International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 01 | Jan -2017 www.irjet.net p-ISSN: 2395-0072

Built-in Face Recognition for Smart Phone Devices

Aesha Shah, Kavin Shah, Vidhi Shah, Chintan Shah

[1] Aesha Shah, Dept. Of Information Technology , Vidyalankar Institute Of Technology ,Maharashtra, India
[2] Kavin Shah, Dept. Of Information Technology, Vidyalankar Institute Of Technology, Maharashtra, India
[3] Vidhi Shah, Dept. Of Information Technology , Vidyalankar Institute Of Technology, Maharashtra ,India
[4] Chintan Shah, Assistant Professor, Dept. Of Information Technology , Vidyalankar Institute Of Technology, Maharashtra, India

---

Abstract - *This paper presents the deployment of face recognition on mobile phones. Mobile phones are becoming the convergent platform for communication and personal sensing such as clicking pictures. Due to this, the invent of digital camera is reduced to much greater extent.*
We envision Auto Face Tagger, a mobile phone based collaborative system that senses the people and context in a picture. This paper describes about a prototype of Auto Face Tagger on Android Phones.

Key Words: Face recognition, Face detection, Viola Jones, Auto Face Tagger, Image tagging, Android phone.

1. INTRODUCTION

Face recognition is used in identifying a person from an image. This expertise has received much attention because of the extensive versatile nature of interest involved in it. It can be used as a biometric system for authentication of the user, distinguish someone and tag him to identify on social networking sites, recognize people and remember their preferences and peculiarities, etc. Adapting such kind of systems to mobile devices would probably benefit because of the flexibility of mobile devices. Creating a standalone mobile application that does face recognition on captured images is an interesting opportunity to explore.
The incorporation of face recognition algorithms into mobile devices has been an exigent task due to the constraints on processing power, inadequate storage of the mobile device, limited network bandwidth and connection flux, privacy and security concerns. Hence client-server architecture needs to be developed . The client side performs facial detection based on color segmentation, pattern matching, etc on the captured image and extracts the instructive features. These features are then sent to the server which does the computationally intensive task of assessment with the database image set that would help in the face recognition and then sends the data back to the client. The client then displays the essential information to the user.

The general structure followed by any face recognition technique is shown below.

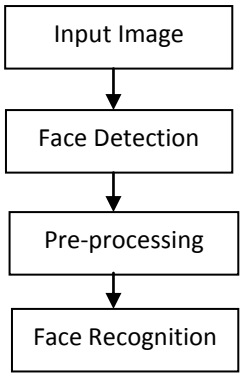
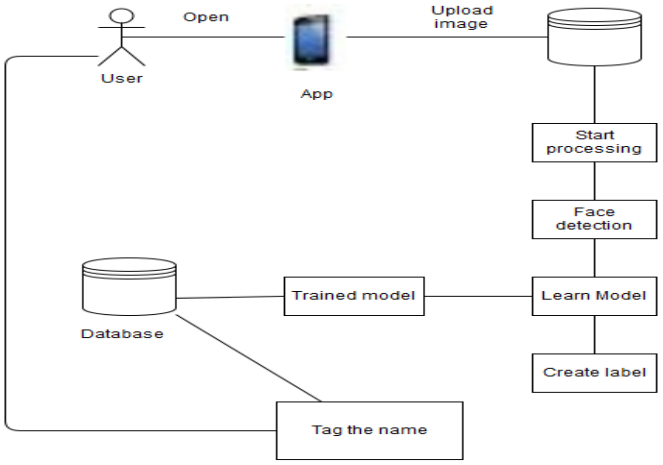


Figure -1: Steps followed during face recognition

1.1 Proposed System



1.2 Face Recognition

PCA is a statistical procedure and its assimilation into a face recognition algorithm requires plentiful design verdict. One of the uncomplicated and most useful PCA approaches used in face recognition systems is the so-called eigenface approach. This approach reconstructs faces into a small set of critical characteristics,

eigenfaces, which are the core components of the initial set of learning images (training set).
Recognition is done by extruding a new image in the eigenface subspace, after which the person is classified by comparing its position in eigenface space with the position of recognized individuals . The benefit of this approach over other face recognition systems is in its straightforwardness, speed and inconsiderateness to miniature or steady changes on the face. The setback is restricted to files that can be used to recognize the face. Namely, the images must be vertical frontal views of human faces. The whole recognition process involves two steps:
A. Initialization process
B. Recognition process

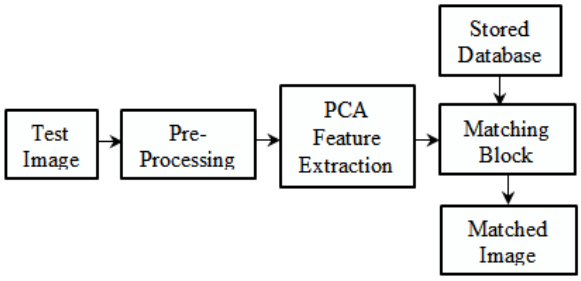


Figure -2: Flow diagram of PCA algorithm

2. Face Detection

A human can identify faces in an image, but a computer needs precise information and constraints. To make the task more manageable, Viola–Jones requires full view frontal upright faces. Thus in order detect the face, the entire face must point towards the camera and should not be tilted to any of the side.

