ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

Implementation of Cloud Computing In the Department of Archaeology

Jerome Robinson .A[1], Satyanarayana .K[2], Muthu Kumaravel .A[*3]

[1]Research Scholar, Department of MCA, Bharath University, Chennai, Tamil Nadu, India

[2]Principal, Sindhi College, Chennai, Tamil Nadu, India

[3] HOD, Department of MCA, Bharath University, Chennai, Tamil Nadu, India

[*]Corresponding Author

ABSRACT: Cloud Computing is going to be a backbone of the modern trend.. It is going to change the work behavior of the entire world. It is a "ON-DEMAND" feature like electrical energy, fuel and mobile communication. Not only in Corporate sectors Government may consider in some aspects to implement the Cloud Computing utilities for their need of publishing informations like Archaeology. There are several difficulties in implementing Cloud Computing but we can reap a set of potential benefits. Like a coin which has two sides, the Cloud Computing has its own, unique, strong and weak properties. We can say that the Scalable, Portable, Payment per use Model and the management policies of risks and Security, Efficiency, any time accessibility and several other aspects represent positive factors in taking the decision of using Cloud Computing.This paper starts with definition of Cloud Computing, importance, service models, its relationship within them and about Archaeology.

KEYWORDS: Cloud Computing, Relationship with Information Technology, Demonstration of the Process, Expansion to other fields, Propensity with Cloud Computing, Resources in Archaeology, Maintenance, System Co-Operation, Proposed Platform

I. INTRODUCTION

India is one of the oldest civilizations in the world. We can understand from its past heritages,great antiquarian samples and cultural wealth.These has to be taken to the entire future humanity. India was ruled by various rulers in various periods. Due to this we are having monuments and archaeological field surveys in various cultures and architectures. On the British Colonial Period the monuments and its treasures were protected by founding Asiatic Society of Bengal in 1784 [12]. Later it was turned as Dept. of Archaeology in the second half of nineteenth century. After independence our Government gave more plans to protect all the monuments, heritages, antiquarians. As we are having very richest number some of the monuments and its treasures were not properly maintained and lead to destroyed due to natural calamities. As a citizen of India everybody has to protect the heritages to our future generations.

Figure:1 Field Work

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

The Storage and retrieval of archaeological data within computer databases is a basic component of modern archaeological research. Analytical tools was provided with relational database technology. These are implemented in variety of RAD products (Rapid Action Design) such as MS-Access, Foxpro, DBASE, that gave most archaeologists easy access to the creation and maintenance of electronic relational databases. Thesedatabase programs allowed access through a wide variety of front end user interfaces.
We have made an attempt to introduce information technology (IT) into archaeological practices and connect the monuments, antiquarians and field surveys to the future researchers and to the future generations for to analyze the Archaeological database.

In this paper, on the basis of the findings of on-site archaeological studies and their analysis, we discuss the suitability of Cloud Computing in archaeology and its application to other fields for better performance.

II. ARCHAEOLOGY

1.1 ARCHAEOLOGY AND INFORMATION TECHNOLOGY

The introduction of IT into archaeology has been performed in the areas where archaeologist and volunteers have been more or less obliged to use it to comply with Archaeology Dept [1]. and Govt. of India as for the distribution of Archaeology rules such as findings of Treasure and maintaining the traceability records.

By focusing the following two points, we have investigated an IT system that should be useful for Archaeological practices [2].

- Sharing information of monuments & field survey with increased efficiency.
- Succession of Archaeological Methods.

