each pixel and thinks about the outcome as a binary number. In addition to LBPH we also use third party libraries like Numpy which is used for divided a pictures into different number of arrays and PIL (Python Imaging Library) which is used for detecting the path and comparison of face in real-time environment with the one in dataset. We are using python Idle and opencv for the detection of face due to the fact that we can use third party libraries in python which cannot be accomplished by using c or java and it's a simple compiler to simulate new codes that are programmed based on the requirement when compared to c and java languages. We are using Opencv for the real-time face detection of a person which cannot be done by either eigen-vectors

or haar wavelet transform method

II. PROPOSED SYSTEM

The proposed software for this technique is Opencv and python IDLE software along with third party libraries such as numpy, Os, PIL (python Image Library), etc. OpenCV (Open source computer vision) is a library of programming functions mainly aimed at real-time computer vision [2]. Official discharges presently happen each six months and improvement is currently done by a free Russian group upheld by business partnerships.



Figure 1. Detection using opencv

IDLE (Integrated development and learning environment) is an integrated advanced condition for Python, which has been packaged with the default usage of the language. It is bundled as a discretionary piece of the Python bundling with numerous Linux appropriations. It is totally written in Python and the. Inactive is expected to be a straightforward IDE and reasonable for tenderfoots, particularly in an instructive domain. With that in mind, it is cross-stage, and maintains a strategic distance from highlight mess. Local Binary Pattern (LBP) is an essential yet extremely proficient texture administrator which denotes the pixels of an image by thresholding the region of each pixel and thinks about the outcome as a binary number. In addition to LBPH we also use third party libraries like Numpy which is used for divided a pictures into different number of arrays and PIL (Python Imaging Library) which is used for detecting the path and comparison of face in real-time environment with the one in dataset. We are using python Idle and opencv for the detection of face due to the fact that we can use third party libraries in python which cannot be accomplished by using c or java and it's a simple compiler to simulate new codes that are programmed based on the requirement when compared to c and java languages.

III. METHODOLOGY

The proposed method uses Python IDLE module along with Opencv and webcam for the detection of the identity of the person. Webcam is used for continuous monitoring of the person for the creation of the dataset with respect to his ID after the path is given for the dataset to store. After the creation of dataset Opencv will compare the pics of the person to the pics that are present in dataset and if the ID is recognized then the name will get displayed on the screen else no name/ID is displayed. Local Binary Pattern (LBP) is an essential yet extremely proficient texture administrator which denotes the pixels of an image by thresholding the region of each pixel and thinks about the outcome as a binary number. In addition to LBPH we also use third party

libraries like Numpy which is used for divided a pictures into different number of arrays and PIL (Python Imaging Library) which is used for detecting the path and comparison of face in real-time environment with the one in dataset.

A. Flowchart

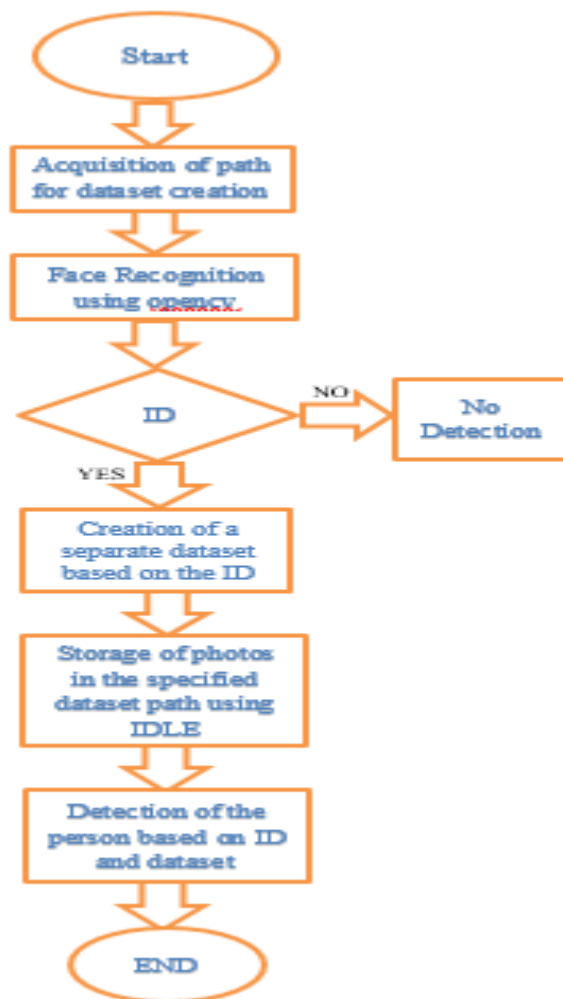


Figure 2. Flow Chart

B. Algorithm:

- Step-1: The process is started by giving a path for the creation of a dataset folder where pictures are stored
- Step-2: Import the respective modules like computer vision2, numpy, Pil, Os
- Step-3: Set the Video Capture Method to 0 to turn on the camera
- Step-4: Give your name with respect to the ID
- Step-5: Create sample dataset by taking several pictures
- Step-6: Use LBPH face recognition to train the dataset
- Step-7: Local Binary Pattern (LBP) is an essential yet effective texture operator which denotes the pixels of an image by thresholding the region of each pixel and thinks about the outcome as a binary number



- Step-8: Now import the LBPH file in the code with the help of libraries
- Step-9: Compare the face to be recognized with datasets present in the given path with the help of the ID and Opencv
- Step-10: If the face is recognized with respect to ID, the name gets displayed
- Step-11: Else it displays nothing but the face of the person
- Step-12: The picture count value updates simultaneously with respect to the pictures taken
- Step-13: Press q to exit from the code
- Step-14: Once you exit from the code, the path and dataset will remain the same

