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QOS MANAGEMENT SYSTEM FOR MOBILE CLOUD

J.Selvin Paul Peter[*1] & Dr. G. Mahadevan[2]
[*1]Research Student, AMCRC
[2]Professor, AMCEC, Bangalore

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ABSTRACT

The rapid innovation of technology in smartphones, increase the no of people using internet using a smartphone. Cloud computing is shifting the mode of data usage. Thereby having an effect on mobile usage. Cloud computing is viewed as the prospect of Internet services. Cloud computing faces a lots of obstacles, among it the prime concern is Quality of Services (QoS), how a mobile service provider can ensure quality of service, for its users. As a result of this here, we provide a QoS management system for Mobile Cloud Computing using QOS aware algorithm for MCC taking in to consideration QoS factors such as Bandwidth, battery life, latency, computational power, packet loss ratio, etc. Using Simulation, we calculate the efficiency of the planned system

KEYWORDS: Cloud Computing, internet services, Bandwidth

I. INTRODUCTION

Devices such as Mobile phones, Smartphones, Tablets are becoming a vital part of human life Efficient communication tools, that are not constrained by location and mobility. Smartphone users receive services from lot of mobile applications that run on these devices. The advent of MCC, delivers services for mobile users irrespective of location at a faster rate and highly secure manner. However, these devices are facing obstacles (e.g.: power, memory and bandwidth) and communications (e.g.: mobility) [1].

These challenges adversely reduce quality of these services. MCC faces a number of obstacles both at server end and client end such as architectural issues, Energy efficiency, Context relevant issues, security, privacy and the most important of them all is QoS i.e., how service provider ensure QoS for its users.MCC is the infrastructure where both the data is stored and processed in location outside the mobile. Cloud computing brings new services which mobile users can take advantage.

II. RELATED WORK

The research work on cloud computing can be catergorised as cloud computing platforms, middleware prototypes, cloud services, security, and resource administration [2]. Among all, QoS is the main challenge. Some of the current work that focuses on QoS-aware services. Dezhong et al[3] proposes using crowdsourcing to provide QoS for Mobile Cloud Computing. Lodi et al [4] proposes a framework for implementing SLA-motivatedgrouping of QoS-aware application servers. Wang et al [5] proposes an adaptive QoSadministrationarchitecture for VoD cloud service . Ye et al [6] proposesaarchitecture for QoS and energy administration in an management cloud with cell phones. Some work concentrate on instruments for QoS administration in distributed environment. Li [7] proposed an adaptableadministration of imaginary resources in cloud computing using report control. Xiao [8] proposed a reputation-based QoS provisioning in cloud computing.Karamoozian et al [9] proposes a resource allocation scheme in MCC based on Learning Automata technique based on response time, level of uncertainity and computational capacity. Kamel et al [10] proposes a precise Qos model based on early detection of performance degradation on client side Still, there exist minimal work widely and openly supporting both QoSfactors and QoSaccess modes as importantfactors for runtime QoSguarantee. cloud security, and resource management.

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III. QOS-MANAMENTSYSTEM

1. System Framework

Fig 1 depicts QoS for mobile cloud computing.In a mobile device, a QoS agent observes the QoS status when the system runs ,e.g.,memory needed and CPU access, connectivityrate, battery power and packet dropped, etc. The QoS status will be provided to QoSadministration in cloud side. The QoSadministration center combines and measures the huge set of QoS details, and vigorously alters resources to meet QoSdemands of each mobile cloud agent.

