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A Survey on Accessing Cloud Services in Social Networks

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Abstract— Recently, the social networks and social group's creation have become quite famous for user with significant results in sharing and collaborative communications between the group members. As well as, cloud computing and mobile computing platforms are the promising technology which is rapidly improving in now-a-days. Due to the increasing demand of the applications for computational power, energy and storage space, mobile technologies is recently drawing their attention to the cloud computing. To accomplish the advantages from these various developments together, an Android application named CroudSTag, which supports in designing social groups of common interest, from the mobile devices. These applications collects a set of pictures/videos from cloud storage, handling cloud services like the video processing and the face recognition from multiple cloud providers to identify the people from the media content, and supports in designing social groups and a well-known social network like facebook.

Keywords—Cloud Computing, Social Networks, Android application, Facial recognition, Middleware, Facebook, MapReduce.

I. INTRODUCTION

Social networks [1] have become more popular these days, with millions of members, from several countries and with different environments and curiosities. Facebook [2] and Twitter [3] are the most famous social networks of them, with respectively more than 800 million and 200 million active members. The number of users present in the network is a great opportunity to create business and professional connections around the world. People with similar interests in the social network can take benefits of the social network taking the advantages like creation of relationships, manage, referrals and public recognition the social capital. Social groups [4] also result in sharing and collaborative relationships between the users. For instance, a group of members developing in the same research area can collaborate with each other sharing ideas, knowledge and resources, etc. This helps in improving their common aims faster. At the same time, the cloud computing [5] platform has become very popular and has led to new business models and application opportunities such as intensive batch processing applications for business analytics, human activity recognition, collaborative tools, among others. Cloud computing is a approach of computing in which, typically, resources extendable on demand are supported "as a service (aaS)" over the Internet to the people who need not have knowledge of, control over or expertise in the cloud infrastructure which supports them. The support of cloud services occurs at the different levels and they are Infrastructure (IaaS) or Platform (PaaS) or at the Software (SaaS). The vast number of services provided in the cloud has become a commodity in people's day-to-day life. For instance, collaborative tools such as Google Docs and Zoho are extensively being used by millions of people around the world for document sharing. Similarly, thousands of pictures are being uploaded daily to cloud services such as Picasa or Flickr for sharing and storing media files. Likewise, services such as Google Maps and Bingo Maps enable the provisioning of location-based services.

However, a cloud service usually does not provide a rich functionality by its own. Several services are to be combined with each other to add a significant value for the user, pushing the mash-up idea. For example, by blending Google Maps and SoundCloud, a media file sharing service; it is possible to visualize the songs and tracks uploaded by a user in the geographical location where those media files were recorded/uploaded. Furthermore, the development of more complex and richer applications like foursquare [6] is only possible by blending several rich services like social network, location-based services, media files storage, IaaS. To sum up, a mash-up application is one that blends or mixes two or more services into a single application, combining data, presentation, and functionality, with the aim of enriching its functionality, improving the user experience, and adding more value for the user. Finally, the development of a mash-up application implies with easy and fast integration of different APIs and data sources into a single application.

Meanwhile, the mobile computing domain also has advanced rapidly and enabled the new generation of cloud based and context-aware mobile applications. Consequently, Clouds are looking proceed to the mobile domain, having their assumption concentrate in the idea of supporting the access and consumption of cloud services at the different levels from mobile devices. Nowadays, mobile devices are equipped with embedded sensors and input devices such as cameras, GPS, accelerometer, magnetic sensor, among others. Moreover, these new capabilities can also be combined with other

services and mash-up applications giving place to mobile mash-up applications. A mobile mash-up application not only blends into a single application several services but also uses the data gathered by embedded sensors and devices in order to enrich the mobile application. For example, foursquare uses the GPS sensor embedded in the device to determine the user's location and provide information about the services around. Similarly, Zompopo [7] is a human activity recognition application, which analyses the data collected by the accelerometer, for identifying the activities.

However, these new applications that rely on the cloud are only possible due to the recent enhancements in mobile devices. Improvements on hardware (memory, embedded sensors, touchscreen, power consumption, better ergonomic design, etc.), in software (more numerous and more sophisticated applications due to the release of iPhone [8] and Android [9] platforms), and in transmission (higher data transmission rates achieved with 3G and 4G technologies and ubiquity of Wi-Fi networks) have contributed toward having higher mobile penetration and better services provided to the customers. This has lead to the Mobile Cloud Computing (MCC) domain. Such a mobile cloud benefits applications from several domains like context-aware, social networks, productivity tools and biometrics. Decaf [10], a cloud resource management application, and Bakabs [11], a cloud based cluster estimation application based on load, which uses data from Google Analytics and linear programming techniques in the process, are clear examples of mobile applications accessing cloud services.

CroudSTag [22] is a mobile application implemented for Android devices, with the goal of supporting in the social group construction by means of facial recognition technologies and MapReduce [12] video processing. CroudSTag identifies the people who appear in media content such as pictures or videos and combines them together into a social group. For instance, assume a researcher who participate conferences around the world and has a set of media content (pictures and video files) of the user with whom he/she had cooperate at the event. The media files are apparently taken from his/her mobile itself and are stored on the cloud. The researcher later wants to create and keep contacts with his people known informally on the social network. He/she also needs to group them according to specific interest and would like to follow the groups directly from his/her mobile phone. The scheme can also be envisioned with any other type of the event or community that wants to keep its users in contact, something like alumni. More methods have been surveyed based on social networks which are being discussed in the following section.

II. METHODOLOGY

Extensive research has been managed in the computer vision domain during the past two decades, concentrating in face detection and facial recognition. These surveys have achieved huge improvements in the generation of algorithms and techniques for facial detection and recognition. However, they happens to be resource and time demanding and thus are not suitable for resource constrained devices like mobile phones.

