Improvement in Genetic Algorithm for Virtual Machine Migration in Cloud Computing

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ABSTRACT
The cloud computing is the architecture in which hosts, virtual machines, brokers, virtual servers are involved in the communications. The cloud architecture is the de-centralized network for task migration, task allocation, security. This work is based on the task migration when virtual machine get overloaded at the time of cloudlet execution. The brokers are responsible to assign tasks to the most appropriate virtual machine for the execution. When any of the virtual machine get overloaded, the task is migrated from one virtual machine to another which can be decided by the improved genetic algorithm. The proposed and existing algorithms are implement in cloudsim and it analyze the execution time, space utilization. Execution time, space utilization is reduce by the proposed improvement.

Keywords
Cloudlets, Brokers, virtual machine, genetic algorithm

1. INTRODUCTION
The combination of systems into one large pool to connect each other publically or in a private manner to share resources is known as cloud computing. A dynamically scalable infrastructure in provided here in the application where the data and the file storage systems are also shared. The cost of computation, application hosting, content storage and delivery is reduced here [6]. The cost benefits are experienced at huge level in this technique because of the facility of sharing resources. The organizations which cannot afford the cost of various resources they can access these resources from the clouds present.

1.1. Applications of Cloud
The application can be deployed on the public, private or hybrid clouds. The clouds have various properties which can be to the organizations and so it is beneficial to choose the right path. The clouds that are operated and accessed by the external users are known as public clouds [9]. The clouds which are used by the single organizations are known as the private clouds. The main objective in private cloud is data security which is absent in the public clouds. The systems which combine the public as well as the private cloud models are known as the hybrid clouds. The external cloud providers are used completely or partially by the service providers in a hybrid cloud [8]. This helps in increasing the flexibility of cloud computing. Cloud computing is a service which provides multiple users and online applications. Cloud computing architecture provides resources to user on demand. The cloud resources are allocated in a proper manner and this is a prior objective of this system. [10]. One of the major function of cloud computing is the allocation of resources so that resources are distributed in a proper manner. For satisfying user requirements, resources are allocated according to there requriments. affected

1.2. Scheduling Algorithms
There are various scheduling algorithms which are used for the allocation of resource. There are various parameters present in the cloud in which the resources are to be allocated. An optimized resource scheduling algorithm is based on Infrastructure-as-a-service (IaaS) model. The seheduling algorithms are used to schedule all resources to virtual machines(VMs). For the development policy in computer systems, an Improved Genetic Algorithm (IGA) is used. On the basis of market (RAS-M) a new resource allocation scheme is proposed [2]. Through this scheme, the resource consumption of huge data centers is advanced. Here, higher QoS is provided for the cloud consumers through the services. The structural design as well as the market replica of RAS-M is constructed. An adaptable on-demand scheme is used for providing resources in the cloud computing environment. On the basis of the Service Level Agreements (SLAs), clouds provide various services. [3]. For the purpose of avoiding under usage as well as over usage of the resources, a Rule Based Resource Allocation Model (RBRAM) is proposed. This model helps in allocating the resources on the basis of task requirements. On the basis of genetic algorithm, a balanced scheduling algorithm is proposed which has the main objective of matching the load with the VM.

2. LITERATURE REVIEW
Huangke Chen, et.al (2015) proposed in this paper [7], theory to portray the uncertainty of the computing environment and a scheduling to reduce the impact of uncertainty on the task scheduling quality for a cloud data center. Based on this design, a novel scheduling algorithm (PRS1) is presented that dynamically exploits proactive and reactive scheduling techniques, for scheduling real-time, a periodic, free tasks. The experimental results demonstrate that PRS performs superior to those algorithms, and can effectively improve the performance of a cloud data center.

Doulamis ND, et.al (2014) proposed in this paper [4], an algorithm for allocating tasks to resources that minimizes the infringement of the tasks' time requirements while simultaneously maximizing the resources' utilization efficiency for a given number of resources. The exact time scheduling of the tasks on the resources is then decided by considering the time constraints. The partitioning is performed by utilizing a spectral clustering methodology through normalized cuts. Experimental results demonstrate that the proposed algorithm performs other scheduling algorithms for

various values of the granularity and the load of the task requests.

Abdul Hameed, et.al (2014) proposed tthe main aim of this paper [1] is to distinguish open challenges connected with energy efficient resource allocation. The review, begins with the layout problem and existing equipment and software-based techniques accessible for this reason. Furthermore, accessible techniques based on the energy-efficient research dimension taxonomy. The focal points and inconveniences of the existing techniques are comprehensively analyzed against the proposed research dimension taxonomy namely: resource adaption policy, objective function, allocation method, allocation operation, and interoperability.

Young Choon Lee, et.al (2012) proposed this paper [11], the energy-cognizant task consolidation heuristics technique define. Main aim to maximize resource utilization and explicitly consider both dynamic and sit without moving energy consumption. Heuristics assign every task to the resource on which the energy consumption for executing the task is explicitly or implicitly minimized without the performance degradation of that task. Based on the experimental results, the heuristics demonstrate their efficient energy-saving capability.

