

Feature Extraction and Searching People

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Abstract: *The problem of face detection and face recognition is increasing with the advent of digitalization. One popular aspect of web-based platform is sharing of personal photographs. Facebook, in 2013, revealed that its users have uploaded more than 250 billion photos, and are uploading 350 million new photos each day. In today's digital era, we come across situations where we have an image of any person and want to identify the person in the image and check whether he/she is present on social networking application. For this purpose, we have developed a stand-alone application and proposed a system that takes an image as input, processes it to detect human face in given image and draw a bounding box around the detected part in the image using Viola and Jones algorithm. The detected face is compared with images in database of stand-alone application using Linear binary pattern algorithm and similarity score is provided for each comparison. The similarity scores are ranked and the image in database with highest similarity score is selected. Then it checks whether the minimum threshold of similarity is satisfied, based on which our system indicates that the person is recognized. The information about the detected person present in the stand-alone application database is displayed.*

Keywords: Feature extraction, Viola and Jones Algorithm, Linear Binary Pattern, Image processing, Face detection

1. Introduction

In today's digital era, with increasing popularity of the world wide web, people are uploading large number of personal images on various web-based platform. A Software system is designed that can identify face in given image and check whether a particular person is present on a stand-in application. After face detection in input image, a bounding box is drawn around the face input image. This is achieved by supervising only set of images that have face (the positive set) and set of images that does not have the face (the negative set). The detected face in image is cropped and converted into grey scale image. The grey scale image is compared with image uploaded by the account holders on stand-in application. The profile image of the user account which gives highest similarity score and satisfies the minimum similarity threshold is selected as final image. The information of that account is fetched and displayed.

2. Problem Statement

To build a system which will identify whether a particular person in the input image is present on the standalone application using Viola-Jones algorithm and Local binary pattern algorithm.

3. Motivation

In some situation we have an image and want to identify the person in the image. The trend of clicking pictures on important events and occasions is increasing with the use of smart phones and people are uploading these photos on various social platforms. An image can be used as an important parameter to identify and search for people on social platforms. In recent decades, it is found that many people got into touch with their lost friends, family members through social platforms. This idea motivated us to design a software system which can identify person in image and check if that person is present on the standalone application by comparing the given image with profile image of users.

Once the person is recognized, the basic information about that person stated on his/her account can be fetched and displayed.

4. Literature Survey

[1] Dayong Wang, Member, IEEE, Charles Otto, Student Member, IEEE, and Anil K. Jain, Fellow, IEEE, "Face Search at Scale" In volume 39, Issue 6, at IEEE transactions on pattern analysis and machine intelligence, June 2017

In this paper they have proposed:

- Face search system for strong face recognition of faces captured under challenging conditions in terms of large variations in pose, expression, illumination and aging.
- Face search system consisting of three main steps: Template generation module, Face filtering module and re-ranking module.

From this paper we have referred:

- Face filtering module which compares input image with gallery images to retrieve top k similar candidates.
- Re-ranking module which fuses similarity scores to generate new ordering of candidates.

[2] Mangayarkarasi Nehru, Dr Padmavathi S, "Illumination Invariant Face Detection Using Viola Jones Algorithm", 2017 International Conference on Advanced Computing and Communication Systems (ICACCS -2017), Jan. 06 – 07, 2017, Coimbatore, India

In this paper they have proposed:

- Experimental work on Viola-Jones Algorithm for face detection.
- Face detection for side face, face with specs, dark and light complexion face, multiple faces in an image, masked face.

From this paper we have referred:

- a) Viola Jones Algorithm for face detection in an image.

[3] Yuqian Zhou, Ding Liu, Thomas Huang, "Survey of Face Detection on low -quality images", 2018 13th IEEE International Conference on Automatic Face & Gesture Recognition

In this paper they have proposed:

- a) In this paper, they first reviewed the Haar-like Adaboost cascade and Hog-SVM detectors and their performance on FDDB database.
b) Secondly, they investigated the performance degradation while testing on low-quality images with different levels of blur, noise, and contrast.

From this paper we have referred:

- a) Extracting features from multiple layers could benefit the detection of blurry tiny Faces.