As a result of performing field work related to these issues at the survey fields, we want to demonstrate the need to propose examples where the work style of Archaeology itself is to be replaced by process of findings such as an improved plan-do-check-act (PDCA) cycle and improved communication & information sharing [1].Improved PDCA Cycle (clarification of workflow such as issuing instructions and reporting)
We have found that the design and implementation of the selected area is decided everyday on the basis of experience and intuition comprising a large body of know-how gathered by archaeologists over many years of methodologies and practices [3]. This know-how takes the form of rules such as "If X available, then decide as A". This is the combination

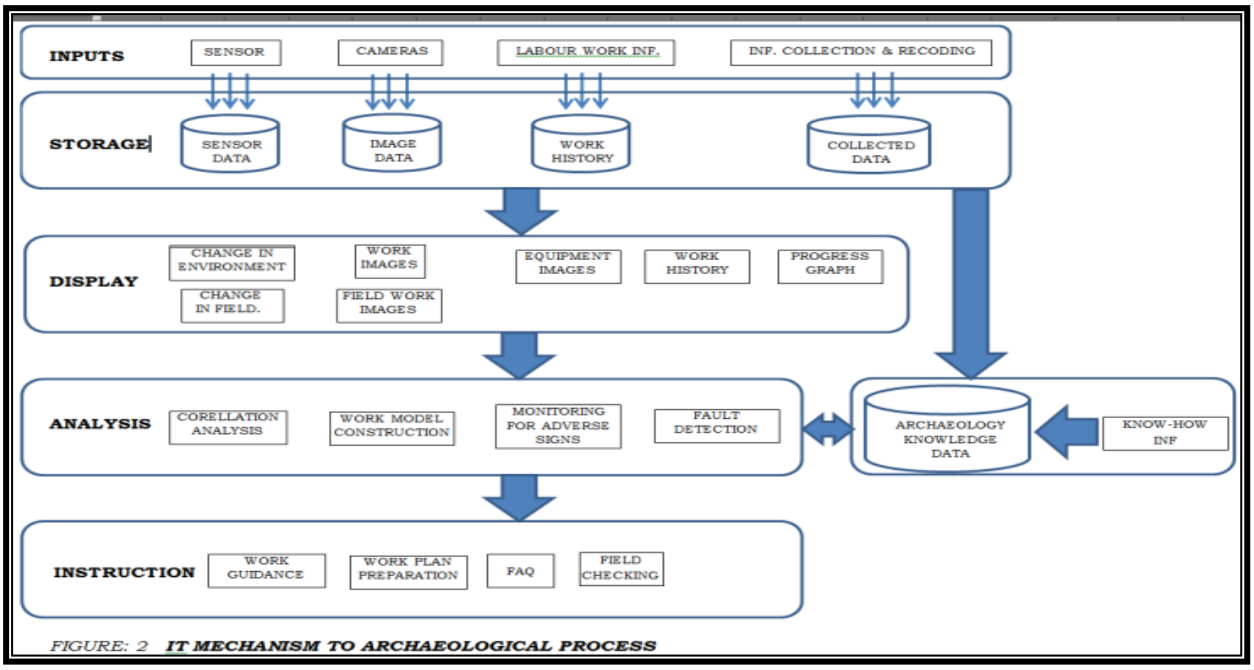

FIGURE: 2 ***IT MECHANISM TO ARCHAEOLOGICAL PROCESS***

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

of knowledge management that has struggled for many years between the available information and IT in the secondary Industries, where it is judged to be worth making sufficient effort and its effectiveness is being verified [4]. On the subject of knowledge management, due to the ideal of converting tacit knowledge into explicit knowledge, there is a tendency to endup focusing on how to share information fruitfully to the users. Although this sort of Archaeological technology is of course important, it has been found to be very difficult to use IT for this purpose. Therefore I want to set out by concentrating on points that are directly connected to operation and management and points related to how knowledge should be stored and utilized [5].

2). Improved communication and information sharing (in meeting to be conducted for Archealogists)
I have shown that by using a projector to display the contents of a PC Screen, one can deliver routine work reports and share information between experienced and inexperienced workers in excavation including specific information about harmful insects, weather conditions or growing conditions of creatures in the monuments and offer the experts advice [6].

