A Survey on Honey Bee Inspired Load Balancing of tasks in Cloud Computing

Anju Baby
Post-Graduate Student
Department of Computer Science and Engineering, Karunya University
India

JenoLovesum
Assistant professor
Department of Computer Science and Engineering, Karunya University
India

Abstract

Cloud computing is nothing but a collection of computing resources and services pooled together and are provided to the users on pay-as-needed basis. Load balancing is a computer networking method for distributing workloads across different computing resources, like computers, a computer cluster, network links, and central processing units. Main goal of the load balancing technique is to optimize use of resources, maximize the throughput, reduce the response time, and avoid overload of any of the resources. This paper discusses various Honey Bee Inspired Load Balancing of Tasks in Cloud Computing Environment.

*Keywords:***Cloud computing,Load balancing, Honey bee foraging behavior**

1.Introduction

Cloud computing is a fully internet-based approach where all the applications are hosted on a cloud. Since it is an internet based approach, it is not necessary to access the service directly to the available resources. A cloud consists of thousands of computers interlinked together in a complex manner. The importance of cloud computing comes whenever there is an excess need of resource comes.

The processing units in cloud environments are called as virtual machines.it is the duty of scheduler to check whether virtual machines are overloaded, less loaded or idle with tasks [1]. If the virtual machine is overloaded, then tasks should be move to under loaded virtual machine. Scheduler should perform efficiently in this case.so load balancing of tasks is an important function of scheduler. Load balancing is used to achieve optimal machine utilization.

This paper is organized as follows. Section 2 includes a discussion on key concepts in this paper; section 3 gives a related works, section 4 gives a conclusion and section 5 gives references.

2.Key Concepts

A. HONEY BEE FORAGING BEHAVIOR

Load balancing techniques are of two types based on the current state of the system.

1. Static
2. Dynamic

Static algorithms used when there is low variation in the load. Static algorithms are not suitable for cloud environments. In cloud environment load is varying by varying time. Dynamic load balancing algorithms overcomes this drawback. But to gain this advantage, need to consider the extra cost associated with collection and maintenance of the load information. Dynamic techniques are successful for load balancing of tasks among heterogeneous resources [2]. Also dynamic load balancing is good for environments where the tasks are varying regularly.

Load balancing is an important factor to improve the performance of the system. Based on process origination load balancing algorithm classified into[3]

a) **Sender Initiated**: In this algorithm client sends request until receiver assigned to him to receive load.
b) **Receiver Initiated**: In this receiver send request to acknowledge the sender.
c) **Symmetric**: It is a combination of both receiver and sender initiated.

3. Related Works

Honey bee foraging behavior means searching of food. Special type of bee in the bee hive is known as scout bees.First these scout bees will search for the new food source when there is a scarcity in their hive. After finding the source it will come back to its hive and perform vibration or waggle dance. By seeing this dance other bees can easily identify the amount and distance of food. Then another type of bee called forager bee will moves to that source by following the scout bees. This process will repeat until the food in that new source gets reduced. This behavior is known as honey bee foraging behavior. Different Honey Bee Inspired Algorithms are described below.

1. An artificial bee colony algorithm for the leaf-constrained minimum spanning tree problem

A. Singh [4], proposed an artificial bee colony (ABC) algorithm for the leaf-constrained minimum spanning tree problem. The ABC algorithm also called meta-heuristic approach. The ABC algorithm is a new meta-heuristic approach inspired by foraging behavior of honeybee. Here they compared the performance of ABC approach against the best approaches reported in the literature. Computational results show the dominance of the new ABC approach over all the other approaches. Computation time is the parameter used in this paper.So it focus only to reduce the computation time for load balancing .But still it faces cost and all.

2. A discrete artificial bee colony algorithm for the lot-streaming flow shop scheduling problem

Q.K. Pan et al [5], proposes discrete artificial bee colony (DABC) algorithm to solve the lot streaming flow shop scheduling problem with the criterion of total weighted earliness and tardiness penalties under both the idling and no-idling cases. This is another application of artificial bee colony algorithm.it deals with computation time and earliest due date.

3. Structural inverse analysis by hybrid simplex artificial bee colony algorithms

F. Kang et al [6] proposes a hybrid simplex artificial bee colony algorithm (HSABCA) which combines Nelder–Mead simplex method with artificial bee colony algorithm (ABCA).This proposed algorithm is an efficient tool for inverse analysis and it performs much better than ABCA and RCGA on such problems. Main different from other application of ABC algorithm is it uses young's modulus as the parameter.

