Improving the Response Time of Cloud Server

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***Abstract*: Mobile learning (m-learning) is a relatively new technology that helps students learn and gain knowledge using the Internet and Cloud computing technologies. Cloud computing is one of the recent advancements in the computing field that makes Internet access easy to end users. Many Cloud services rely on Cloud users for mapping Cloud software using virtualization techniques. Usually, the Cloud users' requests from various terminals will cause heavy traffic or unstable loads at the Cloud data centers and associated Cloud servers. Thus, a Cloud load balancer that uses an efficient load balancing technique is needed in all the cloud servers. This system proposes a new meta- heuristic algorithm, named the dominant fire fly algorithm, which optimizes load balancing of tasks among the multiple virtual machines in the Cloud server, thereby improving the response efficiency of Cloud servers. Findings such as Cloud-Structured Query Language (SQL), querying mechanism in mobile devices will ensure users receive their m-learning content without delay; additionally, our method will demonstrate that by applying an effective load balancing technique would improve the throughput and the response time in mobile and cloud environments.**

1. Introduction

Many computing practices are available in the computing field for maximizing automation. Among those, m- learning and Cloud computing are considered to be the best service oriented computing technologies to automatetasksin virtual machines as well atoneable users to access information very efficiently. Also m-learning offers cost effective solutions for a wide range of services. Mobile learning and Cloud computing are two essential domains to explain distributed data sharing. Inm- learning, mobile devices used by end users are called the m-learning clients. Through internet connectivity, m-learning clients store and retrieve data from Cloud at centers. Hence, m-learning systems integrated with Cloud data centers are quite advantageous for transferring all types of data and applications to mobile device easily and accurate. However load balancing issues in Cloud data centers should be addressed to improve Performance and effectiveness. Also, m-learning offers cost effective solutions for a wide range of services. Mobile learning and Cloud computing are two essential domains to explain distributed data sharing. In m- learning, mobile devices used by end users are called the m-learning clients. Through internet connectivity, m-learning clients store and retrieve data from Cloud data centers. Hence, m-learning systems integrated with Cloud data centers are quite. Load balancing techniques are used to distribute incoming traffic across multiple servers to minimize the delay of the Cloud server response to the Cloud users. Cloud load balancing is considered adequate only if the through put in the Cloud server is high, delays are minimal, and jitter is minimal while addressing Cloud user requests.

Sometimes, failure of load balancing in the Cloud leads to poor image resolution and poor video streaming for users [24].Thus, load balancing in Cloud servers is essential to maximize throughput and to achieve superior performance in both public and private Clouds.

2. Related Works

2.1 Efficient Fair Queuing using Deficit Round Robin

The authors in this paper stated that Fair queuingisa technique that allows each flow passing through a network device to have a fair share of network resources. Previous schemes for fair queuing that achieved nearly perfect equality were expensive to implement: specifically, the work required to process a packet in these schemes was O(log(n)), where n is the number of active flows. This is expensive at high speeds. On the other hand, cheaper estimates of fair queuing that have been reported in the literature exhibit partial behavior. In this paper, the authors described a new approximation of fair queuing, that they called Deficit Round Robin.

2.2 Towards a Middleware for Configuring Large-Scale Storage Infrastructures

The rapid proliferation of cloud and service-oriented computing infrastructure is creating an ever increasing thirst for storage within data centers. Ideally management applications in cloud deployments should operate in terms of high-level goals, and not present specific implementation details to administrators..

3. Observations on Using Genetic Algorithms for Dynamic Load-Balancing

Load-balancing problems arise in many applications, but, most importantly, they play a special role in the operation of parallel and distributed computing systems. Load-balancing deals with dividing a program into smaller tasks that can be executed concurrently and mapping each of these tasks to a computational resource such a processor. Advantageous for transferring all types of data and applications to mobile device easily and accurately. However, load balancing issues in Cloud data centers should be addressed to improve performance and efficiency