2.2 SUMMARY OF DEMONSTRATION

On the basis of field work findings obtained after experiencing in the survey work (Figure1) we thought that it might be possible to support archaeological work with IT trough the flow sequence shown in Figure:2 (input → data storage → visualization →analysis → instruction) [7].

In this section we are describing the mechanism of this sequence and present a summary of the verification procedure.
We can use Web application and mobile phone applications to build prototypes of the four functions listed below.1).Excavation Planning:- findings from the survey and finding process for a selected land can be performed together.
2).Planning Operations and results Management:- Process management and operational checks can be performed on the basis of pre-planned on-site work and automatic collections of results.
3).Patrolling supports:- Reports and instructions can be easily and reliably issued by sharing on-site photographs and comments among all administrators and excavation workers [8].
4). Selected Land for archaeology and Data management:- Managements of all sorts of data relating to the selected land including location, land rights, area soil and land characteristics can be integrated.

These four functions are supports by two data management technologies such as sensors (Weather, soil, Global Positioning System(GPS)), networks (wireless Local Area Network), fourth Generation (4G)) and knowledge management [9].
1). Data storage:-

- Position and time information from mobile phones with GPS functions
- Weather (or) soil sensor data (Image and audio data obtained from mobile phones with digital camera and audio recorder applications)
- Noteworthy data extracted from the results of routine work.
- Material management's data obtained using mobile phones with bar code reading functions.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

