ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 9, September 2016

A Survey On, An Efficient Method for Refugee Identification using Face Detection and Recognition

Sumit Hirve[1], D. Venkat Hari[2], Pushkar Hirlekar[2], Udit Barde[2], Yogendra Lokhande[2]

Assistant Professor, Dept. of Computer Engineering, M.E.S College of Engineering, Pune, India[1]

UG Student, Dept. of Computer Engineering, M.E.S College of Engineering, Pune, India[2]

ABSTRACT: The face is a unique identity of a person. The methods to use this identity for security purposes have seen a great change since the arrival of image processing techniques in computer vision. Internally displaced person is a type of refugee. They have been forced out of their homes because of the same reasons as refugees, but have not crossed an international border. For an internally displaced person, the lack of identity documents may be far more than a source of inconvenience. Our strategy involves refugee identification by using face detection and recognition. The face detection differentiates faces from non-faces and is hence essential for accurate identification. The Raspberry pi module is useful for face detection & recognition. The pi-camera will be connected to the Raspberry pi module. The database will be collected from respective governments. The database will include names of these people, their images, origin, etc. Thus with the help of this system, time for internally displaced person identification and classification will be reduced**.**

KEYWORDS: Face detection; Face recognition; Haar classifier; internally displaced person; Raspberry pi

I. INTRODUCTION

Our system is chiefly meant for internally displaced persons which are type of refugees. Whenever there is a natural disaster or any type of disaster, these people have to leave their homes. A person who has been forced to leave their respective country in order to escape war, persecution, or natural disaster is called a refugee. In a disaster, refugees are stuck in different places and all their identification documents are lost due to disaster. When the government rescues them they need to be identified and given some sort of identification document. With our proposed system the respective governments can apply face recognition on groups of refugees to identify their name, origin, etc. The proposed system tries to simplify the process of identifying refugees that is one by one. Thus this system will help the government for segregation of refugees for availing those services such as food, clothing and shelter. Due to the circumstances in which sometimes they have to leave their home, IDPs are perhaps more likely to find themselves without identity documents.

II. RELATED WORK

Face recognition is a vital part of object recognition research which the scientific community has shown a growing attention in the past few decades. Pattern recognition is one of the most important feature of Face recognition.The face recognition phases include image pre-processing, featureextraction, and clustering. Author [2] focus on developing aface recognition system based on Principal Component Analysis (PCA) and Self-Organizing Maps (SOM) unsupervised learning algorithm. The pre-processing steps contain grey scaling, cropping and binarization. The selected dataset for this research is Essex database that are collect at University of Essex which consist of 7900 face images taken from 395 individuals (male and female).[4] authors uses various techniques for classification of gender using image processing. He generally focus on pixels and features to classify gender. He compare between various gender classification techniques based on feature (Global features, Local features).In [5] authors use cloud computing and windows azure platform to recognise multiple face in real time and increase the performance gain while testing Emugu

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

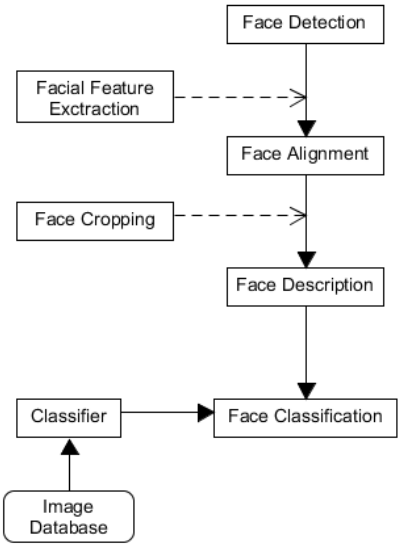
(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 9, September 2016

CV framework. Emgu CV is widely in applications of digital images processing. Emgu CV algorithm uses haar features, adapted for face detection using Voila-Jones concept. This method disregards most time consuming operation, such as classifying and detecting faces .In [6] authors proposed a modified hardware architecture for evaluating the frame detection frame rate by using famous algorithms such as Viola Jones which consist of AdaBoost algorithm integrated with haar features. The system is designed to achieve the processing speed of 60 frames/second.

III. FACE DETECTION

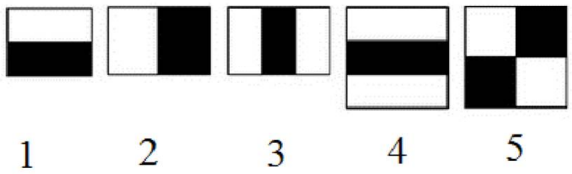
Face detection is a process that identifies human faces in digital images. Face detection and recognition algorithm focuses on the detection of frontal human faces. It is similar to image detection in which the image of a person is



matched bit by bit. For face detection we propose to use Viola Jones face detection algorithm. Viola Jones is the oldest and one of the most recognized face algorithms available for the face detection from the input image.
The basic principle of the Viola-Jones algorithm [1] is to scan a part of window (sub-window) capable of detecting faces across a given input image.

