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Implementing Multi Criteria Analysis of Advanced Mobile Cloud Computing: A Review

Nikki[1], Jitender Kumar[2]
[1]*M. Tech (CSE) Student,* [2]*Assistant Professor Deenbandhu Chhotu Ram University of Science & Technology, Murthal*

Abstract: ***Flexible & scalable services are offered by Cloud services. Mobile applications are enabled by Mobile Cloud Computing for getting powered, built, & hosted with the use of cloud resources. Mobile devices were used for making calls only a few years back but today a lot of applications can be run on mobile devices. Mobile phone would be smart phone which will suit main platform of computing for client. Yet there are many problems like computation time ,battery life etc which resists implementing applications. These applications are computation intensive. It the areas of a typical mobile cloud computing will be investigated in this paper. These are responsible for notable amount of power dissipation.***
Keywords: Mobile Cloud Computing, Cloud Computing, Computation Offloading,, Local Storage, Low bandwidth

I. INTRODUCTION

The network of internet is called Cloud. It is available at remote places. It is giving services over public as well as private networks. They are used in wide area network, local area network or virtual private network. Many applications which are based on email & web conferencing, runs on cloud [1].

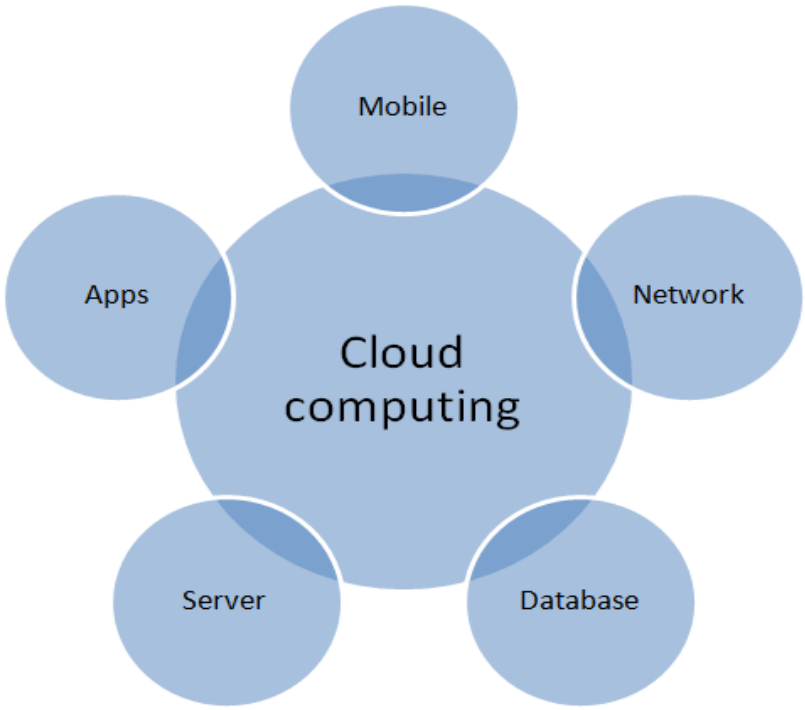


Fig 1 Cloud Computing

Technological innovations are occurring at an accelerated rate[2] increasingly. Mobile devices are much more capable in terms of processing speed & storage. The wireless network is becoming much faster & has lower latency. It has latest deployments such as Long Term Evolution shaping field. Cloud computing paradigm is offering a novel approach for utility computing.

A. Mobile Cloud Computing

The smart phone have become main computing platform for more client[2].

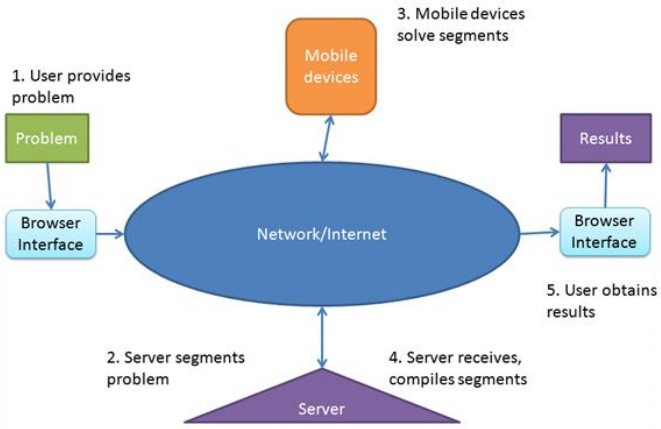


Fig 2 Mobile Cloud Computing

The most wished feature of this type of systems is longer battery lifetime. Many studies have recognized that offload is the way improving application performance& increasing efficiency of the servers & security. Some Few offload growths efficiency of few by alleviating which are required for applications of web server to the client resources. These perform work which may function more powerfully on the solution of application network communication. These may use them besides of handlling requests, serving users, executing application logic . This application network infrastructure device acts on first leg & then hands off to server. When server is done, the device of application[3] network moves another leg, & then it is sent back to client. There are two kinds of server offload functionality:

