Detection and Recognition of Face in Real-Time

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ABSTRACT:

Face detection is process of detecting face in a digital image with the help of some facial characteristics of face. Face detection is a complex process for computer vision field. There are many factors like illumination variations, different type of face expressions, several environmental factors that could impact the face detection. The suggested methodology is based on extracting features from the input image. For feature extraction system applies Haar features. Each Haar feature is created to identify distinct facial characteristics. First of all we have to find best threshold a value from the training set for each feature to determine whether corresponding feature is present or not in the input image. Selected Haar features ought to have a low error rate and be clear. Each Haar feature's input image goes through before being scanned to produce a single value that will be compare with threshold value.

Keywords:Face Detection, Face Recognition, Haarcade, Face Identification.

1.INTRODUCTION

In computer vision-based application research, face identification is a hot topic. Human face detection has been playing an important role in application where humans interact with the machine. There are vast applications of face detection which helps to solve real time problems. Face detection simply involves identifying facial features like the nose, hair, skin, and eyes in an input image. Input image might be consisting of thousands of different objects like tables, buildings, tress. means all objects other than human face but detecting human face is quite difficult because of time changing features like expressions, illuminations, background, skin colour etc. Hence it is very difficult to build a computational model which is more precise and more effective. There are algorithms available that can categorise an image based on its texture. In 2002, Ojala discovered Local Binary Pattern (LBP) which is used as texture descriptor. When compared to the Haar cascade classifier, LBP is a less accurate algorithm for face identification and recognition.

2. MOTIVATION

The movitivation behind of face detection is its high dimension space, which is to be reduced by any dimension reduction techniques. The pattern recognition approach then tries to match the facial features. But pattern recognition approach not able to differentiate difference between noise and expected pattern.

3. PROBLEM DEFINITION

. By presenting the issue from several perspectives, the problem definition method aids in visualising the issue and defining the larger context and related issues. The Problem Definition Process is very effective when all stakeholders are included. When all stakeholders are included, the Problem Definition Process can be implemented with particular success. Currently face recognition algorithms are not effective with respect to time. The computation power required for those algorithms is too high. In case if we able to detect the face, we could not identify the face in real time. Currently face identification is carried out by pattern method but problem with the pattern method is that these method cannot be differentiate between noise and actual pattern

4.OBJECTIVE

• Implementing the haar cascade classifier with local binary pattern histogram (LBPH)
algorithm.
• The accuracy of haar cascade is 96.24% and for LBP it is 94.74%.
• The detection becomes more faster by using both the classifier as per their requirements.

5. SCOPE

Sometimes due to post dataset some images are get fail to detect. In some cases, face detected but there will be no face present because we are using LBPH pattern matching approach. Sometimes it causes falsely face detection as per we explained above. To overcome this false detection we need to increase the accuracy but there will be another challenge for us is to train the model with several thousands of images which leads to increase in time for compilation. As we are going with pattern matching approach if twin faECHNOLOGYces are there and having similar pattern in their faces then system get confused and not able to give expected output.

6.TECHNOLOGY USED

1.Software: These process is model based process. So we don't need internet connection which is required from user standpoint.

• **Backend**: Python
• **Dataset**: xml

2.Hardware: The hardware requirement includes a system with following configurations:

• **Processor:** Intel i3 processor or above
• **RAM:** 4 GB
• **Input device:** Camera
• **Output device :** VGA and High Resolution Monitor

7. METHODOLOGY OF IMPLEMENTATION

- 7.1 Haar Cascade Algorithm:

the Haar cascade In a still image or a live video, it uses an object detection algorithm to find faces. The algorithm uses edge or line detection:

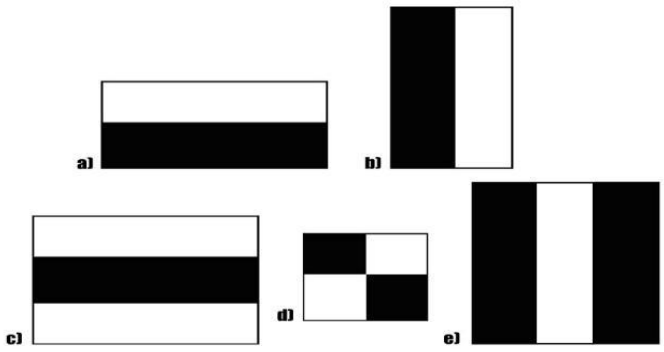


Figure 7.1: A sample of Haar features

The first contribution to the research was the addition of the mentioned haar characteristics. These features on the image makes it easy to find out the edges or the lines in the image, or to pick areas where there is a sudden change in the intensities of the pixels.

Flow of Haar cascade:

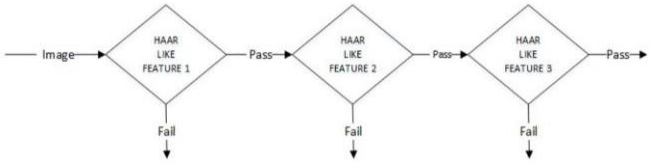


Figure 7.2: Flow of Haar cascade

- 7.2 Local Binary Pattern Histogram:

A straightforward yet highly effective texture operator called Local Binary Pattern (LBP) thresholds the area around each pixel to name the pixels in an image as a binary number.

