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Mobile Cloud Computing

Thesis

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For the M.Sc. Degree in Electrical Engineering
(Computer and Systems)

By

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STATEMENT

This thesis submitted as partial fulfillment of master degree in electrical engineering, Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or qualification at any other scientific entity.

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Thesis Summary

Mobile Cloud Computing is emerging as one of the most important branch of mobile computing. The quick increasing of mobile devices usage and explosive growing of the mobile applications are facing many challenges in their resources as low computing power, battery life, limited bandwidth and storage.

Mobile Cloud Computing (MCC) has been introduced to solve the mobile resources problem by moving the processing and the storage of data out from mobile devices to the cloud. MCC gives the availability to develop real time applications with high computational power and huge storage as face detection and recognition applications. Law enforcement agencies are using face recognition software as a crime-fighting tool.

The development of parallel computing is increasing both speed and accuracy of parallel algorithms such as facial detection algorithm. Graphics Processing Unit (GPU) is a massively parallel device which has the capability of processing large amounts of data required to perform the detection tasks very quickly. Speedups are obtained by exploiting the independent data calculations and executing them in parallel on the GPU. The GPU implementation improves the application speedup by 9times versus CPU.

However, security and privacy is one of major challenges that impeded MCC from being widely adopted. Constrains are originated from moving and storing sensitive data in the cloud. Chain Security Mechanism (CSM) is the proposed security system to provide a secured access control for data storing and processing in the cloud.

The aim of this work is providing a complete module for secured mobile cloud computing with face recognition real time application.

This thesis gives explanation of MCC definition, Builds private cloud with Open Source Cloud OS, develops face recognition as MCC application with presenting the face detection and faces recognition algorithms increases the processing speed by using the algorithm parallelization technique and GPU accelerated computing.

At the end, this thesis provides the security mechanism CSM by taking in consideration the different component of MCC.

The results demonstrate that the proposed architecture is promising for real-time mobile cloud computing application with speedup 40 times compared to mobile application and offering secured mobile cloud computing by minimize security management overhead and reducing the mobile cloud threats and attacks.

Key words:

Mobile Cloud Computing; Cloud Computing; Open Source Cloud OS; Openstack; Openshift; Client Server communication; Web Services; Image processing; face Detection ; face Recognition, cloud security, data encryption and decryption.

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TABLE OF CONTENTS

LIST OF FIGURES	xiii
LIST OF TABLES	xv
LIST OF ABBREVIATIONS	xvi
Chapter 1	17
Introduction.....	17
1.1 Research Scope	17
1.2 Research Contributions	18
1.2.1 Introducing Cloud Computing and Mobile Cloud Computing	18
1.2.2 Developing Mobile Cloud Computing Application.....	18
1.2.3 Enhancing Mobile Cloud Computing Application Using GPUs	18
1.2.4 Propose New Security Mechanism for Mobile Cloud Application	19
1.3 Thesis Organization.....	19
Chapter 2.....	21
Cloud Computing.....	21
2.1 Introduction	21
2.2 Cloud Computing Definition.....	21
2.3 Characteristics of Cloud Computing.....	22
2.4 Service models of Cloud Computing	22
2.5 Deployment Models of Cloud Computing.....	24
2.6 Advantage of Cloud Computing	25
Chapter 3.....	27
Build Private Cloud.....	27
3.1 Introduction	27
3.2 Reason of Building Private Cloud.....	27
3.3 Infrastructure Categories for Private Cloud	28
3.3.1 Virtualization	28
3.3.2 Storage	30
3.3.3 Security	32
3.3.4 Provisioning:	33
3.4 Infrastructure-as-a-Service Open Source Software:.....	33
3.4.1 CloudStack.....	34
3.4.2 Eucalyptus.....	35