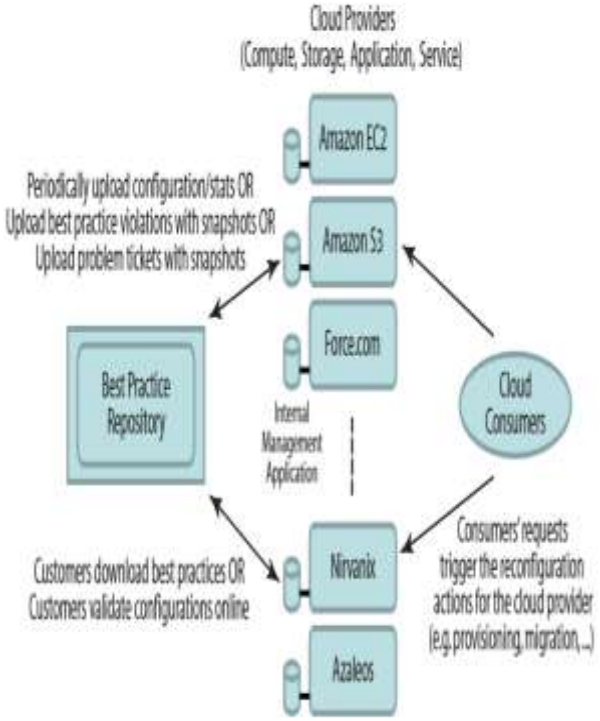

Figure 1 Cloud data center

4. Capturing cloud computing knowledge and experience in patterns

To capture cloud computing best practice from existing cloud applications and provider-specific documentation, they proposed to use an elaborated pattern formaten abling abstraction of concept sand reusability of knowledge in various use cases. They presented a detailed step-by- step pattern identification process supported by a pattern authoring toolkit. They continuously apply this process to identify a large set of cloud patterns. In this paper, they introduced two new cloud patterns they identified in industrial scenarios recently. The approach aims at cloud architects, developers, and researchers alike to also apply this pattern identification process to create traceable and well-structured pieces of knowledge in their individual field of expertise.

5. Firefly Algorithms for Multimodal Optimization

The authors stated that nature-inspired algorithms are among the most powerful algorithms for optimization. This paper intends to provide a detailed description of a new Firefly Algorithm (FA) for multimodal optimization applications. We will compare the proposed firefly algorithm with other meta-heuristic algorithms such as particle swarm optimization (PSO). Simulations and results indicate that the proposed firefly algorithm is superior to existing met heuristic algorithms. Finally they discussed its applications and implications for further research.

6. Biological Model of Dominant Firefly Behavior

The firefly and its behavior for finding food sources and searching for partners are quite interesting. Fireflies that produce the most intense brightness are called dominant fireflies and others with less luminescence are called submissive fireflies. Also, the glow of the fireflies' brightness is akin to an on and off switch. In every four to six seconds, the firefly' stail will be on then off, usually visible during the late evening and nighttime.