[4] Kirti Dang, Shanu Sharma, "Review and Comparison of Face Detection Algorithms", 7th International Conference on Cloud Computing, Data Science & Engineering - Confluence, 2017

In this paper they have proposed:

- a) It provided a comparative analysis of different face detection algorithms such as Viola-Jones, SMQT features & SNOW Classifier, Support Vector Machine-Based face detection and Neural Network-Based Face Detection based on the recall and precision value.

From this paper we have referred:

- a) Experimental results which show that the Viola Jones algorithm has the highest precision and recall, hence we will use Viola Jones algorithm for face detection in our System.

[5] R. Kachouri, K. Djemal, H. Maaref, D. Sellami Masmoudi and N. Derbel, "Feature extraction and relevance evaluation for heterogeneous image database recognition", First Workshops on Image Processing Theory, Tools and Applications, 2008

In this paper they have proposed:

- a) One of the important step in image processing is feature extraction which most frequently extract features such as colour, texture and shape.
b) A hierarchical method for extracting features which outperformed the aggregated feature extraction.

From this paper we have referred:

- a) The hierarchical feature extraction method of extracting first the colour, then texture and at last the shape.

[6] Ms.M.Mahadevi, DrC.P.Sumathi, "Face Detection based on Skin colour model and connected component with template matching", International Conference on Information Communication and Embedded Systems, 2014

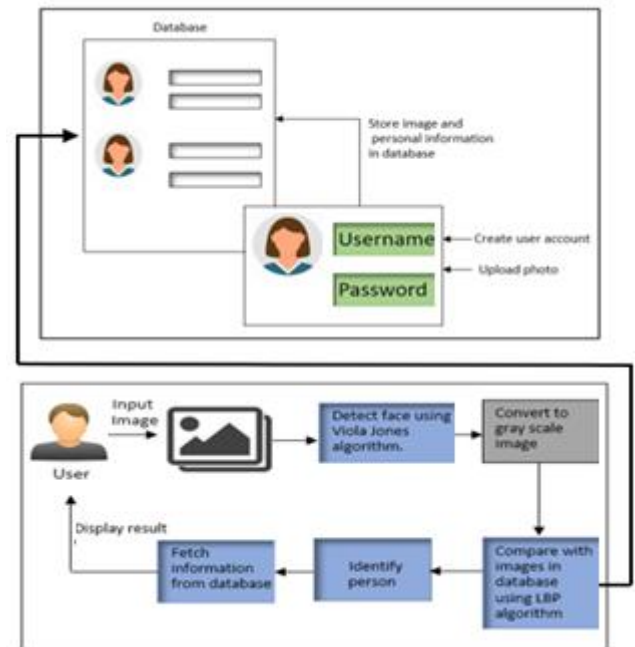
In this paper they have proposed:

- a) Skin colour-based face detection method

From this paper we have referred:

- a) Skin colour-based face detection method and template-based face detection method and template based face Detection method.
b) The detected face in image is cropped and converted into grey scale image.

5. Architecture Diagram



6. Mathematical Model

System S as a whole can be then defined with the following main components.

$S = \{I, O, U, P, PI, Ad, Q\};$

S=System

U=User

P=User

Ad=admin

PI= Person Identify

Input {I} = {Input1, Input2}

Where,

Input1=Image

Input2=User information

Procedures {P}= {Pr, O }

Where, Pr= User Information

Output {O} = {Output1, Output2}

Where,

Output1=Image successfully matched

Output2s=They identify user.

7. Conclusion

In our system we have addressed the problem of person identification from a set of images, as seen in the case of standalone application, where images are uploaded by the account holders. We make use of the Viola and Jones algorithm steps as Haar Feature, Integral Image, Ada-

Boosting, and cascading for human face detection from the given image. The detected face is then converted to grey scale image. The grey scale image is compared with images in database and the particular person is identified and his/her information is displayed.

References

- [1] Dayong Wang, Member, IEEE, Charles Otto, Student Member, IEEE, and Anil K. Jain, Fellow, IEEE, "Face Search at Scale" In volume 39, Issue 6, at IEEE transactions on pattern analysis and machine intelligence, June 2017
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- [3] Yuqian Zhou, Ding Liu, Thomas Huang, "Survey of Face Detection on low -quality images", 2018 13th IEEE International Conference on Automatic Face & Gesture Recognition
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