IV. RESULTS AND DISCUSSION

This image shows you about how a dataset is created with respect to name and ID. Dataset is used to store the images in real-time environment for the detection of the stranger.

```
Python 3.5.0 Shell
File Edit Shell Debug Options Window Help
Python 3.5.0 (v3.5.0:374f501f4567, Sep 13 2015, 02:27:37) [MSC v.1900 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\Ravi Chandra\testopencv\DatasetTrainer.py =====
Now you are creating a data set
Enter your Name|
```

Figure 3. Creating a Dataset with name

```
Python 3.5.0 (v3.5.0:374f501f4567, Sep 13 2015, 02:27:37) [MSC v.1900 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\Ravi Chandra\testopencv\DatasetTrainer.py =====
Now you are creating a data set
Enter your NameRavi
enter ur id
|
```

Figure 4. Creating a Dataset with name and ID

The following image shows you the path where dataset is created and the folder where pictures are stored with respect to your ID/Name.

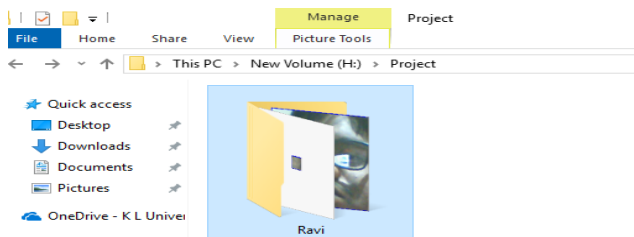


Figure 5. Creation of folder with respect to ID/Name

The following image shows you how the images are stored in the folder(Dataset) and the count value of pictures gets updated accordingly.

```
Now you are creating a data set
Enter your NameRavi
enter ur id
1
Successfully created the directory
IN
THE VALUE IS 1
```

Figure 6. Storing pictures into the folder

The following image shows you about how a picture is taken to get stored in the dataset folder



Figure 7. Image storing in dataset

In this image you will get to know about the picture parameters

```
Hi
['Ravi', '1', '1.jpg']
1
[[ 30 28 29 ... 30 29 29]
 [ 29 27 27 ... 30 26 26]
 [ 29 32 145 ... 224 220 30]
 ...
 [ 31 28 175 ... 206 195 28]
 [ 28 28 155 ... 190 193 30]
 [ 30 32 26 ... 29 26 29]]
['Ravi', '1', '10.jpg']
1
```

Figure 8. Picture parameters

In this image you'll know about how the system(opencv) compares the pictures in dataset with the real-time pictures

```
===== RESTART: C:\Users\Ravi Chandra\testopencv\finalcode.py =====
id is 1
confidence is 151.48712889258204
id is 1
confidence is 137.0762790051175
id is 1
confidence is 41.065714808784165
>>>
```

Figure 9. Picture Comparison

The glimpse of the output that we will get can be seen in the picture below

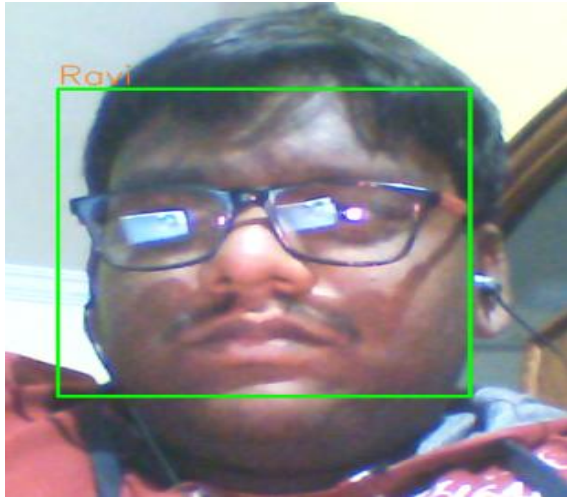


Figure 10. Detection of face with respect to ID/name
In some light source



Figure 11. Detection of face with respect to ID

Then press Q button to close all the windows related to the code. The system will automatically focus onto the person in front of the camera and will be detecting his identity in less amount of time. Continuous camera detection, the camera will not stop detecting until the module is stopped. Real time face detection technique. Separate IDs are provided to different people to avoid any miscalculations. It gives precise output compared to the other techniques in less amount of time. Dataset will be created in the path specified automatically compared to other projects where dataset needs to be created manually. Minimum amount of light is required for the face detection by camera. High mega pixel camera is required for more precise face detection which can be costlier. Once if any ID is used, it cannot be reused. Parameters like oil applied to the face, any changes in the shape of original face to the recorded dataset can create a few problems in identification of the stranger.

V. CONCLUSION AND FUTURE SCOPE

For securing privacy of a person present at home a more precise safety system is required. For achieving the above said thing, the detection of the person can be done with the help of Opencv software, webcam and a general purpose system (which can store the dataset based on the ID and forward the status to the master accordingly). An updated

dataset of the person must be available in the system for precise identification of the person. Using this process will give you more efficiency in less time as it will do real-time face detection when compared to other techniques which requires the dataset to be created manually. So in this methodology precise detection of face can be done using python idle, Opencv, webcam and a general purpose system. In future the importance of home security surveillance will increase and more advanced techniques will be made available (like Eigen vectors, LBPH, Haar, etc) for the world based on the requirement.

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