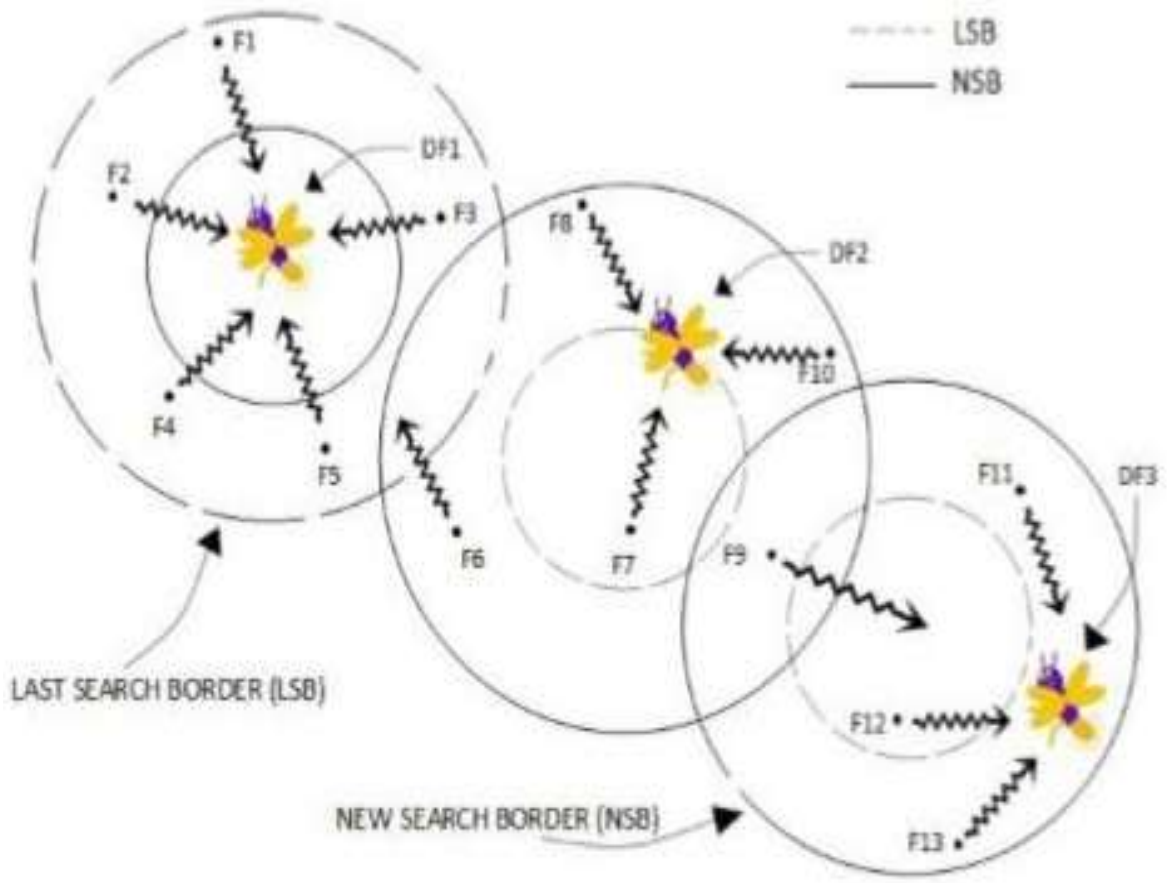

Figure 2 Biological Model of Dominant Firefly Behavior

The path selection of the firefly is another interesting pattern in which fireflies find the optimal distance to reach its partner. Maximum brightness depends upon the distance of the location of the firefly with respect to its partner.