2). Data Analysis

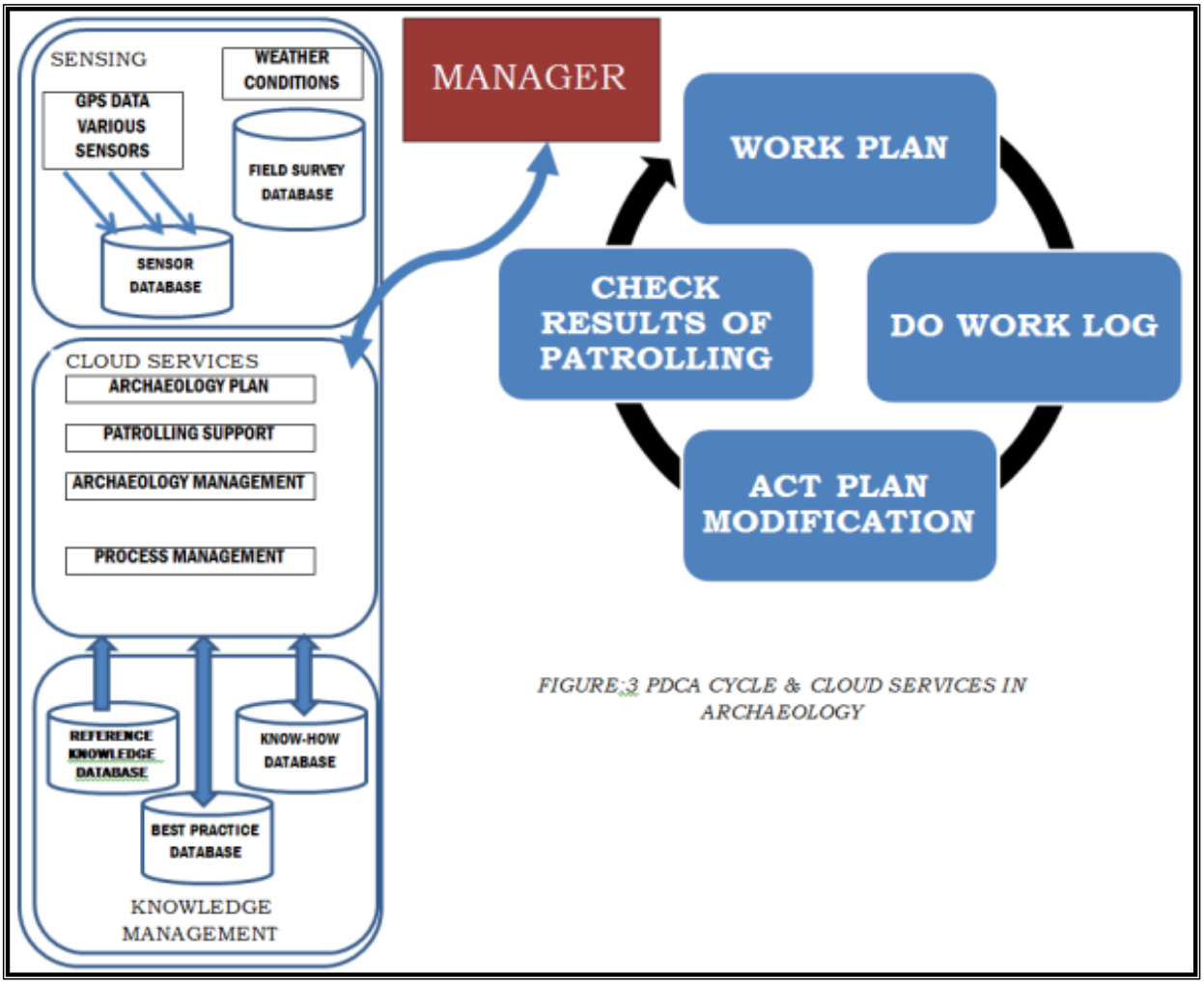

FIGURE 3 PDCA CYCLE & CLOUD SERVICES IN ARCHAEOLOGY

- Registering and updating virtual model
- Data Mining

The above functions should eventually make it possible to add functions to address various different requests from on-site excavation workers [9]. In the future we have planned to construct prototypes and subject them to verification trials in particular. We have intended to construct prototypes of two mechanisms and database as described below:

1). Choosing area for excavation: A mechanism to supports the selection of area based on knowledge management and the land where the land is to be started for archaeological survey [10].

2). Decision making correctness for each plot of Land:- Mobile phones with GPS functions are used to automate the collection of position and time data (which is sent to a server automatically by 3G/4G transmission). This is used to implement a mechanism for performing findings for Decision making correctness for each plot of land on the basis of information such as data representing which people went where and for how long, which is used to calculate human resources costs that makeup the bulk of indirect costs, and material expenses obtained by mobile phones with bar code reading functions [11].

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

3). Records of survey from the land:- A database of static data such as land rights and land areas, together with plot characteristics, soil analysis results excavation histories and the like.

2.3 EXPANSION INTO OTHER FIELDS

These four functions mentioned in the previous section are not specific to archaeology but also have potential application in various other fields (such as medicine, health care, maintenance work, Automatic car parking and agriculture) where the technologies such as GPS activity servicing, web-based mapping applications are already being used. Therefore, we are working not only on vertical integration of these concepts, but also on horizontal expansion into other fields [12].

IT resources are spread throughout the world. This can certainly be said of offices and facilities such as factories and research centres. However, for this sort of on-site work, new IT applications are likely to be incorporated into terminal equipment other than PC and mobile phones.