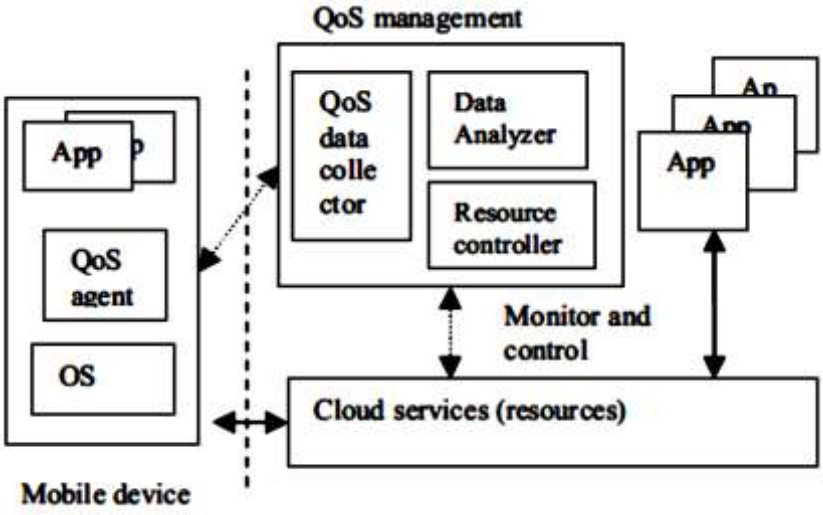

Fig 1. QOS Architecture for Mobile Cloud Computing

In lightof the QoS administration system, we apply a few methods of versatile cloud services. Each service contains numerous administrations, components and setup plans. A cloud access mode is a particular setup to ensure the QoS necessities for a cloud access. Remarkably, the portable distributed computing stage can give different likewise worked administrations that can fulfill the request of an incorporated administration. Particularly, the QoS prerequisites of an administration can be guaranteed by choosing appropriate administration model.

2. QoS management process

Fig 2 showsQoS management processor for cloud access.This model, QoS Prediction is an instrument to foresee execution of an arrangement of cloud access modes before choosing an administration mode. Mode determination is a component to choose the best administration mode in view of past forecast. QoS Assessor is a component to screen and evaluate the QoS status as per clients' QoS prerequisites. For the QoS prerequisites of an administration, the QoS esteems can be anticipated by accepting an administration mode as chosen. In view of forecast comes about, an administration mode can be chosen and made as framework design. The QoS appraisal component assesses the QoSby checking the execution of the cloud benefit.

As indicated by the evaluation, the framework modifies all thefactors of QoS control model to reflect genuine status. The alteration takes place if the assessment value is beneath an edge that is characterized by clients. The procedure keeps running to accomplish the self-adjustableQoS administration in the dynamic portable cloud condition. Specifically, the QoS administration bolsters setting mindfulness by adaptively choosing an appropriate arrangement of administration modes that can simply guarantee the nature of cloud administrations.

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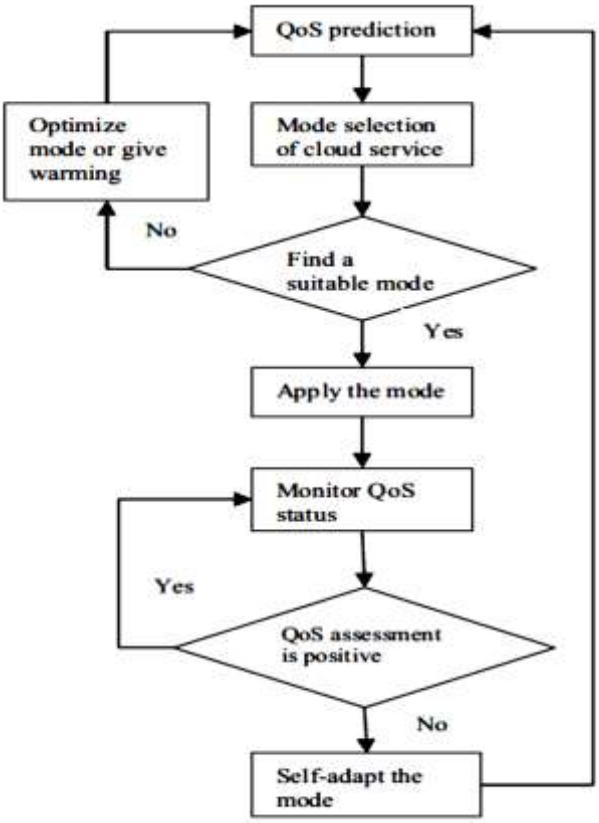

Fig 2 : QOS Management Processor

3. Proposed Algorithm

Aim of the proposed algorithm is to assess the cloud access modes (AMj) given by different cloud access providers based of different QoS factors and select the QoS ensured benefit modes for conveying administrations to customers. The calculation utilizes seven QoS factors, for example, broadcast rate, delay, price, data transfer capacity, effeciency, jitter and movement to investigate the client's prerequisite for giving quality administration. All the QoSfactors are explained below

Step 1: Obtain the QoS factors
Step 2: Estimate the failing result of signal power and hand-off of the mobile phone to measure the movement of all Access modes AMj.
Step 3: Estimate the spacefrom user to every access modes AMjdepending on the movement.
Step 4: Create a quality vector z(AMj) for each QoSfactors for all the access modes AMj.
z(AMj) = { zBR(AMj), zPLR(AMj), zBW(AMj), zPri(AMj), zrel(AMj), zal(AMj), zmoby(AMj) }

$$\mathbf{Z_{nx7}} = \begin{bmatrix} Z_{11} & Z_{12} & Z_{13} & Z_{14} & Z_{15} & Z_{16} & Z_{17} \\ Z_{21} & Z_{22} & Z_{23} & Z_{24} & Z_{25} & Z_{26} & Z_{27} \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ Z_{n1} & Z_{n2} & Z_{n3} & Z_{n4} & Z_{n5} & Z_{n6} & Z_{n7} \end{bmatrix}$$

