RESEARCH ARTICLE

Face Matching and Retrieval of Images

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Abstract— Now a days, users are interested in people with photos (e.g., family, friends, celebrities etc.). Assuming someone with bad intentions steals a database containing face signatures, would it be possible to reconstruct the corresponding face images, revealing who was in the database? Would these reconstructed images be good enough to allow them to gain access via a face recognition system? To deal with these issues we introduce an android based application named Secure Me which consists of authentication techniques that will protect user's information. Existing methods for face image retrieval usually use low-level features to represent faces, but low-level features are lack of semantic meanings and face images usually have high intra-class variance (e.g., expression, posing), so the retrieval results are unsatisfactory. So, we move on to a new perspective on content-based face image retrieval by incorporating high-level human attributes into face image representation and index structure.

Keywords— Content-based face image retrieval, Database, Face signatures, High-level human attributes, Secure Me

I. INTRODUCTION

Due to the popularity of digital devices and the rise of social network/photo sharing services (e.g., Facebook, Flickr), there are largely growing consumer photos available in our life. Among all those photos, a big percentage of them are photos with human faces (estimated more than 60%). Traditional methods for face image retrieval usually use low-level features to represent faces [1], [2], [5], but low-level features are lack of semantic meanings and face images usually have high intra-class variance (e.g., expression, posing), so the retrieval results are unsatisfactory. So we use a new perspective on content-based face image retrieval by incorporating high-level human attributes into face image representation and index structure. As shown in Fig. 1, face images of different people might be very close in the low-level feature space. By combining low-level features with high-level human attributes, we are able to find better feature representations and achieve better retrieval results.
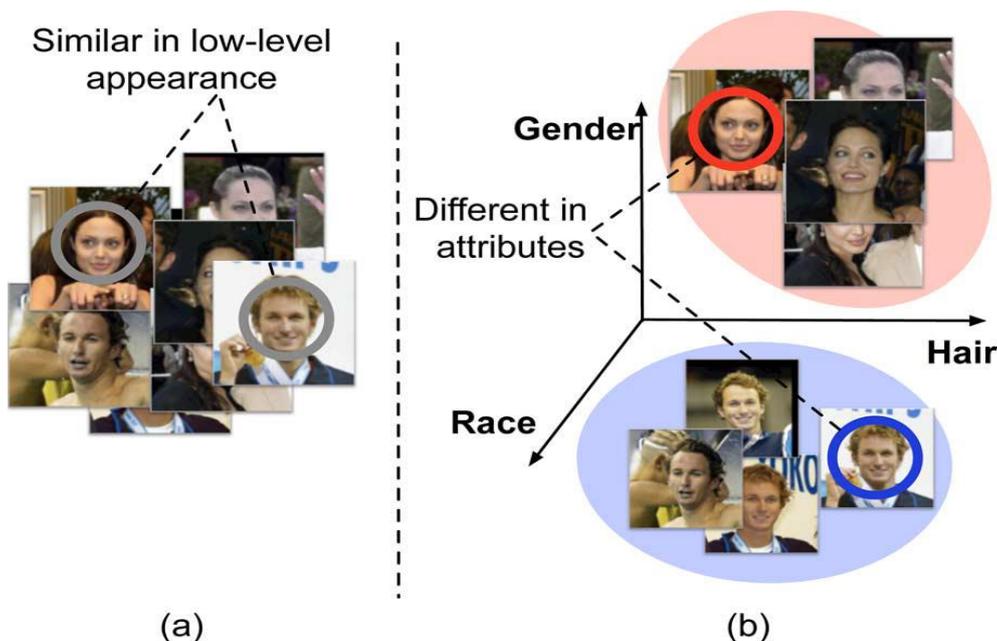
Fig. 1 (a) Low-level features are lack of semantic meanings, face images of two different people might be close in the traditional low-level feature space. (b) By incorporating high-level human attributes (e.g., gender) into feature representations, we can provide better discriminability for face image retrieval [4].

Technology is ever evolving and with new devices, software's and encryptions being introduced every day, specialized software and hardware to keep up with it is also being produced at a rapid pace. Hence, the scope of the Face detection is vast and constantly requires new resources. Several new trends in the digital forensics industry involve new software for forensics over computers, PDA's, mobiles, decryption, crime analysis software, forensics over new devices and operating systems. Digital forensic investigations are performed in support of various objectives, including timely cyber-attack containment, perpetrator location and identification, damage mitigation and recovery initiation in the case of a crippled, yet functioning network. Smart phones are devices that not only let you make phone calls but offer Web access, applications, email and other technological advances not included with older cell phones. Smart phones are handheld mini-computers, and they offer individuals and businesses a way to stay connected while traveling.