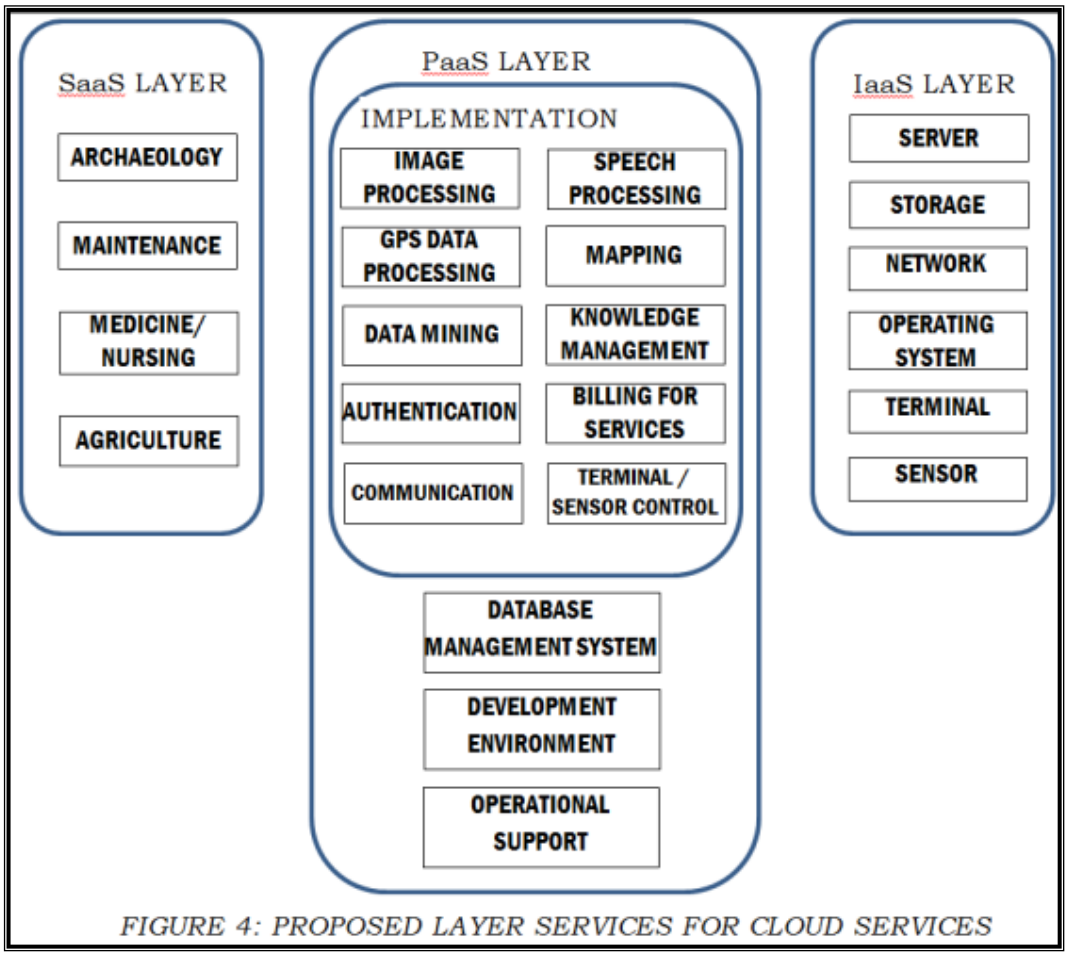

FIGURE 4: PROPOSED LAYER SERVICES FOR CLOUD SERVICES

III. PROPENSITY WITH CLOUD COMPUTING

Before investigating the application of IT to the field of Archaeology, We have confirmed the following five Universal values of Cloud Computing.

- Reduction of initial costs
- Allocation of resources on demand without limit

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

- Maintenance and upgrades performed in the back end.
- Easy rapid development including collaboration with other systems in the cloud.
- More possibilities for global service development.

As a specific service based on these values, we can envisage the mechanism shown in figure 3 where a PDCA cycle can be applied to Archaeological work, which can involve successively performing and obtaining feed back from the following actions:
PLAN: Draw up operation and excavation plans
DO: Gather work results (this involves performing the actual work on-site, though IT support cannot be provided for this)
CHECK: Perform process management and Patrol the Land where the surveys being started.
ACT: Make any work flow, basic serving and knowledge management techniques are likely to be the main one used to provide cloud services.

3.1 RESEOURCES

As mentioned in the previous section, data is routinely collected [13]. This data includes weather and soil data, GPS Data, image data, worker observations and data related to the selected Land for Excavation. The quantity is 5-10 MB/Case/Day. Since Archaeological data has to be stored for 35 to 50 Yrs according to the report given by the statistical Dept. of India for the time interval of each generation and since between half a million and one million monuments/excavations are targeted for to be safe guarded the total amount of data may be exceeded from 500 to 1000 Peta bytes (less than the medical field where the data storage requirements of personal health records are expected to reach 2 Petabytes/Patient).
To obtain advice and recommendations by analyzing this stored data, analysis engines such as data miners are operated on this large amount of data in the Cloud. Although it is not possible to calculate parameters such as the correct MIPS (Million Instructions per Second) value, suitable central processing unit and input/output performances are required. In terms of performance, it is clear that highly efficient (high sustained performance) parallel computer technology or the like is necessary [14].