The uniqueness of Viola–Jones algorithm which makes it a superior detection algorithm are:
Vigorous- very high detection rate (true-positive rate) & very low false-positive rate always.
Instantaneous – For practical applications at least 2 frames per second must be handled.
Face detection only (not recognition) - The goal is to distinguish faces from non-faces (detection is the first step in the recognition process).

The algorithm has four stages:
1. Haar Feature Selection
2. Creating an Integral Image
3. Adaboost Training
4. Cascading Classifiers

1. Haar Features – All human faces share some analogous properties. These consistency may be coordinated using Haar Features.
A few properties familiar to human faces:
•The eye region is darker than the upper-cheeks.
•The nose bridge region is brighter than the eyes.
Composition of properties forming identical facial features:
•Location and size: eyes, mouth, nose bridge
•Value: oriented gradients of pixel intensities

The four features corresponding to this algorithm are then sought in the image of a face.
Rectangle features:
•Value = Σ (pixels in black area) - Σ (pixels in white area)
•Three types: two-, three-, four-rectangles, Viola & Jones used two-rectangle features
•For example: the variation in brightness between the white &black rectangles over a specific area
•Each trait is related to a special location in the sub-window

2. An image illustration called the integral image assesses rectangular features in constant time, which gives them a significant pace gain over more complicated unusual features. Because each feature's rectangular area is always contiguous to at least one other rectangle, it follows that any two-rectangle feature can be gauged in six array references, any three-rectangle feature in eight, and any four-rectangle feature in nine.
The integral image at position (x,y), is the addition of the pixels above and to the left of (x,y), comprehensive.
•In cascading, each stage consists of a strong classifier. So all the features are organized into several stages where each stage has definite number of features.
The job of each stage is to verify whether a given sub-window is definitely not a face or may be a face. A given sub-window is instantly discarded as not a face if it fails in any of the stages.

3. CONCLUSIONS

We can see that the project is divided into three main parts- Android, Face recognition and Automatic tagging. The overall goal of this project is to investigate the extent to which predicting tags as sets increases annotation accuracy over automatic tagging methods that treat the tags independently.

In our app, Auto Face Tagger, the aim is to assign a list of keywords indicating core functionalities, main contents, key features or concepts of a mobile app. Mobile app tags can be potentially useful to improve app search, browsing, categorization, and advertising, etc.

The face recognition concept has a wide scope in the future of technology. It can be majorly used in security as well as in advertising sector.
This app makes it possible to improve quality of searching in numerous ways. For example, searching a picture by a person's name or the place name. Tagging a picture at the time it is taken only once, and then from next time when the picture of same person or thing is taken, tagging will be done automatically. It helps in saving time and gives an easier access for searching pictures.

REFERENCES

[1] Proyecto Fin de Carrera, 2010,"Face Recognition Algorithms".
[2] Mattias Junered, 2010,"Face Recognition in Mobile Devices".
[3] P. Viola and M.J. Jones, "Robust Real-Time Face Detection", International Journal of Computer Vision 57,137-154,2004.
[4] M.Bartlett, Stewart, J.Movellan, R.Sejnowski, J,Terrence, "Face Recognition by Independent Component Analysis",IEEE Trans. Neural Networks 13(6), 1450-1464,2002.
[5] Gustavo Carneiro, Antoni B. Chan, Pedro J. Moreno, and Nuno Vasconcelos,"Supervised learning of semantic classes for image annotation and retrieval," IEEE Transactions on Pattern analysis and Machine Intelligence, vol.29,pp.2007,2007.
[6] Face Recognition Using Principal Component Analysis Method Liton Chandra Paul1 , Abdulla Al Sumam2 Electronics and Telecommunication Engineering1,2 Rajshahi University of Engineering and Technology
[7] E. Fazl Ersi, J. S. Zelek, "Local Feature Matching for Face Recognition", In Proc.of the 3rd Canadian Conf. on Comp. and Rob. Vis.(CRV'06),2006.