1) *Protocol processing offload:* Protocol processing offload includes functions like Secure Sockets Layer termination & Transmission Control Protocol optimizations. Rather than enable Secure Sockets Layer communication on web application server, it could be offloaded[4] to an system of mobile network communication method & communal across all applications needed safe communications.
2) *Application-oriented offload:* This system involve capability to apply joint services on an application network communication device. This is often complete via a network-side scripting capability, but some functionality has become so commonplace that it is now built into core features available on system of network communication some result[5].

II. BACKGROUND OF MOBILE CLOUD COMPUTING

Mobile computing is becoming ubiquitous at a very fast rate. - - it is possible to carry big amounts of processing power each day from Chrome books to tablets &.smart phones. Even smart watches & smart glasses are included in it.But in past decade success of these devices is because of in part to pioneer work of many companies. Important landmarks in portable computing involve devices such as PC single chip calculators which weighed near about two stone which are older Apple inventions & digital organisers. Let us take a look at 21 of most considerable mobile computers. It might look odd to start a list of portable computing target with a calculator, but the machine was one of first handheld devices which may carry out computing function. Mostly known handheld calculators have existence before this product, but it was Handy-LE the first calculator. You can hold easily in your hand or can fit in your pocket. The small size was due to one chip calculator route Mostek. It apply out device's computing functions.

III. MOTIVATES FOR CLOUD COMPUTING OF MOBILE

A momentous ground is gained by mobile devices in many communities as governmental agencies, enterprises. It is also famous in providers of social service like healthcare, education & organizations of engineering.

A. Low bandwidth

Recently smart phones are merged in heavy applications like video editing. They are also engaged in recognition of face. Such applications require high computational memory as well as power and battery. Several are going to solve problem using offloading applications. These are running on Cloud. It is because of its computation resources and huge storage . Yet not any of achieveable

solutions ponder over low bandwidth in the case of networks as well as communication & network overhead. In such type of case, executing application would be more efficient on Smartphone than offloading it on Cloud.

B. Processing Power

Processing deficiencies of mobile clients has been known as big challenges in mobile computing. Mobile devices have been expected to have high processing capabilities. This is similar to computing capabilities of desktop machines. It is to perform computing intensive tasks.

C. Energy Resources

Energy has been considered as non replenish able resource in case of mobile devices. It demands external resources. Capacity of Battery has increased about five to ten percent per year. This is because battery cells have been considered excessively dense. Moreover, mobile device manufacturers are attempting to get device compactness. They are also trying to attain lightness as well as handiness. It is restricting exploitation of long lasting batteries which are bulky.

D. Local Storage

There is major increase in digital contents. These contents could be picture, movie, songs and home videos. But there is limited storage in mobile devices. However personal computer might store large amount of data. But the mobile devices are limited to some gigabyte memory. This memory is occupied with user application and system files.

E. Visualization Capabilities

Due to energy limitation there is limit of size extension in case of mobile devices. However there are 5.5 to 6 inch screen in modern mobiles. But they are too little as compared to desktop.

IV. EXISTING RESEARCH

There has been lot of researches in field of mobile based computing. Some of them have been mentioned here.

A. Karthik K. et al (2010) "Cloud Computing For Mobile Users: Offloading based Computation is Saving Energy", [1]

This analysis is suggesting that cloud based computing may retain energy potentially in case of mobile users. The Mobile based cloud computing services may be vary from cloud based services. It is in case of desktops. This is because they offer savings of energy. Services might consider overhead of energy for protection. It also considers privacy, reliability & information communication at the time of offloading.

B. Paramvir B., et al (2012) "Advancing State of Mobile based Cloud Computing", [2]

They represented that latest capabilities might allow users of mobile to utilize cloud. This is to get benefits of resource. It would occur without incurring delays & jitter. It would also occur without any worry of energy.

C. Sweta P., (2013) "Mobile Cloud Computing: Architecture, Present work & Issues : A survey", [3]

The mobile computing based technology is trending in future. It is combining characteristics of mobile computing as well as cloud computing. Network service has bought up as a latest dimension with emergence in cloud computing as well as mobile field.

