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Cloud Vision Using MOCHA Architecture on Jelastic Cloud

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Abstract— ***face recognition applications that automatically identify an individual from captured images or Videos are everywhere and are used for applications such as surveillance, airport security, military enforcement, and edge detection. Face recognition algorithms analyse images, extract information such as the shape, size and position of the facial features (e.g., eyes, nose, mouth), and then use these extracted features to search a facial database to locate matching images. We design and implement face Recognition application using Mobile cloudlet cloud architecture on Jelastic cloud where we make use of highly powered cloudlets which are technically feasible and help in reducing the overall processing time.we use Android phones as our main mobile device as a client and cloudlet and cloud as a server.***

Index Terms— **Cloud computing, Cloudlet, Mobile, Face Recognition, Face Detection.**

I. INTRODUCTION

In this paper we are using the three latest technologies like image processing, cloud computing and we talk about the performance of the application which involves networking. Face recognition application which automatically identifies the captured image with the image in the template element of a database. Another trend is the excess of lightweight mobile devices such as smartphones, tablets and laptops. Smartphones are used to store, generate and share multimedia data. These lightweight mobile devices are increasing because of its more processing power, storage and sensing capabilities. Another trend is the cloud computing the delivery of computing services over the Internet. Cloud services allow individuals and businesses to use software and hardware that are managed by third parties at remote locations... Cloud computing provides a shared pool of resources, including data storage space, networks, computer processing power, and specialized corporate and user applications[2][3][4].This paper describes our work with the design and implementation of face recognition using mobile cloudlet cloud architecture on the Jelastic cloud [7]. We use smartphones as our main mobile device to capture images and to forward them to the cloudlet; the cloudlet performs computation on the received images and finds matching images from the database in collaboration with the cloud.

Proposed System

The motivation of proposed system is to utilize a mobile-cloudlet-cloud framework and develop algorithms that minimize the overall response time for face recognition based on estimated communication latencies and processing powers of the cloud. To demonstrate that high-powered cloudlets are technically feasible and provide benefit to mobile device face recognition applications, among others. To the best of our knowledge, no prior work has yet shown this in large-scale with specific architectures, algorithms. The rest of the paper is organized as follows: Section II describes MOCHA architecture. Section III describes face recognition in MOCHA.Section IV concludes the paper.

II. MOCHA ARCHITECTURE

Some applications might never be feasible from mobile devices, due to the high latency. As a result for this mobile face recognition problem, we propose the MOCHA architecture, illustrated in Figure 1.[7].

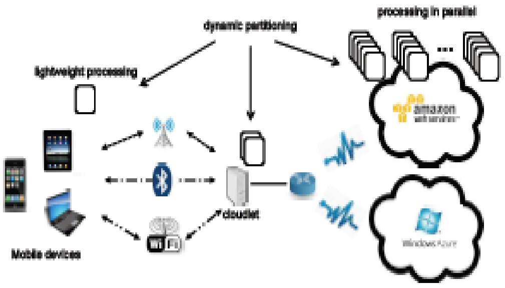

Fig. 1. The MOCHA Architecture: mobile devices interact with the cloudlet and the cloud via multiple connections and use dynamic partitioning to achieve their QoS goals (e.g., latency, cost).

The components of MOCHA architecture are described below:

A. Mobile

Mobile devices like smart phones are connected to cloud via cloudlet. We use smartphones as our main mobile device to capture images and send them to the cloudlet in raw form for pre-processing. Thus pre-processing of the image, either at the mobile device or at the cloudlet is necessary. Once after face recognition is completed, the mobile device receives the results back from the cloudlet or directly from the cloud.

B.Cloudlet

Cloudlets are decentralized and widely-dispersed Internet infrastructure whose compute cycles and storage resources can be powered by nearby mobile computers. Cloudlet, a dedicated server which is designed for commodity hardware supports multiple network connections such as 3G/4G, Bluetooth, WI-Fi and Internet. The cloudlet determines how to partition the computation among itself and multiple servers in the cloud to improve the overall quality of service based on the QoS metrics like latency and cost. Cloudlet, a local device which provides 100 to 1000 time's higher computational power with minimal latencies, creates possibilities for running latency sensitive and computationally-intensive applications such as face recognition from a mobile device. In our architecture, the cloudlet is a special-purpose inexpensive compute-box with the capability of massively parallel processing.

C.Cloud

In our system, a client program running on the cloudlet sends a request to the servers on Jelastic cloud where the actual program runs on virtual instances in parallel, and the results are sent back through the cloudlet to mobile device. Jelastic Cloud which is open Source cloud helps in providing complete Iaas, Paas and we are using SaaS in the cloud.