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Step 5: Create the quality matrix to sort the QoS factors value in common form using the equation,

$$\mathbf{Z_{nx7}} = \begin{bmatrix} QM_{11} & QM_{12} & QM13 & QM_{14} & QM_{15} & QM_{16} & QM_{17} \\ QM_{21} & QM_{22} & QM_{23} & QM_{24} & QM_{25} & QM_{26} & QM_{27} \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ QM_{n1} & QM_{n2} & QM_{n3} & QM_{n4} & QM_{n5} & QM_{n6} & QM_{n7} \end{bmatrix}$$

$QM_{ij}= 1-q_{ij}/(\max(q_{ij}) + \min(q_{ij}))$, $1\leq i \leq n$ ------- (2)
For positive QOS Values
$QM_{ij}=q_{ij}/(\max(q_{ij}) + \min(q_{ij}))$, $1\leq i \leq n$ --------(3)
For negative QOS Values

Step 6: Evaluate quality vector(QV) value using quality matrixQoSfactors of all access modeAMj.
QV of the positive QoSfactorsis given by „p(AMj)" in Zn×7 is
p(AMj) = {p1(AM1),p2(AM2), p3(AM3), p4(AM4), p5(AM5), p6(AM6), p7(AM7), p8(AM8)}
= {Max(QM_{i1}), Max(QM_{i2}), Max(QM_{i3}), Max(QM_{i4}), Max(QM_{i5}), Max(QM_{i6}), Max(QM_{i7}), Max(QM_{i8}) }

QV for the negative QoS factors given by „b(AMj)" in Qn×7 is,
n(AMj) = { n1(AM1), n2(AM2), n3(AM3), n4(AM4), n5(AM5), n6(AM6), n7(AM7), n8(AM8)}
= { Min(QM_{i1}), Min(QM_{i2}), Min(QM_{i3}), Min(QM_{i4}), Min(QM_{i6}), Min(QM_{i6}), Min(QM_{i7}), Min(QM_{i8}) }

Step 7: Derive the Euclidean distance(ED) for QoS factors of all the access modesAMj,
ED between access modes (AMj) and the negative QoSfactorsn(AMj)

$$EDneg(AMj) = \sqrt{\sum_{j=1}^{7} W_j \left(V_{ij} - n(AM_j)\right)^2} \quad , 1\leq i \leq n \qquad \text{---------- 4}$$

ED between access modes (AMj) and the positiveQoSfactorsp(AMj) is

$$EDpos(AMj) = \sqrt{\sum_{j=1}^{7} W_j \left(n(AM_j) - V_{ij}\right)^2} \quad , 1\leq i \leq n \qquad \text{---------- 5}$$

Step 8: Derive the QoS value of all the accessmodes AMj. using the equation- 6, The value of access mode μ(AMj) is given by,

$$\mu(AMj) = \frac{1}{1+\left[\frac{EDpos(AMj)}{EDneg(AMj)}\right]^2} \qquad \text{---------- 6}$$

Step 9: Select theaccess modes AMj as the QoSservice mode which has largestQoS value.
QOS_{μ} = max(μ(AMj))
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IV. RESULT ANALYSIS

1. Numerical Results

The above algorithm is tested for 8 access modes and all QoS factors. The values in the Table 1 was implemented in the algorithm.The values of weight vectorsfor thesimulation isW= (0.10, 0.10, 0.10, 0.20, 0.30, 0.10, 0.10). The QV has created using Table 2. The scaled quality matrix has given in Fig.3.