D. G. Folino, et al (2014) "Automatic Offloading of Mobile Applications in case of Cloud by means of Genetic Programming", [5]

This work is presenting automatic approach in order to generate models to take decision. It is for offloading of mobile based applications according to requirements of user. Condition of network system has been made up of a general framework. It is in case of testing offloading algorithms. It is including a mobile simulator. It usually computes energy wasted during offloading. An inference engine which is generating models is going to perform process of automatic offloading.

E. Claudio R., et al (2015) "Energy-Efficient Computation Offloading in case of Wearable Devices as well as Smartphones in Mobile Cloud Computing", [6]

Researchers are investigating task offloading performed. It has been performed by devices that are wearable in case of mobile based cloud computing. Scenarios that are offloading based have been considered. It is including local processing according to technology.

D. Queen K. G., et al (2016) "A Computation Offloading Scheme for Performance Enhancement of Smart Mobile Devices for Mobile Cloud Computing", [7]

Authors has proposed better scheme in case of offloading complex computation. It is done using device that are resource scarce like mobile to environment which is resource intensive. Simulation is conducted using Cloudsim. Proposed scheme is going to use two virtual machines.

F. *Mohammad G., (2017) "A Fast Hybrid Multi-Site Computation Offloading for Mobile Cloud Computing", [8]* they have introduced a rapid offloading solution that is hybrid multi-site computation. It is for mobile cloud computing. They have also proposed a weighted cost model that has been dependent on running time. They are also dependent on energy consumption.

Table 1. Comparative Analysis

Paper	Technique	Outcomes	Shortcoming
Cloud Computing for Mobile Users: could Offloading Computation Save Energy	Real-time data	The services of Mobile based Cloud Computing would be different. It is different from cloud services in case of desktops. This is because of offering savings of energy.	Would this will prove cloud computing an ultimate solution for energy problems for all the mobile devices? Not quite.
Advancing State of Mobile Cloud Computing	Programming model	They should view such fundamental capabilities. It would qualify mobile users in order to utilize cloud. It is to get resource advantages without taking time.	This system is programmed to enquire what is the basic problem of cloud computing. This can be as programming models are allowing seamless remote execution, a middle tier, cloud which is of low-latency
A Survey of Mobile Cloud Computing: Architecture, Existing Work & Challenges	NameNode Jobtracker Data Node TaskTracker	Mobile computing technology is going to provide joint features of cloud computing as well as mobile computing. Thus it is providing optimal services.	Due to Bandwidth issues in mobile cloud environment. The Mobile network resources are very smaller
Automatic offloading of mobile applications into cloud by means of genetic programming	Genetic programming	The made comparison of classification algorithm. Better approach has been provided with process of offloading model.	The most key problems of modern mobile devices is the limited battery life .
Energy-Efficient Computation Offloading for Wearable Devices & Smartphones in Mobile Cloud Computing	Offloading algorithm	This system consists of middle layer that is present in middle of mobile devices and cloud infrastructure. It is composed of cloudlet as well as cloudlet layer.	Under cloud computing, Web applications & the data replace old stand-alone programs, which cannot be stored in users' computers for no longer time.
A Computation Offloading Scheme for Performance Enhancement of Smart Mobile Devices for Mobile Cloud Computing	Virtual Machines	Computation offloading have been made energy-efficient. It has been done by reducing time execution as well as load on machine.	One of key problems of modern mobile devices is the limited battery life due to which their use becomes limited.
A fast hybrid multi-site computation offloading for mobile cloud computing	Offloading algorithm	They are proposing a offloading solution that is hybrid multi-site computational. It is for cloud based computing of mobile.	Another problem is energy challenge of mobile devices with their limited computation act as barriers .

V. COMPONENTS OF MOBILE CLOUD ARCHITECTURE

Architecture of mobile based cloud computing has been represented in following figure. Mobile devices have been connected to mobile networks. It has been made through base stations. It has established and controlled connections. It has also established functional interfaces. Mobile users have been requesting and transferring data to central processors. Such processors have been connected to servers. They are providing mobile network services.