III. FACE RECOGNITION IN MOCHA

Cloud vision is executed in two separate phases**:** 1.Face Detection. 2. Face Recognition**. Face Detection**: given an arbitrary image, the goal of face detection is to determine whether or not there are any faces in the image and if present return the image location and extent of each face.it uses the viola jones algorithm for face detection [1]. 1. **Knowledge-based method:** These rule–based methods encode human knowledge of what represent a characteristic face. Usually, the rules describe the relationships between face features. These methods are designed mainly for face identification. 2. **Feature in-variant approaches**: These algorithms aim to find out the eye, point of view, or light conditions, and designed essentially for face localization. 3. **Template matching methods:** Several standard patterns of face recognitions are independently. The connection between the input image and the stored images are computed for face detection. These methods have been used for both face recognition and detection. 4. **Appearance-based methods:** this method contrast to template matching the models is learned from a set of training images should capture the representative variability of facial appearance. These methods are then used for detection. These methods are mainly intended for face detection.This process determines the potential locations of the human faces within an image. We have utilized the Haar Features and Haar Classifiers described in [8] to perform face detection. This approach begins with classifiers that group potential face candidates based on a small number of features. These simple classifiers have low computational complexity but must operate on a large amount of data, and they produce a large number of face candidates. The algorithm then eliminates some of these candidates by using increasingly more sophisticated classifiers based on additional features, such that the final stage outputs the detected faces with high confidence.

Face recognition: Recognition is comparing the captured face to other faces that have been saved and stored in a database. The face recognition phase determines the match-likelihood of each face to a template element from a database. The potential locations of the faces determined in the previous face detection phase are fed into this phase for recognition. We have used the widely-accepted Eigen faces algorithm [6]. The recognition algorithm yields one of a few potential results for each face candidate determined (1) not a face, (2) a face, but not in the database, and (3) a face and in the database.it use Eigen faces approach [7],which calculates an orthogonal set of M Eigen faces for a given training set of N faces, where M <= N. Thus each face from the original N faces can be represented as a point within the M dimensional space spanned by the M Eigenfaces. This permits a significant reduction in the amount of computation that has to be performed to recognize a face within a given database, as well as a significant reduction in the amount of storage required for the template images. To recognize a face, the algorithm simply transforms the face into a point within the M-dimensional space spanned by the Eigenfaces and calculates the Euclidean distances between the point of the face to be detected and the points of all template faces from the database. If the Euclidean distance is above a large threshold, the algorithm determines that the potential face is actually not a face (outcome (1)), meaning that the detection algorithm yielded a false positive. Otherwise, if the Euclidean distance is above a small threshold to all the template faces, the algorithm determines that the face is not in the database (outcome (2)). In this case, if desired, this face can be added to the database by re-calculating the Eigenfaces and the Eigenfaces representation of the newly introduced face and updating the databases of all the cloud servers. If the Euclidean distance to one of the template faces is below a small threshold, the algorithm detects a match for the face (outcome (3)).

IV. SUMMARY AND CONCLUSION

This paper discusses about the response time achieved by face recognition application using mobile cloudlet cloud architecture on Jelastic cloud. This paper is also focused on our application which is more realistic and ready to work on any cloud world. Mocha is helping to reduce the response time and sending response to client instantly. Cloudlet is a key point for the communication in MOCHA which uses multiple instances for the web server and virtual memory and do face detection jobs. We are setting MOCHA architecture using Jelastic Cloud which is open Source cloud. Jelastic cloud is providing complete Iaas, Paas and we are using SaaS in the cloud. This Application can be deployed for Private Cloud also. Our application is more efficient for the communication using Facial Recognition concept in the cloud server Cloudlet helps in reducing processing time and responsible for Face Detection in the project. This project will be used in any security application.

REFERENCES

[1] Ming-Hsuan Yang, David Kriegman, and Narendra Ahuja, “Detecting faces in images : A survey,” IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 24, no. 1, pp. 34–58, 2002.

[2] Amazon,“ Amazon Web Services(AWS),” http://aws.amazon.com.

[3] Microsoft, “Windows Azure,” http://www.microsoft.com/windowazure.

[4] Google, “Google App Engine,” http://code.google.com/appengine.

[5] T. Soyata, R. Muraleedharan, J. H. Langdon, C. Funai, M. Kwon, and W. B.Heinzelman, “Mobile cloud -based compute/communications infrastructure for battlefield applications,” in SPIE Defense, Security, and Sensing 2009. Modeling and Simulation for Defense Systems and Applications VII. 2012, vol. 8403, SPIE.

[6] Matthew Turk and Alex Pentland, “Eigenfaces for recognition,” Journal of Cognitive Neuroscience, vol. 3, no. 1, pp. 71–86, 1991.

[7] Tolga Soyata , Rajani Muraleedharan , Colin Funai , and Minseok Kwon†, Wendi Heinzelman□] “Cloud-Vision: Real-time Face Recognition Using a Mobile-Cloudlet-CloudAccelerationArchitecture”978-1-4673-2713-8/12/$31.00 ©2012 IEEE.

[8] Paula Viola and Michael J. Jones, “Robust real time face detection,”in Second International Workshop on Statistical and Computational Theories of Vision - Modeling, Learning, Computing, and Sampling, July 2001, pp. 1–25.