II. RELATED WORKS

Alexis Mignon et.al, 2013 [3] describes the reconstructing faces from their signatures. Face matching technologies have become powerful enough to discover the links between people through faces and, thus, are able to aggregate the information scattered at different places. Such databases use and store face signatures as keys for organizing the data. R. Sureshkumar et.al, 2013 [8] proposed generates attribute-enhanced sparse code words to retrieve image from large image database. Main goal of system is to retrieve the image from large scale content based image retrieval. They give an image as input to retrieve the image to find the similar image. It shows that image retrieved from the large scale database. Dayong Wang et.al, 2011 [6] explained retrieval-based face annotation by weak label regularized local coordinate coding. This paper investigate the retrieval-based face annotation scheme by proposing a novel Weak Label Regularized Local Coordinate Coding (WLRLCC) technique to tackle the retrieval-based face annotation problem, which attempts to boost the annotation performance by a unified learning scheme, which exploits the local coordinate coding in achieving more effective features and makes use of the graph-based regularization to enhance the weak label simultaneously. Kalaivani.J et.al, 2014 [7] proposed scalable face restitution via attribute enhanced sparse code words. To balance global representations in image collections and locally embedded facial characteristics, they propose two orthogonal methods to utilize automatically detected human attributes to improve content Based face image retrieval under a scalable framework. Timo Ahonen et.al, 2010 [9] studied face recognition with local binary patterns. In this work, they introduced a new approach for face recognition which considers both shape and texture information to represent the face images. As opposed to the EBGM approach, a straightforward extraction of the face feature vector (histogram) is adopted in their algorithm. The face image is first divided into small regions from which the Local Binary Pattern (LBP) features are extracted and concatenated into a single feature histogram efficiently representing the face image. Yin-His kuo et.al, 2012 [11] addressed

unsupervised semantic feature discovery for image object retrieval and tag refinement. The primary contribution of the paper includes: Observing the problems in image object retrieval by conventional BOW model.

III. EXISTING SYSTEM

In this, face recognition was implemented using Feature Extraction. There is no secure way to auto fill user data and to store user data such as passport details, licence details etc. Existing user has to re-enter his/her details every time for registration or for login [10]. This system doesn't uses modern mobile technology so, it is not so user friendly because, no face detection technology is provided for user.

A. Drawbacks of Existing System

• Low customer satisfaction
• Existing system is not Cost Effective
• Less secure
• Held back technologically
• Not user friendly
• Difficulty in registering different website
• No advance mobile technology used

IV. PROPOSED SYSTEM

In the proposed system we designed an android application, Secure Me, which uses three types of authentication techniques: password authentication, pattern authentication, face authentication [4]. Secure Me is an application designed to work on the android based devices, which will give the user the power of creating an account in any websites without typing any details of his or her. The user will be able to manage their accounts with the details he provided. User can switch to any one of the authentication method. After successful login user can securely login to his/her email, Facebook and can send mail/can post on his/her wall post. Also another attractive feature is that user can Autofill his user details during the time of registration. Thus registration process is simplified and is easy for each and every web user [4]. User can store his important data's such as using face recognition system we designed an application on android based devices, which will give the user the power of creating an account in any websites without typing any details of his or her. The user will be able to manage their accounts with the details he provided .Using this app he/she can securely access to their registered application.

We use Eigen face approach for recognition of the images. The system performs by projecting pre extracted face image onto a set of face space that represents significant variations among known face images. Face will be categorized as known or unknown face after matching with the present database. If the user is new to the face recognition system then his/her template will be stored in the database else matched against the templates stored in the database passport details, driving license details etc with images.

A. Expected Advantages of Proposed System

• Authentication systems: Users should be able to authenticate using username and password.
• Authentication methods such as Face detection, pattern matching and password authentication are implemented.
• One time Registration.
• No use of any desktop software components: Clearly, it is preferable to avoid desktop software's and eliminate the related risks, effort and expenditure.
• Flexibility
• User interface: The user interface is simple and user friendly.

V. SYSTEM ARCHITECTURE

In this section, we provide a comprehensive architectural overview of the system, using a number of different architectural views to depict different aspects of the system. It is intended to capture and convey the significant architectural decisions which have been made on the system.

The face recognition procedure is divided into three steps: Face Detection, Feature Extraction, and Face Recognition. The main function of Face Detection step is to determine whether human faces appear in a given image, and where these faces are located at. The expected outputs of this step are patches containing each face in the input images. Initially, the camera device in the system takes the images for processing. After that

images are taken and are send to image grabbing system [4] .Image grabbing system uploads the image taken to the server .Now Image recognition system make the comparison with the current image taken and the saved images within the server. If the authentication is 90%- 100% then facial recognition is successful and thus user can login to the web application systems. If the authentication is 80%-90%, then the face detection system is unsuccessful and it doesn't permits user to login to the system. Thus a password authentication will appear.

A. Input design

The main objective that guide the input design are controlling the amount of input, avoiding errors in data, avoiding extra steps, keeping the process simple. The input for our project includes the various details assigned for the tasks that have to be performed. Secure me organize a secure way to login to your accounts, register user details on a single click, save your important data's with images, manage user registration, secure login with password/pattern/face detection, save your personal info such as passport details, license etc with image, secure and easy login to Facebook/Gmail.