Parameters: The LBPH uses 4 parameters –

• Radius: The radius, which indicates the area surrounding the central pixel, is utilised to construct the circular local binary pattern. It is usually set to 1.
• Neighbors: the quantity of sample points needed to create the local binary pattern in a circle. Keep in mind: The computational cost increases as you include more sample points. It is usually set to 8.
• Grid X: the number of horizontal oriented cells. The resulting feature vector has a higher dimensionality when there are more cells and a finer grid. It is usually set to 8.
• Grid Y: the number of vertically oriented cells. The resulting feature vector has a higher dimensionality the more cells there are and the finer the grid is. It is usually set to 8.

8. DESIGN

- **A] SYSTEM ARCHITECTURE**

Details on the integration of the modules or components are provided by the system architecture. Figure is indicating the system architecture of the face detection. This architec ture will give complete description of input and outputs of each process. The conceptual model, often known as the system architecture, of a system determines its structure, behaviour, and other characteristics. A formal description and representation of a system that is set up to facilitate analysis of its structures and behaviours is called an architecture description.

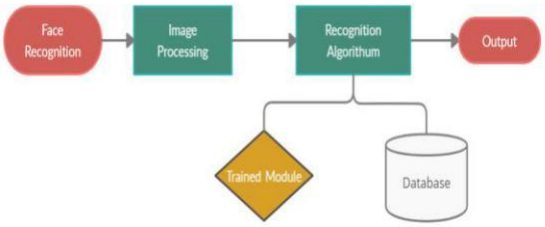


Figure 8.1: System Architecture

- **B] LEVEL 2DFD**

A level 2 data flow diagram offers a more detailed look at the processes that make up an information system than a level 1 DFD does. It can be used to plan or record the specific makeup of a system. Figure 4.4 shows Level 2 DFD of project. The image is processed by

using cascade.xml file and then the data is recognized and saved to training.yml file if not present.

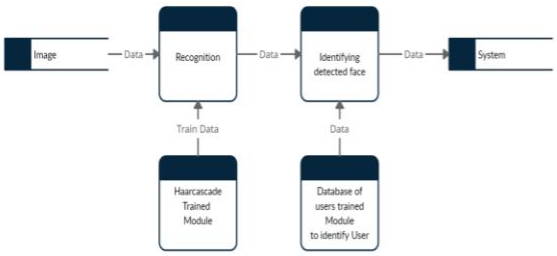


Figure 8.2: Level 2 Data flow diagram

- **C] USE CASE**

In this diagram the image is been captured from real time system and then the face is detected after that the face is saved in dataset and the face is identified. The identified image is saved in dataset with information.

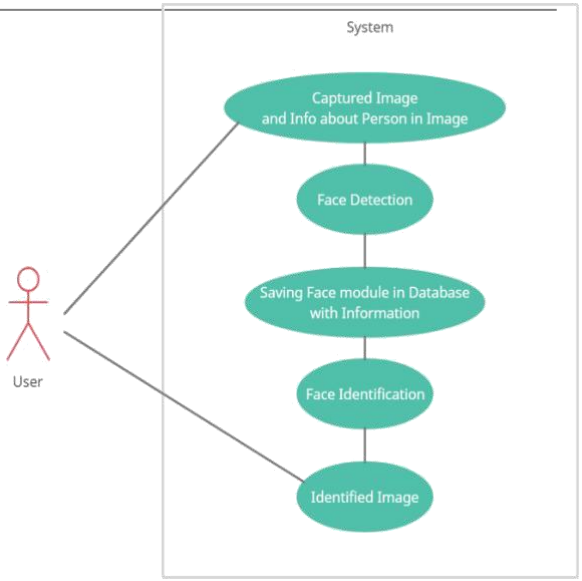


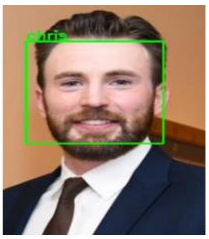
Figure 8.3: Use Case Diagram

9. RESULT

The result we got from this project is after giving images to module the image is being recognize and identified.

INPUT:

OUTPUT:



10. CONCLUSION

Face detection is influenced by the clarity of image,coloured or black and white image.It can only detect the frontal detection of images.So we have implemented an Face detection using HAAR Cascade feature. Our algorithm successfully detects the Face region from the image. We have applied our algorithm on many images and found that it successfully detect the faces with various face expression and with different environmental conditions.

11. FUTURE WORK

Security is an imperative part of any industry. The purpose of this endeavour is mostly criminal identification. The Viola-Jones algorithm and the linear binary pattern algorithm were used in this paper. The recognition rate attained by this process is 90%-98%. There will be deviation in the result on account of the distance, camera resolution and lightning. To speed up processing, more powerful processors might be used. By adding more recognition servers, it is possible to speed up the collecting of photos.

12. REFERENCES

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