3.4.3	Ganeti	37
3.4.4	OpenStack	38
3.4.5	Component Comparison for Open Source Private Cloud (IaaS) Platforms	40
3.5	OpenStack Instillation:	41
3.5.1	Installation Prerequisites	41
3.5.2	Create Ubuntu VM over VirtualBox.....	42
3.5.3	Install Openstack Using Devstack	44
3.5.4	Openstack Dashboard	47
3.5.5	Create windows and Linux Instances over OpenStack.....	49
3.6	Platform-as-a-service Open Source Software:	53
3.6.1	Openshift.....	54
3.6.2	Comparison for PaaS Software	54
3.7	Openshift Instillation steps over OpenStack:	55
3.8	Software-as-a-service Cloud Service	58
3.8.1	Application deployment over windows Openstack instance	58
3.8.2	Application Deployment over Openshift	59
3.9	Experiment	60
3.9.1	Experiment (1) Deployment application on IaaS vs PaaS	60
Chapter 4		63
Mobile Cloud Computing		63
4.1	Introduction	63
4.2	Mobile Cloud Computing Definition	63
4.3	Other Definitions of Mobile Cloud Computing	64
4.4	Advantage of Mobile Cloud Computing.....	65
4.5	Mobile Cloud Computing Architecture.....	67
4.5.1	Architecture of Mobile Cloud Computing:.....	68
4.6	Clients Sever Communication.....	69
4.6.1	Communication Protocol	69
4.6.2	Communication Way	70
4.6.3	Client Server Communication Way Comparisons	72
4.7	Approaches of Implementing Mobile Client Application.....	73
4.7.1	Comparison between Native and Pure Embedded Browser Applications..	73
4.7.2	Implementations of Native Mobile Application	74
4.8	Experiments.....	77

4.8.1	Experiment (2): Sending Multiple Service Requests From Different Mobile Client Platforms.	77
4.8.2	Experiment (3): Sending single service request from different mobile client platforms to different cloud structures.	78
Chapter 5		80
MCC Face recognition		80
5.1	Introduction	80
5.2	Mobile Cloud Computing Applications	80
5.2.1	Typical MCC Applications	81
5.3	Face Detection and Recognition Algorithms	82
5.3.1	The Difference between Face Detection and Face Recognition:	82
5.3.2	The Algorithms Used For Face Detection and Face Recognition:	82
5.4	Haar Cascade Classifier Faces Detection:.....	82
5.4.1	Integral Image	83
5.4.2	Calculate The Rectangular Value:	84
5.4.3	Haar Feature:.....	84
5.4.4	Face Detection Cascade Stage	86
5.5	Face Detection Algorithm Implementation:.....	87
5.5.1	Flow Diagram of Face Detection	87
5.5.2	Pseudo Code of Face Detection Application	88
5.5.3	Skin Color Filter Face Detection Enhancement.....	92
5.6	Eigenface Recognizers	93
5.6.1	Eigenfaces Initialization Stage.....	94
5.6.2	Eigenfaces recognition.....	95
5.7	Face Recognition Algorithm Implementation:.....	96
5.7.1	Pseudo Code of Face Recognition Application	96
5.8	Mobile cloud Computing Face Recognition Application	100
5.8.1	Application structure summary	100
5.9	Face Detection CPU multiple thread.....	102
5.9.1	Integral image parallelization:	102
5.9.1	Face Detection Threading Parallelization:.....	103
5.10	Experiments	104
5.10.1	Experiment (4): Evaluate Face Detection Algorithm Accuracy with and without Skin Filter	104