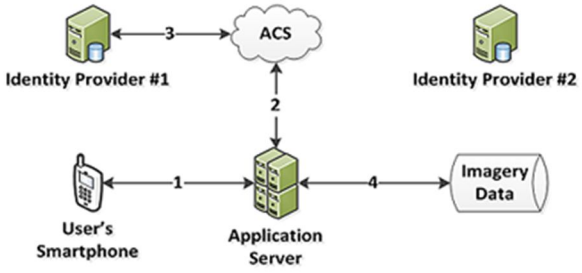


Fig 3 Mobile Cloud Architecture

Mobile network operators might a lot the services to mobile based users. Such services are authentication and authorization.

VI. ADVANTAGES OF MOBILE CLOUD COMPUTING

Mobile cloud computing is providing us a software system. It work as a fuels convergence of mobile networks and cloud computing, solutions. It is also required for all types of web as well as mobile applications. It is opening new opportunities in information technology sector & markets. Benefits have been given as follow:

A. Network Operator

It is giving power to operators to cast their mobile network. It supports billings by giving full commercial solution. This is for services related to network.

B. Mobile Cloud Providers

It is providing on demand services. It has added mobile network enablers and brilliant commerce. It has given power to make recent B2B solutions.

C. Enterprise Solution Providers

Such solutions are supporting organizations as well as enterprise. They support to increase employee collaborations. It is enhancing business processes and improve customer service.

D. Web & Mobile Application Developers

It is enabling website and mobile developers. It is to comprehend applications with support of mobile networks. It allow them to get good potential customer base. Such solution makes it simple for developers enhance different applications.

VII. CHALLENGES IN MOBILE CLOUD COMPUTING

There is lot of challenges related to cloud computing as well as networks communication. It is giving us overview related to such solutions.

A. Challenges at Mobile Side

1) Less Bandwidth: Bandwidth becomes major issue in mobile cloud climate mobile network sources have been very small. This could be overcome with help of P2P Media Stream. It is sharing limited bandwidth. It is shared among users. These users are situated in nearby area.

2) Availability: The hazard of users connecting to cloud is network failures. This is due to very high traffic as well as poor performance or signal errors.

3) Heterogeneity: There are networks that could be used as WiMAX, GPRS, CDMA, ECDMA and WLAN. It is hard to handle such heterogeneity in various networks.

B. Challenges in Computing Side

Main issues and solutions in cloud side are as below:

1) Computing Offloading: It is one of the main feature of MCC. It is for improvement of battery life time. It is to increase performance of application using cloud computing. Computation offloading technique works with purpose of migrating very large computations. It also performs complex processing.

2) Security: Security has been considered major issue in mobile computing. It is gaining more importance. This is because stakeholder is increasing in cloud. It is for save user privacy and secrecy of data. Another security issues is mobile device users. Second issue is privacy of data with its security.

*3) Authentication: A*pplication developer and mobile users should be very careful during dealing with data. It occurs when user store and process large amount of data on a cloud.

*4) Data Access: A*ccessing has become very challenging with increment in number of data resources. It is also due to various cloud services. It occurs while dealing with data resources in the terms of storing.