7. System Flow Diagram

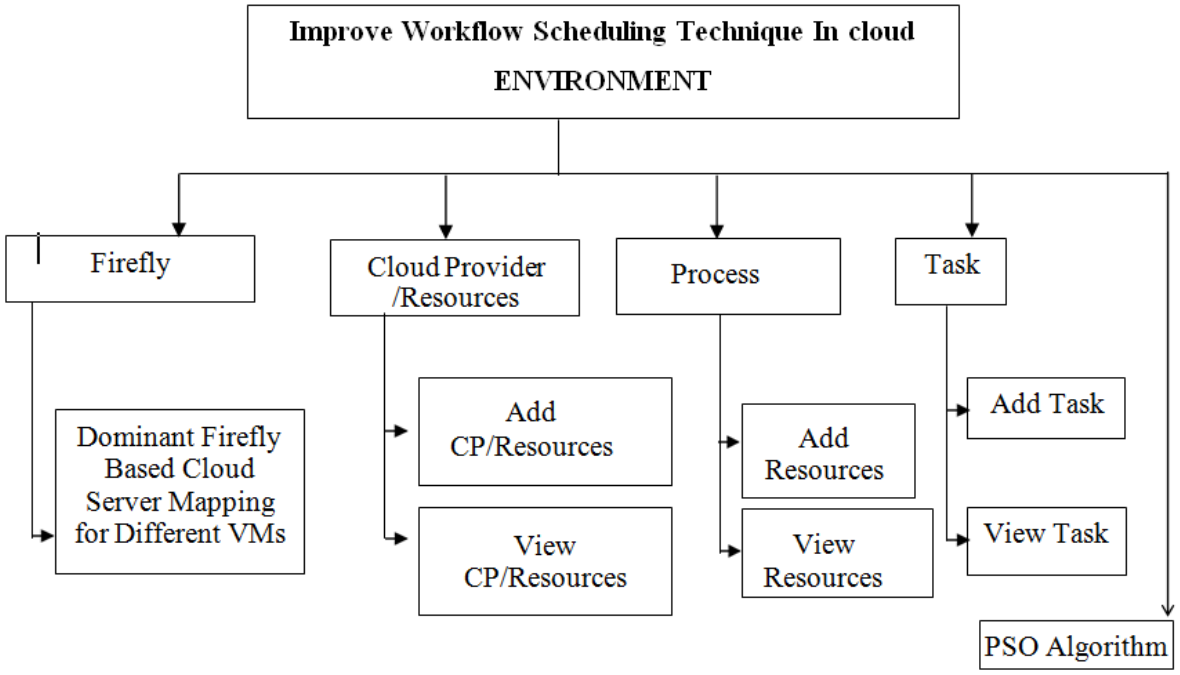

Figure 3 System flow diagram

8. Existing System

In existing system, Dominant firefly behavior is applied to Cloud load balancing strategies, termed the dominant firefly algorithm. In a group of fireflies, there will be several dominant fireflies and many submissive fireflies. The method assumes that dominant fireflies represent Cloud servers and submissive fireflies represent Cloud users. Whenever the Cloud servers are occupied with a lot of load (user requests), this needs to be balanced in such a way that queries or requests are transferred to some other Cloud server to complete the task. Based on firefly behavior, it is understood that if dominant fireflies are already occupied with many other submissive fireflies during partner searching, then the load is balanced by passing on excess submissive fireflies to the next dominant firefly. According to this algorithm, when Cloud user requests are increased to a particular Cloud server, then users are automatically transferred to the next (dominant) Cloud server. Also, the flight path of submissive fireflies towards the dominant firefly represents nearby Cloud servers that provide the dynamicity of load balancing.

9. Proposed System

Along with existing system implementation, Deadline resource provisioning algorithm for Job execution is being carried out. The dissertation presented the algorithm named SEMO (Superior Element Multitude Optimization) which is compare the total execution time and total execution cost between one processes to another process. In addition, it extends the resource model to consider the data transfer cost between data in cloud environment so that nodes can be deployed on different regions.

$$exeTime = \begin{array}{c} \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \end{array} \begin{array}{c} \begin{array}{ccc} r_1 & r_2 & r_3 \end{array} \\ \begin{bmatrix} 2 & 1 & 4 \\ 4 & 3 & 6 \\ 10 & 6 & 15 \\ 7 & 4 & 12 \\ 8 & 4 & 10 \\ 3 & 2 & 7 \\ 12 & 7 & 18 \\ 9 & 5 & 20 \\ 13 & 8 & 19 \end{bmatrix} \end{array}$$

(a)

Figure 4 Matrix representation of execution time

$$transferTime = \begin{array}{c} \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \end{array} \begin{array}{c} \begin{array}{ccccccccc} t_1 & t_2 & t_3 & t_4 & t_5 & t_6 & t_7 & t_8 & t_9 \end{array} \\ \begin{bmatrix} 0 & 9 & 9 & 9 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 5 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 7 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 10 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

(b)

Figure 5 Matrix representation of transfer time

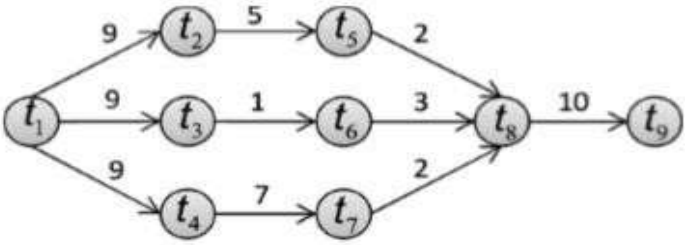

Figure 6 Node representations of servers

10. Conclusion

The thesis presented the Dominant- firefly based Cloud server mapping for Different Virtual Machines and also PSO (Particle Swarm Optimization) algorithm which is used to predict the least time computation in the cloud provider area. In addition, the thesis compared the time evaluation work between one dynamic resource flows to another process flow of dynamic resource in the cloud environment. In addition, it extends there source model to consider the data transfer cost between data centers so that nodes can be deployed on different regions. Extending the algorithm to include heuristics that ensure a task is assigned to a node with sufficient memory to execute it will be included in the algorithm. Also, it assigns different options for the selection of the initial resource pool. For example, for the given task, the different set of initial resource requirements is assigned. In addition, data transfer cost between data centers are also calculated so as to minimize the cost of execution in multi-cloud service provider environment. The main contribution of thesis, the following problem solve in the existing system, they contribution are

- Adaptable in situations where multiple initial set of resource availability.
- Suitable for multiple cloud service provider environments.
- Data transfer cost is reduced between different cloud data centers.

The system is very flexible and user-friendly, so the maintenance based on the changing environment and requirements can be incorporated easily. Any changes that are likely to cause failures are prevented with security and preventive measures could be taken. The coding is done in understandable and flexible method program which helps easy changing. Since Python is very flexible programming language, user can easily incorporate any modular program in the application.