5.10.1 Experiment (5): Evaluate Face Recognition MCC Application in Different Cloud Structures.....	105
5.10.2 Experiment (6): Evaluate Face Detection Application In Mobile Device And Different Cloud Structures.	106
5.10.3 Experiment (7): Evaluate Effect of Multiple Thread Face Detection Application.....	107
Chapter 6.....	109
MCC Face Detection GPU Acceleration	109
6.1 Introduction	109
6.2 Graphics Processing Unit GPU	109
6.2.1 GPU Accelerated	110
6.2.2 CPU Vs GPU	110
6.3 NVIDIA CUDA	111
6.3.1 CUDA Architecture	111
6.3.2 CUDA Program	112
6.4 Viola & Jones Object Detector.....	113
6.4.1. GPU Accelerated Opencv (Face Detection) Implantation.....	113
6.5 Experiments.....	114
6.5.1 Experiment (8): Face Detection Performance Comparisons between GPU Vs. CPU.	114
6.5.2 Experiment (9): Face Detection mobile Vs. CPU Cloud Vs.GPU Cloud.	115
Chapter 7.....	117
Chain Security Mechanism	117
7.1 Introduction	117
7.2 Issues in Mobile Cloud Computing.....	117
7.3 Mobile Cloud Computing Security:	118
7.3.1 Mobile Cloud Computing Security Risks:	119
7.3.2 Mobile Cloud Computing Security Layer:	119
7.3.3 Mobile Cloud Computing Security Module:	120
7.3.4 Mobile Cloud Computing Security Platform:	120
7.4 Encryption and Decryption	121
7.4.1 Encryption and Decryption Definitions	121
7.4.2 Types of Cryptography	121
7.4.3 Symmetric Versus Asymmetric Algorithm	122
7.4.4 Symmetric Algorithms.....	122

7.4.5	Asymmetric Algorithms.....	123
7.5	Chain Security Mechanism (CSM) Approach	123
7.5.1	Chain Security Mechanism Goal	124
7.5.2	Chain Security Mechanism General Approach.....	124
7.5.3	Chain Security Mechanism for Application Platform	125
7.5.4	Chain Security Mechanism for Data Platform.....	126
7.6	Experiments.....	127
7.6.1	Experiment (10): Symmetric and Asymmetric Performance.....	127
7.6.2	Experiment (11): Chain Security Mechanism Overhead	129
Chapter 8		132
Conclusion and Future Work		132
8.1	Conclusion.....	132
8.2	Future Work	133
Appendix A – Summary of hardware and software specifications required for Cloud, application and mobile Clients		134
References		137

LIST OF FIGURES

Figure 2.1 Cloud Service Models [2].....	23
Figure 2.2 Cloud Service Models Management Layers [3].....	23
Figure 2.3 PaaS Cloud Layer	24
Figure 2.4 Cloud Deployment Models [4].....	24
Figure 3.1 Bare-Matal (un-Hosted) Hypervisors	29
Figure 3.2 Hosted Hypervisor.....	29
Figure 3.3 Data Disk Array.....	31
Figure 3.4 Virtual Firewall	33
Figure 3.5 Private Cloud OS	34
Figure 3.6 CloudStack Components [23]	34
Figure 3.7 Eucalyptus Components [24]	36
Figure 3.8 Openstack Component [26].....	39
Figure 3.9 Create Ubuntu VM on Virtual Box	44
Figure 3.10 Devstack	45
Figure 3.11Openstack instance [25]	49
Figure 3.12 Import instance Image to Openstack	50
Figure 3.13 Security Group.....	51
Figure 3.14 Add Rules to Security Groups	51
Figure 3.15 Create Keypair.....	52
Figure 3.16 lunching Instance.....	52
Figure 3.17 Experiment (1) JSON Result	60
Figure 3.18 Experiment (1) Graph.....	61
Figure 4.1 Mobile Cloud Computing [30].....	64
Figure 4.2 Local Mobile cloud computing	64
Figure 4.3 Cloudlet Mobile cloud computing.....	65
Figure 4.4 Mobile Cloud Computing Component	68
Figure 4.5 Cloud computing architecture [35].....	69
Figure 4.6 Remote Procedure Call.....	70
Figure 4.7 Proposed native mcc application module	75
Figure 4.8 Mobile Cloud Application Flow Diagram.....	75
Figure 4.9 Mobile Cloud Web Service Pseudo Code	76
Figure 4.10 Different Cloud Platform response time graph	79
Figure 5.1 Integral Image Generation	83
Figure 5.2 Rectangle Value Calculation	84
Figure 5.3 Haar-like features	85
Figure 5.4 Apply Haar Feature on training face	86
Figure 5.5 Face Detection Cascade Stage.....	87
Figure 5.6 Flow Diagram of Face Detection	88
Figure 5.7 Pseudo Code Calculate Integral Image.....	89
Figure 5.8 XML Satge Description.....	90
Figure 5.9 XML Feature Description.....	90
Figure 5.10 Pseudo Code Read Haar-like features	90
Figure 5.11 Pseudo Code For Apply feature Classifier on Integral Image.....	91
Figure 5.12 Face Detection Generated Image.....	92