For instance, Turk and Pentland [13] developed a framework for the identification and detection of human faces, which demands to work in near-real-time. The framework describes face as a two-dimensional set of characteristics and tries to identify a user by comparing his/her face characteristics to those which are already known. This approach has been broadly used in applications that rely in the detection and recognition of user using computer vision facilities. This technique treats face recognition as a two-dimensional recognition problem taking advantages of the face that the faces are normally upright and thus may described by a small set of 2-D fundamentals views. Face images are predicted onto a feature space that best encodes the variation among known face images. The face space is defined by the set of faces; they do not necessarily correspond to unique features such as eyes, ears and noses. The framework contributes the capability to learn to recognize new face in an unsupervised manner. However, such applications commonly need to be trained with large datasets demanding large amount of resources and time.

In Chang et al. [14] utilizes the cloud capabilities for creating an access security framework by means of facial recognition. They introduced a Hadoop cloud computing together with access security by using the fingerprint identification and face recognition. In Hadoop cloud computing is associated to serve plenty of mobile devices or thin clients using wired or wireless network. In fact a controller (master) may be linked to several nodes (slaves) to form a Hadoop cloud computing, where the cloud computing introduces the services like SaaS, PaaS, and/or IaaS. However, these approaches focus only in the detection and recognition, usually for authentication purposes, and they lack the social group formation capabilitieswhich is present in CroudSTag. Despite, the enhancements in the facial recognition techniques have improved the accuracy and the rate of detection; they are mostly applied in biometrics and security domains like in Chang et al. work. In contrast, CroudSTag aims the social group formation of people by processing media files via facial recognition.

Furthermore, Hadid et al. [15] proposes an authentication technique for authenticating users by means of facial recognition using mobile devices. It considers Haar-like [16] features with Ad-aBoost [17] for face and eye detection, and local binary pattern (LBP) approach for face authentication. In addition, it uses the facial recognition only for authentication purpose and the process occurs locally in the mobile device. Similarly, Ijiri et al. [18] try to solve the security and usability issues that arise when the mobile devices store private information from the user such as payments, back accounts and credit cards, personal pictures. They propose an authentication mechanism that uses the camera embedded in the device for taking a picture of the user that is analysed with the help of facial recognition techniques. Even though, Ijiri's and Hadid's work have proved to be effective, their purpose is distinct from CroudSTag's aim. Besides, the social group formation by means of composition of cloud services at IaaS and SaaS level is characteristic that truly distinguishes CroudSTag from other applications.

In March et al. [19] introduces μ-Cloud, a framework for building rich mobile applications based on composition of cloud services. They have shown that rich mobile applications can be achieved through the convergence

of mobile and cloud computing. They addresses two main drawbacks in cloud-enabled mobile applications, namely offline usability and complexity of application development. We then propose μ-Cloud framework which models a rich mobile application as a graph of components distributed onto mobile devices and the cloud. Lastly, we discuss μ-Cloud's major research drawbacks, i.e., offline usability, workflow language for interactive applications, secure and scalable multi-tenancy, energy optimization and portability. However, the work does not clarify how the framework scales under heavy workloads neither how it handles the authentication across the different cloud services. In addition, μ-Cloud proposes a facial recognition application; however, it is restricted to detect faces and compare them against a reduced repository of known faces.

Facial recognition technologies [20] are one of the most promising features for the mobile users. There have been more attempts to combine the facial recognition capabilities to mobile devices. Some manufactures such as Sony Ericsson incorporated the feature in its model X10 [21] the "Recognizer" application. This application enables the user to take a picture using the camera and to recognize people present in the picture. It stores the pictures locally in the device and only recognizes people who are present in the contacts list and have a list of picture identified. However, it inadequacy provides the opportunity to search people in the social networks or take benefits of cloud technologies, and finally overloads the storage resources of the phone with the pictures taken.

TABLE 1: COMAPRISON ON ACCESSING CLOUD SERVICES IN SOCIAL NETWORKS

Ref No:	***Methodology***	***Pros***	***Cons***
Turk and Pentland [13]	***Eigen values for recognition***	***Ability to adopt over time.***	***Large amount of time and resource for large datasets.***
Chang et al. [14]	***Identification on fingerprint and face in Hadoop***	***High efficiency access security.***	***Lack the social group formation capabilities***
Hadid et al. [15]	***Face and eye detection***	***High performance for authentication.***	***Require high hardware cost for combining several modalities***
Ijiri et al. [18]	***Facial recognition techniques***	***Solve the security and usability issues.***	***Not effective for social group formation.***
March et al.[19]	***μ-Cloud framework for social face recognition application***	***Secure and scalable multi-tenancy, high portability and energy optimization***	***High overhead***
Dominik et al. [20]	***pattern recognition***	***Computational complexity is less***	***Lacked the opportunity to search people in the social networks.*** ***Overloads the storage resources.***

III. CONCLUSION

In the above survey various Facial recognition technologies and social network has been discussed. The approaches mentioned above are eigenvectors, face recognition, face and eye detection, fast face tracking using parallel particle filter algorithm, Hadoop system for mobile devices and face recognition application by means of composition of basic cloud services has been discussed. Each of the above surveyed methods proves and shows better in some categories and not in other categories. In order to give better performance in face recognition proposed method CroudSTag outperforms in face recognition and social network rather than surveyed methods. We are also interested in adapting the CroudSTag application to specific application domains and user communities. For instance, we are in the process of extending the application, to support the researchers to finish their publication activities, such that the application can be accessed by the researcher for tracking his research from beginning to the end. The extended application will have

support to store the files, keeping track of their versions, storing the presentations and talks at the conferences in the form of videos, and notifying people about the forthcoming conferences and deadlines.

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