3.2 MAINTENANCE

When IT systems are introduced into any new field, not just Archaeology, frequent bug fixes and upgrades are needed. In cloud computing, instead of an engineer having to visit an office to do this work, the maintenance work for hundreds of thousands or even millions of users can be done simply system in the Cloud center; this could solve many of the problems associated with maintenance. Moreover, in Cloud computing, there are no disparities in the software versions being used by different users, which leads to improved usability in addition to reduced maintenance problems.

3.3SYSTEM CO-OPERATION

Cloud computing strength lie not only in individual technologies, but also in our ability to integrate various technologies together. Even from a global perspective, there are very few businesses that can combine skills in such diverse fields as sensors, mobile phones and other terminals; network services (security, authentication, multimedia), business applications, and back-end server storage. Indeed, businesses of this sort are tending to decline in western developed countries where they have become more specialized since the last century. However, companies such as GOOGLE are tending towards vertical integration. To promote the use of the Cloud services we should consider the need for tools that can reach individual users [4].

Since the initial prototype stage, the Archaeological Dept. may use the verification trials were aimed at providing total support for Archaeological process by linking together the following three systems belonging to the Field work Unit, Processing and Security:
1). Administration System: System for performing financial, human resources
2). Archaeological Database System: It is a logging system that provides traceability records leading to the monuments/excavations in safer and dependable

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

3). Good Archaeological Practice operational support: System that efficiently manages safety and quality improvements in the Field survey producing by supporting the operation of the Good Archaeological Practice in the international Archaeological standard.

In the next stage, we will need to link together the CRMate Customer Relationship Management solution, supply chain management solution, and Ub!Point and SS Tube for handling video information. These are not simply combined into a single system as a sort of mash-up, but are used to provide functions that become necessary when providing services suited to business such as Hotel, Car Rentals, AirLine Tickets, familiar product to purchase and traditional foods in the nearby area [6].

IV. PROPOSED PLATFORM

Mashups of the various systems cited in the previous section also require flexibility in the platform structure. Even when one is considering just one Archaeological service application, the required functions include basic authentication and some functions that can be shared with other fields such as GPS data processing and mapping systems [15]. Other functions that should be shared with other fields are too numerous to mention, but include image/speech processing and data mining. These functions can probably be used not only in Archaeology but also in any business work needs to be done on the spot, such as medicine/nursing, health Care, automatic Car Parking, and maintenance work. Some examples are Figure:4.

At present, in the verification trials we are using a system with a vertically integrated structure, but from the beginning of the prototype development we have focused on the fact that it is possible to develop horizontally at the platform as-a-service (PaaS) layer.

V. CONCLUSION

In the future, in parallel with holding specific discussions for the construction of optimal platforms in a cross-cutting internal fashion to analyse the survey records, work history, findings not only in the dept. of Archaeology also in Higher Education, Agriculture and Tourism.
It is an approach to lift up, protect and share the informations about the monuments, antiquarians archaeological fields, collected samples and the comparisons of monuments with the history to the intended people and to the future generations by utilizing the benefits Cloud Computing. We are expecting that the trial we be useful to all us and this will be a grand success.