Zhanjie Wang, et.al (2015) proposed, in this paper [12], a dynamically hierarchical resource-allocation algorithm. Algorithm define multiple cloud nodes collaborating in big data environment. The algorithm dynamically divides tasks and nodes into various levels based on computing power and storage factors. Both theoretical and experimental results represent that the proposed algorithm outperforms the MinMin algorithm in terms of communication traffic and makespan. The results demonstrate that DHRA can reduce message number and communication traffic significantly, with the equal or even less tasks finish time compared with MinMin. DHRA is proven to be efficient for resource allocation in cloud computing environment.

Guiyi Wei, et.al (2010) proposed, this paper show [7], a QoS constrained resource allocation problem in which service demanders intend to take care of sophisticated parallel computing problem by requesting the utilization of resources over a cloud-based network. The cost of each computational service depends on the measure of computation. Game theory is utilized to tackle the problem of resource allocation. A pragmatic approximated solution proposed. The method might be a valuable for optimal scheduling solution of the complex and dynamic problems that can be divided into multiple cooperative subtasks in many cloud-based computing and data store services.

3. GENETIC ALGORITHM

Genetic algorithm (GA) is a met heuristic inspired by the process of natural selection. The GA belongs to the larger class of evolutionary algorithms (EA). High-quality solutions are generated using the GA for the purpose of optimization and searching problems. The algorithm also depends upon the bio-inspired operators such as mutation, crossover and selection for generating these solutions. The genetic algorithms are known as the evolutionary algorithms. In this numerous methods are included by developmental science for example, legacy, change, characteristic determination, and recombination. In the representation of the hereditary calculations the wellness capacity is characterized. The hereditary calculation continues to instate the arrangements arbitrarily.. In this case it involves many applications such as: mutation, crossover, and selection operators.

4. PROPOSED METHODOLOGY

In the proposed technique, the algorithm is defined which reduce the burden of developers by offloading the classes. To implement the offloading concept in cloud computing various techniques are used. In this algorithm graph modal is used. In the technique of graph modal whole application is divided into graph like structure and .The classes which are directly access of the node is offload using the technique of decision tree algorithm. The decision tree algorithm will decided that which classes need to be offloaded and what are best possible ways to offload the classes. The code of classes which need to be offloaded are called. To improve performance of proposed technique graph like structure can be replaced with tree like structure. This improvement leads to reduction in complexity. The maximum number of classes are identified which can be offloaded using the technique of decision tree. The global optimization is done using the genetic algorithm, whereas the local refinement is done using the conventional method such as hill climbing, greedy algorithm, and so on. Variants are possible here such as:

1. First of all the coarse search is performed. Once the GA ends, the local refinement is performed further.

2. Through the GA, the local method is integrated. For example, for each K generation a locally optimal individual is used for doping the population.

3. Parallel running of both the methods: Using the local method, the individuals are used as initial values. Within the current generation, the locally optimized individuals are re-implanted.