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Table 1 : QOS Data

QoS Factors	ACCESS MODES							
	AM1	AM2	AM3	AM4	AM5	AM6	AM7	AM8
B Rate	20	15	10	10	15	10	15	12
PLR	10	15	20	25	30	30	25	30
BW	100	70	100	20	25	50	60	50
Price	40	63	54	56	58	60	62	64
Reliability	96	91	92	86	88	90	85	92
Accessibility	94	88	86	85	88	85	82	90
Movement	5	30	35	22	10	20	40	25

The Quality vector values are given below calculated using p and n

$$Z_{nx7} = \begin{matrix} 0.56 & 0.45 & 0.53 & 0.51 & 0.49 & 0.47 & 0.46 & 0.44 \\ 0.67 & 0.50 & 0.33 & 0.33 & 0.50 & 0.33 & 0.50 & 0.40 \\ 0.83 & 0.58 & 0.83 & 0.17 & 0.21 & 0.42 & 0.50 & 0.42 \\ 0.75 & 0.63 & 0.50 & 0.38 & 0.25 & 0.25 & 0.50 & 0.38 \\ 0.53 & 0.51 & 0.51 & 0.48 & 0.49 & 0.50 & 0.47 & 0.51 \\ 0.53 & 0.50 & 0.49 & 0.48 & 0.5 & 0.48 & 0.47 & 0.50 \\ 0.89 & 0.33 & 0.22 & 0.51 & 0.78 & 0.56 & 0.11 & 0.44 \end{matrix}$$

p(AMj) = { 0.51,0.89,0.63,0.83,0.51,0.78,0.56, 0.5}
n(AMj) = {0.38,0.53,0.33,0.22,0.17,0.2,0.25,0.11}

With the above data QOS value of each access node is calculated as below
μ(AMj) = { 0.56, 0.77,0.17,0.38,0.73,0.75,0.48,0.47}
With respect to the algorithm the access node with the maximum μ(AMj) value is selected as the access node giving service to the user. So the framework selects the AM4 as the access node which provides service to the user.

2. Simulation Results

The algorithm was simulated in cloudsim software. The aim of the simulation is to compare our algorithm with other random approaches. The results of the simulation generated the following graph

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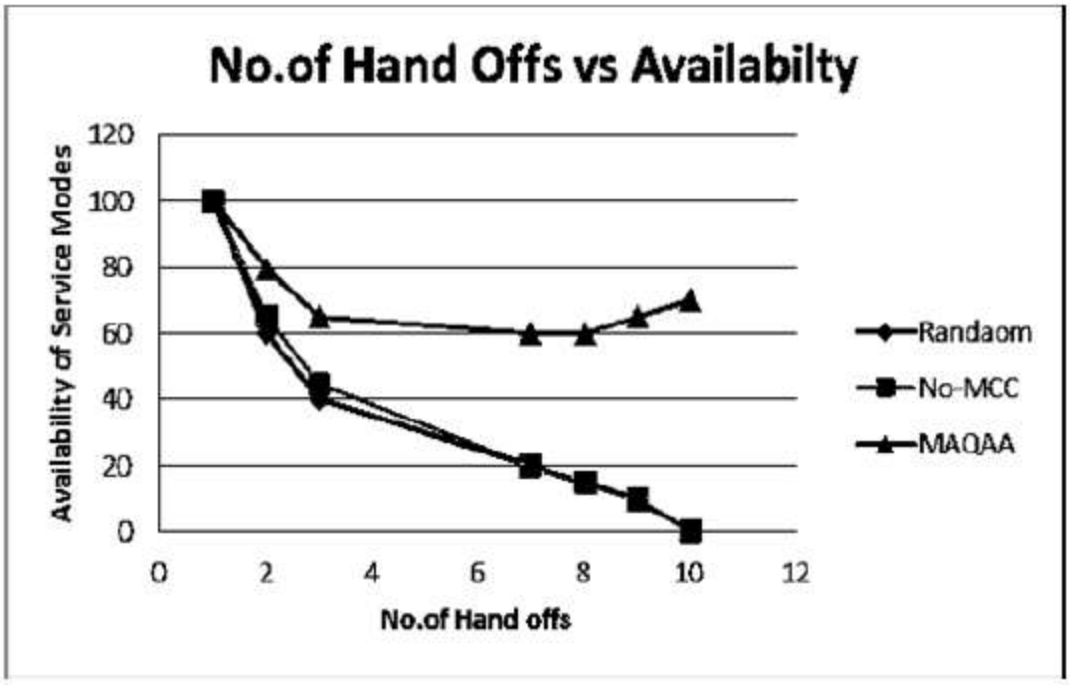

The above graph proves that our algorithm provides a very high level of avialabilty compared to all other algorithms and random methods

V. CONCLUSION

In this paper we have offered a framework and algorithm for QoS aware mobile cloud computing. The algorithm was simulated with random test data. The architecture used 7 access mode and most of the QOS factors to provide usage to its users. The result of the simulation proves that our algorithm works as intended and gives a better usage comfortabilty to the user

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