REFERENCES

1. Mitsuyoshi Hori, Elji Kawashima, Tomihiro Yamazaki, “Application of Cloud Computing in the field of Agriculture and prospects in other fields” at FUJITSU Science & Technologies Journal Vol.46. on OCT-2010
2. Anisha Tandon, “Implementing & Developing Cloud Computing on Web Application”, in International Journal of Computer Science and Mobile Computing (ISSN 2320–088X IJCSMC, Vol. 3, Issue. 2, February 2014, pg.153 – 157)
3. Udayakumar R., Khanaa V., Saravanan T., "Analysis of polarization mode dispersion in fibers and its mitigation using an optical compensation technique", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) pp. 4767-4771.
4. Ahmed E. Youssef, “Exploring Cloud Computing Services and Applications” in the Journal of Emerging Trends in Computing and Information Sciences, on Jul-2012. (VOL. 3, NO. 6, July 2012 ISSN 2079-8407)
5. Udayakumar R., Khanaa V., Saravanan T., "Chromatic dispersion compensation in optical fiber communication system and its simulation", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) pp. 4762-4766.
6. Anjali Jain, U.S.Pandey, “Role of Cloud Computing in Higher Education” in the International Journal of Advanced Research in Computer Science and Software Engineering, Jul-2013 (Volume 3, Issue 7, July 2013 ISSN: 2277 128X)
7. Udayakumar, R., Khanaa, V., Saravanan, T., "Synthesis and structural characterization of thin films of sno2 prepared by spray pyrolysis technique", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) pp.4754-4757.
8. Introduction to Cloud Computing by DIALOGIC, Whitepapers-Liladhar R. Rewatkar & Ujwal A. Lanjewar, “Implementation of Cloud Computing on Web Application”, International Journal of Computer Applications (0975 – 8887) Volume 2 – No.8, June 2010
9. Alanna Ossa and Dr. Arleyn Simon, “Basic Archaeological Database Design” at School of Human Evolution and Social Change, Arizona State UniversityArchaeological Research InstituteSHESC Graduate Workshop Series
10. Uma Mageswaran, S., Guna Sekhar, N.O., "Reactive power contribution of multiple STATCOM using particle swarm optimization", International Journal of Engineering and Technology, ISSN : 1793-8236, 5(1) (2013) pp. 122-126.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2015

11. Thomas F. King, "The Archaeological Survey: Methods and Uses" at Heritage Conservation and Recreation Service1, U.S. Department of the Interior Washington, 1978
12. Thilan Wijesjnghe, "A Proposed Methodology for. Measuring theEconomic Value or CulturalMonuments",Engineering Consultant10). Archaeological Survey of India, "National Mission on Monuments and Antiquities"
13. Vidyalakshmi K., Kamalakannan P., Viswanathan S., Ramaswamy S., "Antinociceptive effect of certain dihydroxy flavones in mice", Pharmacology Biochemistry and Behavior, ISSN : 0091-3057, 96(1) (2010) pp. 1-6.
14. P. J. Cherian, "Report of the Fifth Season Excavation at Pattanam: The fifth season excavations at Pattanam (Eranakulam District, Kerala, India)
15. Archaeological Survey of India, "National Mission on Monuments and Antiquities"
16. R.Karthikeyan, Dr.S.R.Suresh, An Approach for Real Time Testing Reliability& Usability Testing Process, International Journal of Innovative Research in Computer and Communication Engineering, ISSN (Online): 2320 – 9801,pp 644-651, Vol. 1, Issue 3, May 201
17. P.Ramya, dr.nalini, effective navigation queryresults based on biomedicaldatabase, International Journal of Innovative Research in Computer and Communication Engineering, ISSN: 2249-0183,pp 36-39, volume 1 Issue 3 No4- Dec 2011
18. P.Kavitha, Authentic Learning Activities withPedagogical Stylistics – Enhancing InE-Learning Websites, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 1211-1215, Volume 1, Issue 6, August 2013
19. N.Priya, VANET Based Adaptive Traffic SignalControl, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 1201-1208, Vol. 1, Issue 6, August 2014
20. N.Sakthi Priya, Cervical Cancer Screening and ClassificationUsing Acoustic Shadowing, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 1676-1679, Volume 1, Issue 8, October 2013