4. The bees algorithm – a novel tool for complex optimization problems

D.T. Pham et al [7] propose a new population-based search algorithm called the Bees Algorithm (BA). This algorithm follows the food foraging behavior of honey bees. This paper focus on functional and non-functional optimization. In bees algorithm it deals with success rate as the parameter.

5. On the performance of artificial bee colony (abc) algorithm

Artificial Bee Colony Algorithm is an optimization algorithm based on intelligent behavior of honey bees. D. Karaboga et al [8] compares performance of ABC algorithm with differential evolution (DE), particle swarm optimization (PSO) and evolutionary algorithm (EA).The results show sthat performance of ABC algorithm is very much greater compared to other techniques.

6. Block matching algorithm for motion estimation based on artificial bee colony

Block matching motion estimation plays an important role in video coding. E. Cuevas et al [9] propose a new algorithm based on Artificial Bee Colony (ABC) optimization is proposed to reduce the number of search locations in the BM process.

7.Enhanced artificial bee colony optimization

It is called the Interactive Artificial Bee Colony (IABC) optimization, for numerical optimization problems. The IABC introduces [10] the concept of universal gravitation into the consideration of the affection between employed bees and the onlooker bees. Efficiency and accuracy are the parameters used in this paper.

8.HBB-LB Algorithm

Honey-bee based load balancing technique that is a nature- inspired algorithm for self- organization. It gains global load balancing through action of local server . Performance of the system is enhanced with system diversity. This is most efficient techniques and it uses make span and response time as

parameters. This algorithm is mainly based on the foraging behavior of honey bee. That is searching of food.

Based on metrics used in above section, existing honey bee foraging behavior is compared in the below table.

Techniques	Capability	Youngsmodulous	earliest due date	Success rate	Population size	Slack time	Computation time	Efficiency	accuracy
An artificial bee colony algorithm for the leaf-constrained minimum spanning tree problem							√		
A discrete artificial bee colony algorithm for the lot-streaming flow shop scheduling problem			√			√			
Structural inverse analysis by hybrid simplex artificial bee colony algorithms		√							
The bees algorithm – a novel tool for complex optimization problems				√					
On the performance of artificial bee colony algorithm					√				
Block matching algorithm for motion estimation based on artificial bee colony								√	
Enhanced artificial bee colony optimization								√	√

4. Conclusion

Load balancing is one of the important and challenging thing in cloud computing. It is necessary to balance the workload among different processors in order to increase the efficiency.so in this paper we compared different Honey Bee Foraging algorithm. By comparing all these algorithms Honey bee behavior inspired load balancing algorithm have more advantages over other algorithms.

5. References

[1]DhineshBabu L.D, P. VenkataKrishna , "Honey bee behavior inspired load balancing of tasks in cloud computing environments",2013.
[2] DhineshBabu L.D, P. VenkataKrishna , "Honey bee behavior inspired load balancing of tasks in cloud computing environments",2013.
[3] NayandeepSran, NavdeepKaur, " Comparative Analysis of Existing Load Balancing Techniques in Cloud Computing ",2013
[4]A. Singh, "An artificial bee colony algorithm for the leaf constrained minimum spanning tree problem" , 2009.
[5] Q.K. Pan, M.F. Tasgetiren, P. Suganthan, T. Chua, "A discrete artificial bee colony algorithm for the lot-streaming flow shop scheduling problem" ,2011.
[6] F. Kang, J. Li, Q. Xu, "Structural inverse analysis by hybrid simplex artificial bee colony algorithms ",2009.
[7] D. Karaboga," An idea based on honey bee swarm for numerical optimization ",2005.
[8] D. Karaboga, B. Basturk, "On the performance of artificial bee colony (ABC) algorithm,Applied Soft Computing" , 2008.
[9] E. Cuevas, D. Zaldívar, M. Pérez-Cisneros, H. Sossa, V. Osuna, "Block matching algorithm for motion estimation based on Artificial Bee Colony (ABC), Applied Soft Computing ", 2012.
[10] P.W. TSai, J.S. Pan, B.Y. Liao, S.C. Chu, "Enhanced artificial bee colony optimization" , 2009.
[11] C. Zhao, S. Zhang, Q. Liu, J. Xie, J. Hu, "Independent tasks scheduling based on genetic algorithm in cloud computing, wireless communications.Networking and mobile computing".