The algorithm has four stages:

1. **Haar Feature Selection**:Haar-like features are digital image features used for recognizing objects like eyes, mouth, etc. from facial image. A Haar-like feature considers adjacent rectangular regions at a certain location in a detection window, sums up all the pixel intensities in each region and it also calculates the difference between these sums. Then this difference is used to categorize subsections of an input image.



Classifier type

2. **Creating an Integral Image:** Integral image is done by making each pixel equal to the entire sum of all the pixels to the left of the concerned pixel and above of it. This permits for the calculation of the addition of all pixels inside a given rectangle using only four values. These values are nothing but the pixels in the integral image coinciding

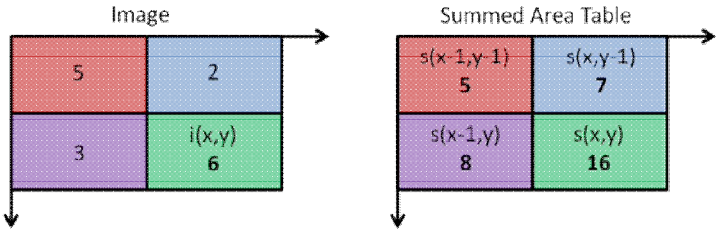
ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

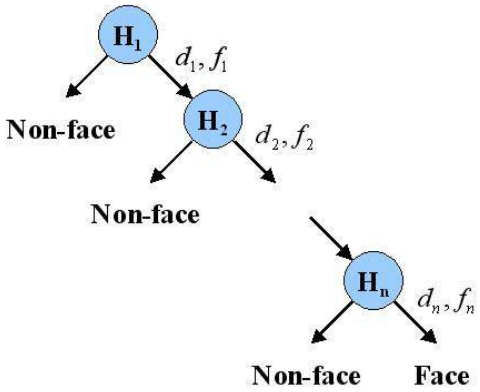
(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 9, September 2016

with the corners of the rectangle in the input image. The benefit in using this type of image is to speed up the extraction of the features, as for any rectangular region can be evaluated from the four end point of the region.



3. **AdaBoost Training:** AdaBoost is a machine learning boosting algorithm which has a capability of constructing a powerful classifier through a weighted association of weak classifiers. As seen above there can be calculated approximately one lakh sixty thousand feature values within a detector at base resolution. In order to find some features which are expected to give almost consistently high values when on top of a face Viola-Jones use a modified version of the AdaBoost algorithm



4. **Cascading Classifiers:** Instead of applying all the features on a given window, we propose constructing a cascade of classifiers. First, a classifier is trained with a few hundred sample views of a face, called positive samples that are scaled to the same size and negative samples - random images of the same size. Once a classifier is trained, it can be applied to our interested region in an input image. The region of interest should be of the same size as used during the training. In this case the region of interest is the face. The classifier shows output '1' if the region is likely to show the face, else '0'. The classifier is designed so that it can be easily 'resized' for finding the objects of interest of different sizes, which is more efficient than changing the size of image itself. When examining a window, it quickly determines '*this is not a face*' as soon as any node classifier says that window is not a face. This property provides cascade classifier very fast testing speed.A cascade classifier basically tells OpenCV what to look for in images.

IV. METHOD

Software Requirements

A facial recognition methodology is a computer application which is capable of identifying or verifying a human being from a digital image or from a video. One of the ways to do this is by comparing selected facial characteristics from the image and a facial database. For this we propose to use the famous computer vision platform of OpenCV. OpenCV has a trainer as well as detector with it.

- Open-CV [12]
- Python 3.4.2
- Database for storing facial data.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 9, September 2016

Following open-cv modules will be used:-

- **cv2**:
  - This is the OpenCV module and contains the functions for face detection and recognition.
- **os** :
  - This module is used to make movements with image and directory names. First, it will extract the image names in the database directory and then from these names the individual number, which will be used as a label for the face in that image can be extracted.
- **Image** :
  - OpenCV does not support gif format, so in that case to read the image in grayscale format, Image module from PIL is used.
- **numpy** :
  - Our images will be stored in numpy arrays.

Hardware Requirements

The device is made of Raspberry Pi 3 model B which supports camera. It has following features:

- A 1.2GHz 64-bit quad-core
- ARMv8 CPU
- 802.11n Wireless LAN
- Bluetooth 4.1
- Camera interface (CSI)
- 1 GB RAM

Using raspberry pi will add more computational power than using a single machine for image processing and storing data. For storage purpose a simple computer will be enough. By performing image processing on Raspberry Pi it will be utilized properly and its computing power will not be wasted. Also the device will be mobile as it is an embedded device.