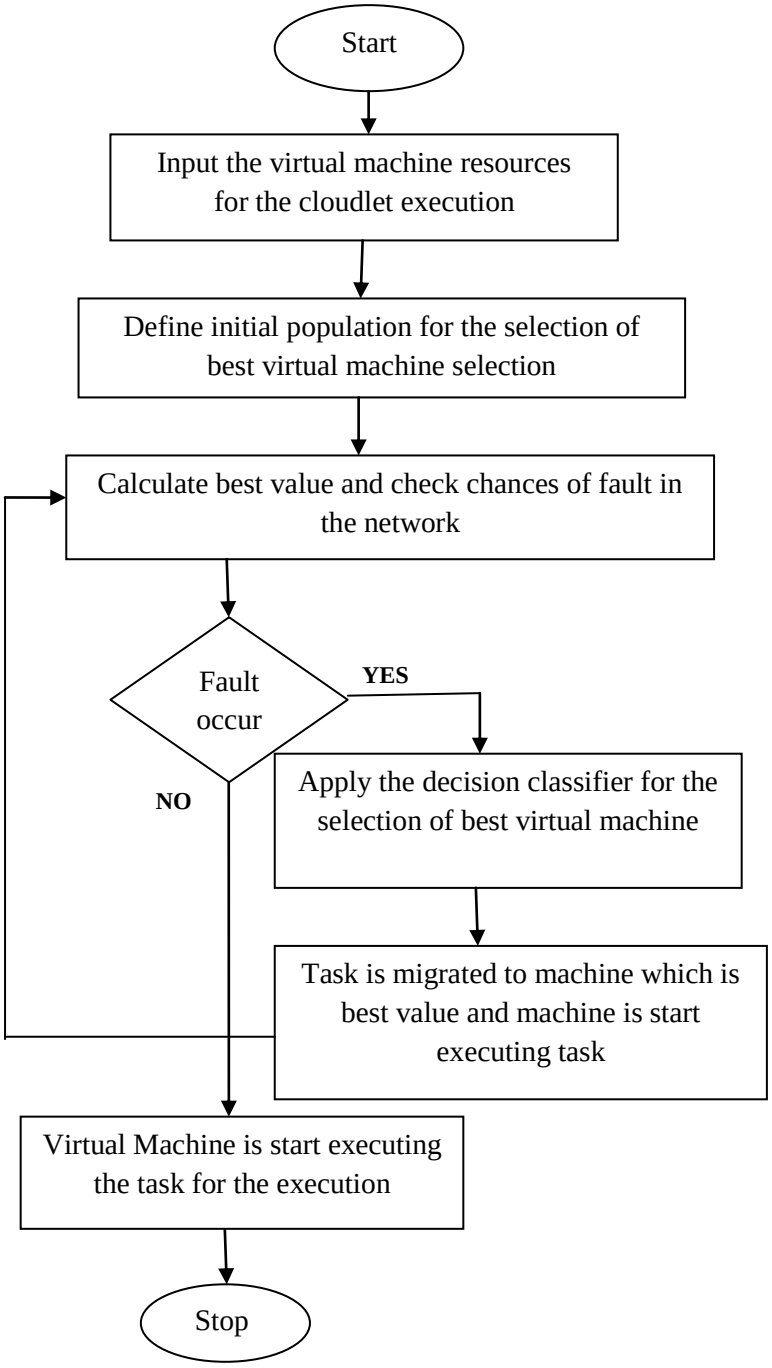

Fig 1: Proposed Flowchart

5. RESULTS AND DISCUSSION

The proposed technique is been implemented in cloudsim and to test the performance the existing genetic and proposed genetic algorithm are implemented and compared in terms of various parameters

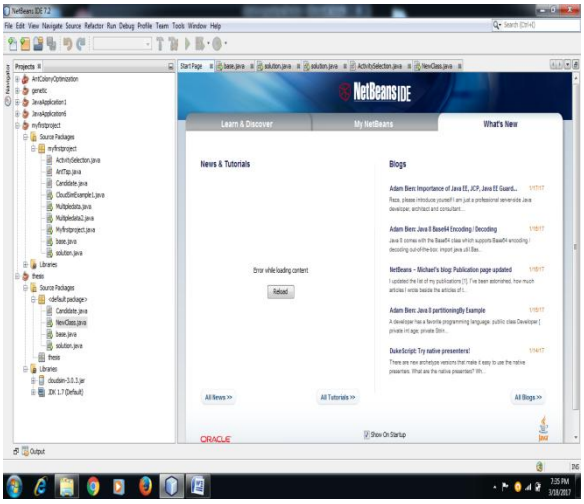

Fig 2: Task migration

As shown in the figure 2, the technique of improved genetic algorithm is been applied for the task migration. The task is migrated from the machine 1 to 2 for the efficient execution

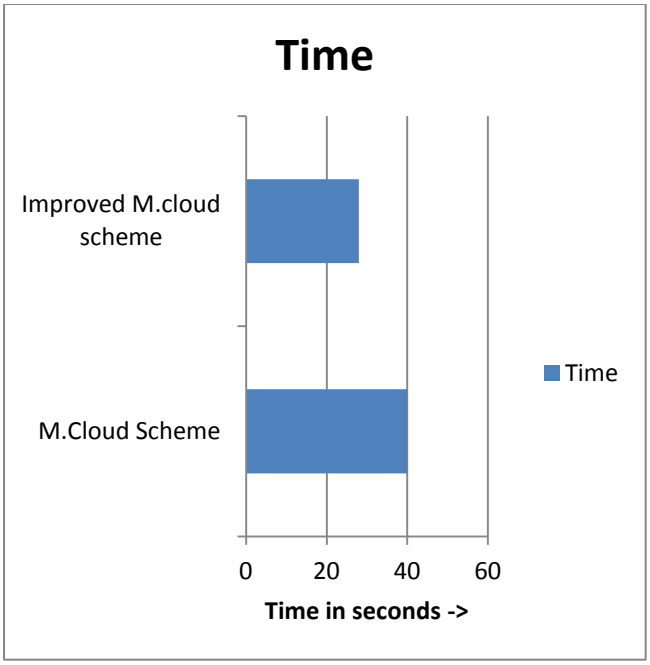

Fig 3: Time comparison

As shown in the figure 3, the execution time of the proposed and existing algorithm is been compared and it is evaluated that due to virtual machine migration the execution time is reduced in the improved version

Fig 4: Space Comparison

As shown in the figure 4, the space utilization of the proposed and existing algorithm is compared and it is been analyzed that space utilization of proposed technique is reduced due to virtual machine migration.

6. CONCLUSION

In this paper, it is been concluded that brokers are responsible to assign the task to the virtual machine for the execution. The genetic algorithm is implemented on the broker which assign tasks to the virtual machine for the efficient execution. When the machine get overloaded the fault may raised in the network which can be resolved by the virtual machine migration. The virtual machine need to be migrated will be decided with the improved genetic algorithm. The simulation results shows that execution time is reduce to 15 percent and space utilization is reduced to 20 percent

7. REFERENCES

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