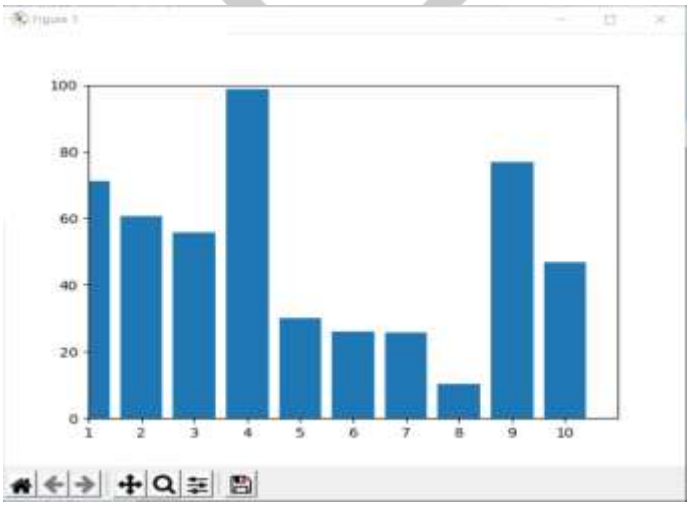

Figure 7 Execution time of server

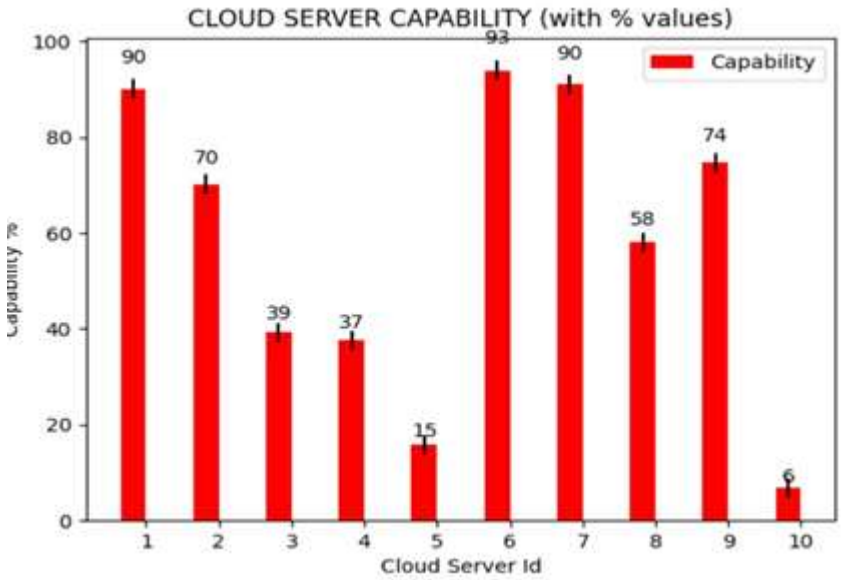

Figure 8 Capability of server in cloud

References

[1] M.Shreedhar and G.Varghese,‘‘Efficient fair queuing using deficit round robin,’’ IEEE/ACM Trans. Netw., vol. 4, no. 3, pp. 375–385, Jun. 1996

[2] D. Eyers, R. Routray, R. Zhang, D. Willcocks, and P. Pietzuch, “Towards a middleware for configuring large-scale storage infrastructures” ’in Proc. 7th Int. Workshop Middleware Grids, Clouds e-Sci., 2009, p. 3.

[3] A. Y. Zomaya and Y.-H. Teh, ‘‘Observations on using genetic algorithms for dynamic load-balancing,’’ IEEE Trans. Parallel Distrib. Syst., vol. 12, no. 9, pp. 899–911, Sep. 2001

[4] C.Fehling, T.Ewald, F.Leymann, M.Pauly, J.Rütschlin, and D.Schumm, ‘‘Capturing cloud computing knowledge and experience in patterns,’’ in Proc. IEEE 5th Int. Conf. Cloud Comput. (CLOUD), Jun. 2012, pp. 726–733

[5] X.-S. Yang, ‘‘Firefly algorithms for multimodal optimization,’’ in Proc. Int. Symp. Stochastic Algorithms. Berlin, Germany: Springer, 2009, pp. 169–178.

[6] Nandagopal S, Arunachalam VP, KarthikS, “A Novel Approach for Mining Inter-Transaction Item sets”, European Scientific Journal,Vol.8,pp.14-22, 2012.

[7] V.S. Suresh kumar “Frequent Pattern Complex query management using FIUT Approach”, South Asian Journal of Engineering and Technology, pp: 300-304, issue 204, volume 202, 2018

[8] Gokulraj P and Kiruthikadevi K, “Revocation and security based ownership deduplication of convergent key creating in cloud”, International Journal of Innovative Research in Science, Engineering and technology. Vol. 3, Issue 10, ISSN: 2319-8753, October 2014.