V. PROPOSED WORK

The working of system in brief is:

Step 1: The raspberry pi module will be used with a camera module for capturing image of a group of people.
Step 2: The images are applied face detection by using Viola-Jones algorithm.
Step 3: The detected faces will undergo further optional image processing such as image enhancement, feature extraction, and face recognition.
Step 4: The whole process of face recognition can be divided in following steps -

- The first step is to train the software with a large number of faces with multiple images for each individual.
- The next step is to detect new faces and match them with the faces from the database.

Step 5: Then they are matched with the existing database, if a match is found it will show the details of person from the system.
Step 6: If a match is not found then the software will ask to create new profile if it is a new individual.
Step 7: The software will also help in creating profile of these internally displaced persons.
Step 8: The details retrieved will help the rescuing organization for segregating people into various groups based on their origin, etc. Thus it can help reunite families. This information about the refugees will help the government to provide them different services. Also these refugees can be tracked wherever they go.

VI. CONCLUSION

The current system for Refugee management is based on personal interaction with victims. For their identification and it is very time consuming. So to overcome this problem we propose better and accurate system. Because of this new proposed system it will be easier to identify the refugees and will take very less time as compared to the existing custom. Our system promises to profile the internally displaced persons accurately using face recognition.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 9, September 2016

VII. FUTURE WORK

- In this refugee identification process sometimes it may not be possible for government authorities to reach to the affected place where all the refugees are present and take images. In this case we can attach the raspberry pi module to a drone which can be connected to the system through Bluetooth/Wi-Fi and it can take images and send the processed facial data to system for further processing. By recognizing these people, authorities can contact their families and update them with current status.
- Also this system can be used at identifying people involved in riots, etc. where there are large number of people at same location. By taking an image of number of people they can be identified and the respective authorities can take action on them.
- In shopping malls, the mall can use this system for creating a profile based shopping experience for the members of the mall. Whenever a member is recognized, he/she is updated about various offers in the mall.
- Marking attendance in various institutes

REFERENCES

1. P. Viola and M. J. Jones, "Robust real-time face detection," Int. J. Comput. Vision, vol. 57, no. 2, pp. 137–154, 2004.
2. Dian Retno Anggraini ,"Face Recognition Using Principal Component Analysis and Self Organizing Maps",Third ICT International Student Project Conference,2014.
3. Dolly Reney,Dr.Neeta Tripathi,"An Efficient Method to Face and Emotion Detection", Fifth International Conference on Communication Systems and Network Technologies,Vol.3,Issue 10,2013.
4. Sajid Ali Khan Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology, Islamabad ,Muhammad Nazir UIIT-PMAS University of Arid Agriculture Rawalpindi,Sheeraz Akram UIIT-PMAS University of Arid Agriculture Rawalpindi, Naveed Riaz Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology, Islamabad ,"Gender classification using Image Processing Techniques: A Survey",Institute of Electrical and Electronics Engineers,Vol.14,pp.25-30,2011.
5. Diego von Sohsten,Sergio Murilo,"Multiple Face Recognition in Real-Time Using Cloud Computing, Emgu CV and Windows Azure",Institute of Electrical and Electronics Engineers,Vol 13,pp. 137,2013.
6. Suraj Das,Atit Jariwala,Pinalkumar,Sudar Vallabhbhai,"Modified Archtecture For Real-Time Faces Detection Using FPGA",Nirma University International Conference On Engineering,2012.
7. Bangyu Cai, Siyuan Xiao, Lei Jiang, Yiwen Wang* and Xiaoxiang Zheng, "A Rapid Face Recognition BCI System using Single-trial ERP", 6th Annual International IEEE EMBS Conference on Neural Engineering San Diego, California, 6 - 8 November, 2013.
8. Wonjae Lee, Bora Park, Minsoo Kim, Jaehyun Kim, and Shihwa Lee, "Accelerating Face Detection Algorithm Using Coarse Grained Reconfigurable Architectures", 2015 IEEE International Symposium on Consumer Electronics (ISCE).
9. Viorel Suse, Dan Ionescu, "A Real-Time Reconfigurable Architecture for Face Detection", ReConfig 2015 International Conference on ReConfigurable Computing and FPGAs, December 7-9, 2015, Mayan Riviera, Mexico.
10. R. Raghavendra Kiran B Raja† Bian Yang Christoph Busch, "A Novel Image Fusion Scheme For Robust Multiple Face Recognition With Light-field Camera", 16th International Conference on Information Fusion Istanbul, Turkey, July 9-12, 2013.
11. C. Huang and F. Vahid, "Scalable Object Detection Accelerators on FPGAs Using Custom Design Space Exploration," in Proceeding of the IEEE 9th Symposium on Application Specific Processors. 2011, pp. 115-121.
12. Sourceforge: 'Open Computer Vision Library', http://sourceforge.net/projects/opencvlibrary/, 2008.