Figure 5. 13 Face Detection Input Image.....	92
Figure 5.14 Pseudo Code of Skin Color Filter.....	93
Figure 5.15 Database Images (Training Set)	94
Figure 5.16 Eigenfaces Initialization and Recognition.....	96
Figure 5.17 Intensity Image For Training Set Pseudo Code.....	97
Figure 5.18 Obtain Main Image Pseudo Code.....	97
Figure 5.19 pseudo code of the eigenvectors and eigenvalues Calculation.....	98
Figure 5.20 Test image transfer into its Eigenface	99
Figure 5.21 Test Image weight comparison with training set.....	100
Figure 5.22 Mobile cloud Computing Face Recognition Application Flow Diagram ...	101
Figure 5.23 Mobile cloud Computing Face Recognition Application Interface	102
Figure 5.24 Original Image Data on Left and Integral Image on Right	103
Figure 5.25 Integral Image Parallel Computing of Rows	103
Figure 5.26 Integral Image Parallel Computing	103
Figure 5.27 Face Detection threading Parallelization.....	104
Figure 5.28 Experiment (5) MCC Face Recognition Application Result.....	106
Figure 5.29 Experiment (6): Face detection Mobile App Vs Mobile Cloud App	107
Figure 5.30 Experiment (7): Effect of Multi-threading	108
Figure 6.1 Simple Architecture For CPU and GPU [55].....	110
Figure 6.2 CUDA Grid layout [55].....	112
Figure 6.3 CUDA program flow	112
Figure 6.4 OpenCv GPU Face Detection Implementation	114
Figure 6.5 Experiment (8) Face Detection CPU vs GPU	115
Figure 6.6 Face Detection Mobile vs. Mobile cloud	116
Figure 7.1 MCC Privacy and Security.....	120
Figure 7.2 Data Processing model	121
Figure 7.3 Data Sharing Model.....	121
Figure 7.4 Sequence Diagram For CSM Application Platform.....	126
Figure 7.5 Sequence Diagram For CSM Shared Data Platform	127

LIST OF TABLES

Table 3-1 Virtualization Application	30
Table 3-2 Comparison Between Private Cloud OS	40
Table 3-3 Installing Openstack Steps	45
Table 3-4 Openstack Dashboard Access Sreen	47
Table 3-5 Windows And Ubuntu Instance.....	53
Table 3-6 Platform-as-a-service Software comparison.....	54
Table 3-7 Openshift Intallation Over Openstack	56
Table 3-8 Application deployment steps on windows Openstack instance.....	58
Table 3-9 Application deployment on Openshift.....	59
Table 3-10 Experiment (1) Result.....	61
Table 4-1 comparisons between client server communication ways	72
Table 4-2 Comparison between Native and embedded browser Mobile application	73
Table 4-3 Request and Parsing Time Android and Blackberry	77
Table 4-4 Different Cloud Platform response time.....	79
Table 5-1 Face Detection & Recognition Algorithms	82
Table 5-2 Face Detection features Stages	87
Table 5-3 Experiment (4) Skin Color Face Detection Enhansment Result	104
Table 7-1 Mobile Cloud Computing Issues [59]	118
Table 7-2Experiment (10) RSA different Plaintext Size Encryption Result	128
Table 7-3 Experiment (10) AES different Plaintext Size Encryption Result	128
Table 7-4 Experiment (11) Chain Security Mechanism Overhead Results	130