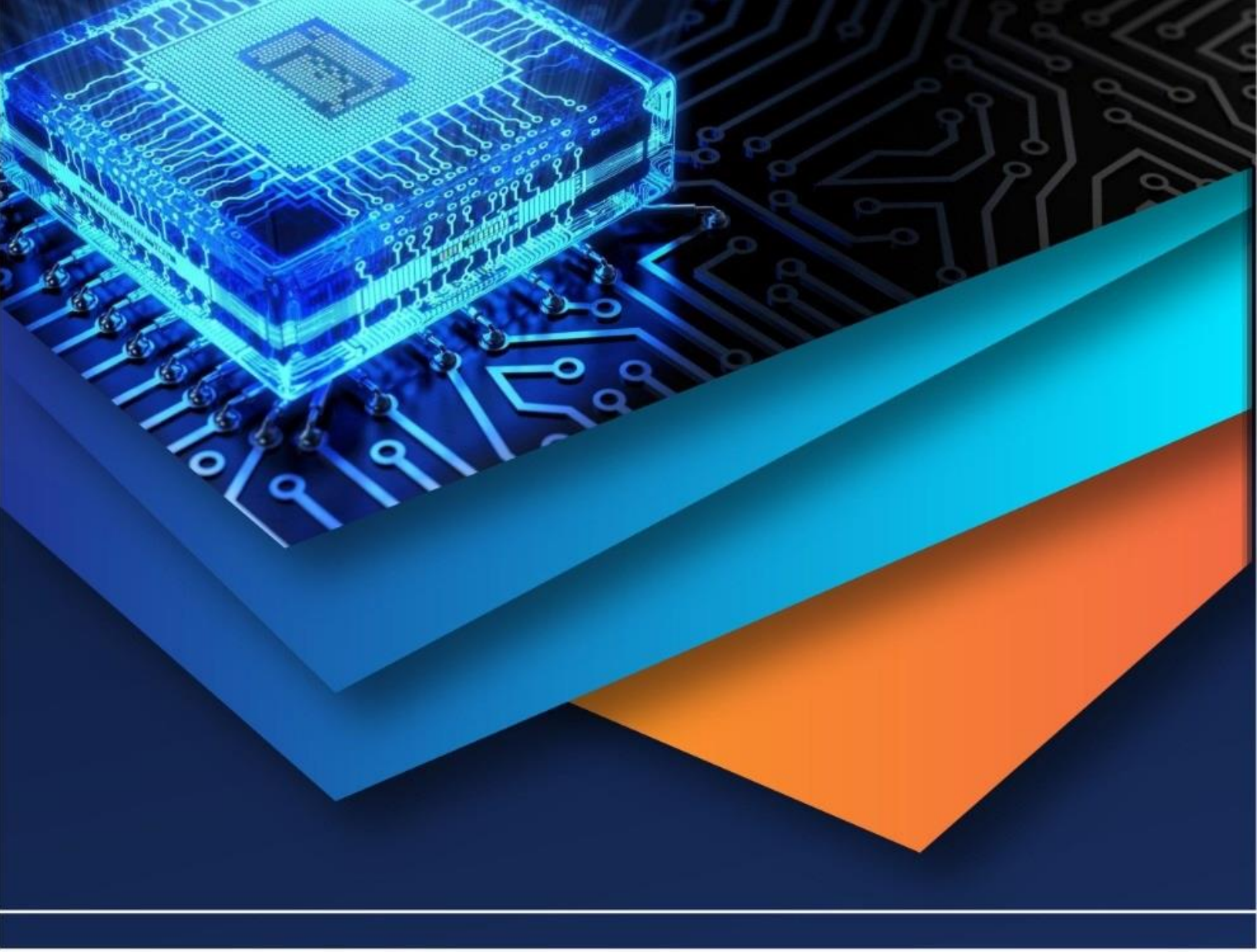
VIII. CONCLUSION

Mobile Cloud Computing is considered as one of best mobile computing technology. It is trending in future because it is combining benefits of both cloud computing as well as mobile computing. Thus it is providing optimum services. Network service has been bought up to new dimension with the development in cloud computing as well as mobile field. Mobile Cloud Computing is providing latest way to market. It is going to provide better commercial application. It is considered as an easy way for users to take benefits of such service. More than two hundred fifty million businesses would use cloud services According to modern study. There are various mobile devices by 2015. Contraction would raise benefit of mobile cloud computing to dollar 5.2 billion. This research is going to provide overview of mobile cloud computing where its architecture as well as work application along with challenges has been granted.