[9] Sureshkumar V S, Chandrasekar A,” Fuzzy-GA Optimized Multi-Cloud Multi-Task Scheduler For Cloud Storage And Service Applications” International Journal of Scientific & Engineering Research, Vol.04, Issue.3,pp-1-7, 2013

[10] E.Prabhakar, V.S.Sureshkumar, Dr.S.Nandagopal, C.R.Dhivyaa, Mining Better Advertisement Tool for Government Schemes Using Machine learning “ , International Journal of Psychosocial Rehabilitation, Vol.23,Issue.4, pp. 1122-1135, 2019

[11] Vijayakumar M, Prakash s, “An Improved Sensitive Association Rule Mining using Fuzzy Partition Algorithm”, Asian Journal of Research in Social Sciences and Humanities, Vol.6,Issue.6, pp.969-981, 2016.

[12] Prakash S, Vijayakumar M, “ Risk assessment in cancer treatment using association rule mining techniques”, Asian Journal of Research in Social Sciences and Humanities,Vol.6,Issue.10, pp.1031-1037, 2016.

[13] Prabhakar E, “ Enhanced AdaBoost algorithm with modified weighting scheme for imbalanced problems, The SIJ transaction on Computer science & its application,Vol.6,Issue.4, pp.22-26, 2018.

[14] Suresh kumar V S ,Thiruvankatasamy S, Sudhakar R, “Optimized Multicloud Multitask Scheduler For Cloud Storage And Service By Genetic Algorithm And Rank Selection Method”, Vol.3,Issue.2, pp.1-6, 2014

[15] Nandagopal S, Malathi T, “Enhanced Slicing Technique for Improving Accuracy in Crowd Sourcing Database”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.3,Issue.1, pp.278-284, 2014

[16] Prabhakar E, Santhosh M, Hari Krishnan A, Kumar T, Sudhakar R,” Sentiment Analysis of US Airline Twitter Data using New Adaboost Approach” ,International Journal of Engineering Research & Technology (IJERT),Vol.7,Issue.1, pp.1-6, 2019

[17] V.S. Suresh kumar “E-Farming by means of E-Mandi Process”, International Journal of Research and Advanced Development (IJRAD), ISSN: 2581-4451, pp: 55-57, Issue 6, volume 2, 2019

[18] Dr.C.R. Dhivyaa, R. Sudhakar, K. Nithya and E. Prabhakar “Performance Analysis of Convolutional Neural Network for Retinal Image Classification”, International Journal of Psychosocial Rehabilitation, Vol. 23, no.4, pp.1149-1159,November 2019.

[19] S Nandagopal, S Karthik, VP Arunachalam,”Mining of meteorological data using modified apriori algorithm”, European Journal of Scientific Research , Vol. 47, no.2, pp. 295-308, 2010.

[20] P Gokulraj, K Kiruthika-Devi,"Revocation and security based ownership deduplication of convergent key creating in cloud", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 3, no.10, pp16527-16533, October 2014.
[21] E Prabhakar, R Parkavi, N Sandhiya, M Ambika,"Public Opinion Mining for Government Scheme Advertisement", International Journal of Information Research and Review, Vol. 3, no.4, pp2112-2114, February 2016.
[22] Karthik.S. Nandagopal.S, Arunachalam.V.P.," Mining of Datasets with Enhanced Apriori Algorithm", Journal of Computer Science, Vol. 8, no.4, pp599-605, 2012.
[23] Nandagopal.S. Malathi.T.,"Enhanced Slicing Technique for Improving Accuracy in Crowd Sourcing Database", International Journal of Innovative Research in Science, Engineering and Technology) , Vol. 3, no.1, pp278-284,2014.
[24] V Dharani S Thiruvenkatasamy, P Akhila, V Arjitha, K Bhavadharani," A MD5 Algorithm Approach to Monitor Village Using Mobile Application", South Asian Journal of Engineering and Technology, Vol. 8, no.s1, 2019.
[25] V.S. Suresh kumar, Vijaya Rao.S, V Vijay, D Nagarjun, G Thangavel "E-Commerce Recommendation over Big Data based on early reviewers for effective product marketing Prediction Rates", South Asian Journal of Engineering and Technology, pp: 202-204, Issue 204, volume 202, 2019