B. Output Design

The main Objective that guides the output design are convey information about past activities, current status or projects of the future, trigger an action, confirm an action. Output for our project includes manage user registration, secure login with password/pattern/face detection, save your personal info such as passport details, license etc with image, secure and easy login to Facebook/Gmail.

VI. SIMULATION ENVIRONMENT

Java is used as a developing environment which is a programming language originally developed by James Gosling at Sun Microsystems (which has since merged into Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform. The language derives much of its syntax from C and C++ but has a simpler object model and fewer low-level facilities. The two principal products in the Java Standard Edition platform are Java Development Kit (JDK) and Java SE Runtime Environment (JRE). Eclipse IDE classic is used as a working environment. Eclipse is a multi-language software development environment comprising an Integrated Development Environment (IDE) and an extensible plug-in system. The Android SDK platform is made available fewer than one of the most progressive, developer-friendly open-source licenses, which gives mobile operators and device manufacturer's significant freedom and flexibility to design products.

TABLE 1
REQUIREMENTS SPECIFICATION

Software Requirements		Hardware Requirements	
Software	Version	Component	Minimum Requirement
JDK	1.7	Processor	64-bit, four cores
Eclipse IDE	Eclipse classic 3.3.2	RAM	1GB for developer or evaluation use
Android SDK	Android 2.2 platform	Hard disk	40 GB for system drive
SQLite	Version 3.7.6.3	Android Phone	4.0 OS or above

A. Data Flow Diagram

Data Flow Diagram (DFD) is an important technique for modelling a system's high-level detail by showing how input data is transformed to output results through a sequence of functional transformations. DFDs reveal relationships among and between the various components in a program or system. The technique starts with an overall picture of the business and continues by analysing each of the functional areas of interest. This analysis can be carried out to precisely the level of detail required. The technique exploits a method called top-down expansion to conduct the analysis in a targeted way. A business model comprises one or more data flow diagrams (also known as business process diagrams). Initially a context diagram is drawn, which is a simple representation of the entire system under investigation. This is followed by a level 1 diagram which provides an overview of the major functional areas of the business and is showed in figure 2.
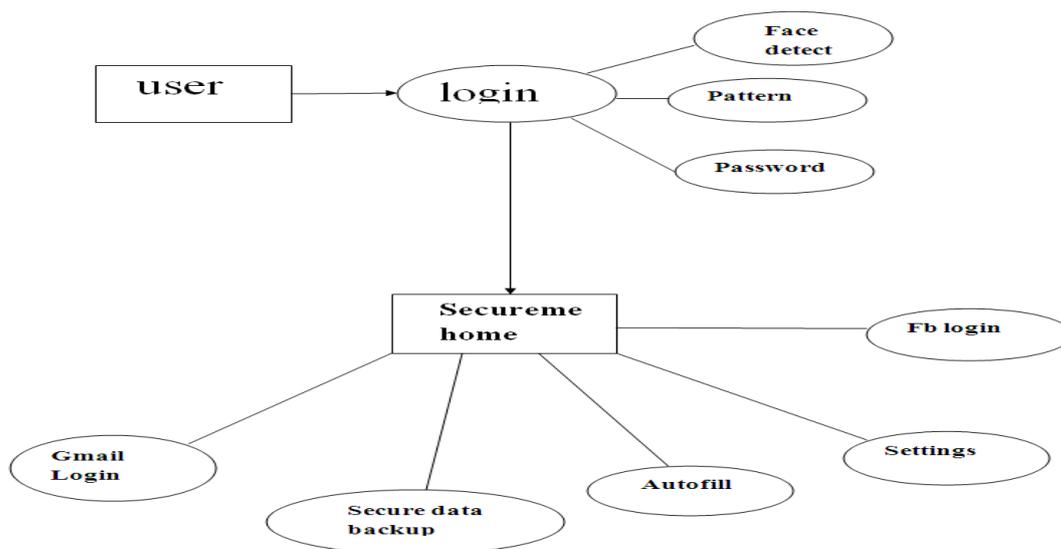
Fig. 2 Data flow diagram for Secure Me

Input output specification of our work is showed in table 2:

TABLE 2
INPUT OUTPUT SPECIFICATION

Module	Input	Process	Output
Login	Username/Password	Password Authentication	User Login To Home Page
Login	Draw Pattern	Pattern Authentication	User Login To Home Page
Login	Face	Face Detection	User Login To Home Page

VII. CONCLUSIONS

In this paper, we discussed an android based application i.e., Secure Me, which uses three types of authentication: password authentication, pattern authentication, face authentication for the user to manage their accounts with the details provided .Using this app he/she can securely access to their registered application on social website like Facebook/Gmail. As a future work, Secure Me includes the development of secure wallet in IOS & BlackBerry platforms. Also we will enhance the system with voice recognition system, advanced irish authentication and encryption technique to save user details.

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