REFERENCES

[1] K. Kumar & Y-H Lu,(2010) “Cloud Computing for Mobile Users: could Offloading Computation Save Energy”, Published by IEEE Computer Society
[2] P. Bahl, R. Y. Han, L. Erran, M. Satyanarayanan (2012) “Advancing State of Mobile Cloud Computing”,
[3] S. Patel (2013) “A Survey of Mobile Cloud Computing: Architecture, Existing Work & Challenges”, International Journal of Advanced Research in Computer Science & Software Engineering, Volume 3, Issue 6, June 2013
[4] N. Fernando, S. W. Loke , W. Rahayu (2013) “Mobile cloud computing: A survey”, Future Generation Computer Systems 29 (2013) 84–106
[5] G. Folino, F.S. PisaniI (2014) “Automatic Offloading of Mobile Applications into Loud by means of Genetic Programming”, Applied Soft Computing 25 (2014) 253–265
[6] C. Ragona, F. Granelli, C. Fiandrino, D. Kliazovich, P. Bouvry (2015) “Energy-Efficient Computation Offloading for Wearable Devices & Smartphones in Mobile Cloud Computing”,
[7] Q. K. Gill, K. Kaur (2016) “A Computation Offloading Scheme for Performance Enhancement of Smart Mobile Devices for Mobile Cloud Computing”, 2016 International Conference on Next Generation Intelligent Systems
[8] M. Goudarzia, M. Zamania, A. T. Haghighat (2017) “A Fast Hybrid Multi-Site Computation Offloading for Mobile Cloud Computing”, Journal of Network & Computer Applications 80 (2017)
[9] D. Mazza, D. Tarchi, & G. E. Corazza(2017) “A Unified Urban Mobile Cloud Computing Offloading Mechanism for Smart Cities”, IEEE Communications Magazine • March 2017
[10] S. Sthapit, J. R. Hopgood, & J. Thompson (2017) “Distributed Computational Load Balancing for Real-Time Applications”, 2017 25th European Signal Processing Conference
[11] S. Saha & M. S. Hasan (2017) “Effective Task Migration to Reduce Execution Time in Mobile Cloud Computing”, Proceedings of 23rd International Conference on Automation & Computing,
[12] J. Panneerselvam, J. Hardy, B. Y. & N. Antonopoulos (2016) “Mobilouds: An Energy Efficient MCC Collaborative Framework With Extended Mobile Participation for Next Generation Networks”, 2016 IEEE., VOLUME 4, 2016
[13] A. Mukherjee, D. De (2016) “Low Power Offloading Strategy for Femto-Cloud Mobile Network”, Engineering Science & Technology, an International Journal 19 (2016)
[14] N. I. M. Enzai & M. Tang (2016) “A Heuristic Algorithm for Multi-Site Computation Offloading in Mobile Cloud Computing”, Procedia Computer Science Volume 80, 2016
[15] S. Deshmukh, R. Shah (2016) “Computation Offloading Frameworks in Mobile Cloud Computing : A Survey”, 2016 IEEE
[16] E Cuervoy, A. Balasubramanianz, D. ki Cho(2010) “Making Smartphones Last Longer with Code Offload”,
[17] S. Kosta, A. Aucinas (2012) “ThinkAir: Dynamic Resource Allocation & Parallel Execution in Cloud for Mobile Code Offloading”, IEEE
[18] M. V. Barbera, S. Kosta, A. Mei, & J. Stefa (2013) “To Offload or Not to Offload? Bandwidth & Energy Costs of Mobile Cloud Computing”, 2013 Proceedings IEEE INFOCOM
[19] N. Kaushik, J. Kumar (2014) “A Computation Offloading Framework to Optimize Energy Utilisation in Mobile Cloud Computing Environment”, International Journal of Computer Applications & Information Technology Vol. 5, Issue II April May 2014

[20] M. V. Barbera, A. C. Viana, M. D. de Amorim (2014) "Data Offloading in Social Mobile Networks Through VIP Delegation", 2014 Elsevier B.V. All rights reserved
[21] Chathura, M. S. Magurawalage , K. Yang(2014) "Energy-efficient & Network-aware Offloading Algorithm for Mobile Cloud Computing", ournalofNetworkandComputerApplications47(2015)47–60
[22] N. Kaushik, Gaurav, J. Kumar(2014) " A Literature Survey on Mobile Cloud Computing: Open Issues & Future Directions", International Journal Of Engineering & Computer Science ISSN:2319-7242 Volume 3 Issue 5 may, 2014
[23] M. Shiraz, M. Sookhak, A. Gani (2015) "A Study on Critical Analysis of Computational Off loading Frame works for Mobile Cloud Computing", journal of Network & Computer Applications 47(2015)47–60
[24] G. Orsinia, D. Badea, W. Lamersdorf (2015) "Context-Aware Computation Offloading for Mobile Cloud Computing: Requirements Analysis, Survey & Design Guideline", 12th International Conference on Mobile Systems & Pervasive Computing
[25] M. Shiraz, A. Gani (2015) "Energy Efficient Computational Offloading Framework for Mobile Cloud Computing", Centre for Mobile Cloud Computing Research
[26] N. I. Md Enzai & M. Tang (2016) "A Heuristic Algorithm for Multi-Site Computation Offloading in Mobile Cloud Computing", Procedia Computer Science Volume 80, 2016
[27] A. Mukherjee, D. De (2016) "Low Power Offloading Strategy for Femto-Cloud Mobile Network", Engineering Science & Technology, an International Journal 19 (2016)
[28] J. Panneerselvam, J. Hardy, B. Yuan & N. Antonopoulos (2016) "Mobilouds: An Energy Efficient MCC Collaborative Framework With Extended Mobile Participation for Next Generation Networks", 2016 IEEE., VOLUME 4, 2016
[29] L. Zhang, Di Fu, J. Liu,(2017) "On Energy-Efficient Offloading in Mobile Cloud for Real-Time Video Applications", IEEE TRANSACTIONS ON CIRCUITS & SYSTEMS FOR VIDEO TECHNOLOGY, VOL. 27, NO. 1, JANUARY 2017



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