



Performance Evaluation of the QoS and Security of Database System using the PSO

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Abstract:

Both network security and quality of service (QoS) consume computational resource of IT system and thus may evidently affect the application services. Database systems are widely used in today’s computer system, which are adopted for storing and accessing data in various application services. It is important to model the mutual influence between network security and QoS, which can be concurrently optimized in order to provide a better performance under the available computational resource. This paper represents the particle swarm optimization which enhances is designed to get the optimization performance. These obtained security policies not only meet the security requirement of the user, but also provide the global optimum solution easily and has good convergence speed.

Keywords: Database System, QOS, Network Security, Particle Swarm Optimization (PSO).

I.INTRODUCTION

Quality of service (QoS) things benefits equally the user and also the spread system. QoS consumers advantage by using efficient entry to products and services; as well as spread methods in whose assets will be QoS managed advantage by using extra expected useful resource utilization and a lot more effective useful resource permitting (that is, within methods wherever permitting performance is supported). The commitment with the deliver the results identified right here is to guide determine if this excellence, predictability and also performance might be improved by including stability as a proper element of QoS, adjusting stability out of a constant operation barrier in to a optimistic multilevel supervision tool. We've classified the particular effects of this inclusion, “Good quality of Security Service” (QoS).

1.1 BASIC ARCHITECTURE OF QOS

The fundamental structures features a few of the basics for QoS implementation. QoS is definitely detection as well as paying attention to approaches for complementing QoS via end to end involving community elements.

1. QoS inside of an individual community factor (for instance, lining up, scheduling, plus traffic-shaping tools)
2. QoS insurance plan, supervision, plus accounting characteristics to master plus apply end-to-end targeted traffic over a new network.

1.2 SECURITY IN DATABASE SYSTEM

Security can be a problem that need considering seeing that an elementary requirement throughout information methods improvement, especially throughout database design. Hence stability, seeing that another top quality property or home with program, need to be dealt with in any respect steps on the development. The best extensive safe and sound collection design could be the multilevel design, which permits the particular classification of knowledge based to its discretion, as well as thinks about necessary entry handle [4]. While using the wide-spread make use of collection methods, many people experience increasingly more external and internal threats. When the information kept in data source continually involve a great deal sensitive information, for example individual comfort, lender information as well as business oriented secrets. Progressively more real-time providers throughout collection are expected, that may extremely effect the grade of program (QoS). Consequently the particular collection procedure desires the safety program as well as QoS simultaneously.

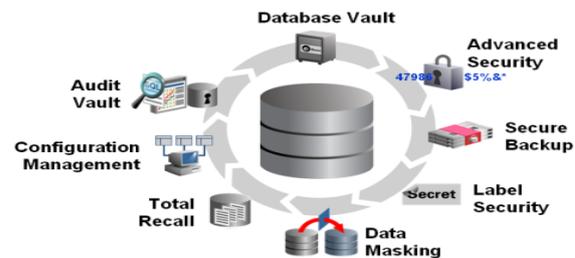


Figure.2. Security in database system

1.3 GENETIC ALGORITHM

Genetic algorithms loosely parallel biological evolution and are based on Darwin’s theory of natural selection. The specific mechanics of the algorithms involve the language of microbiology and, in developing new potential solutions, mimic genetic operations. A population represents a group of potential solution points. A generation represents an algorithmic iteration. A chromosome is comparable to a design

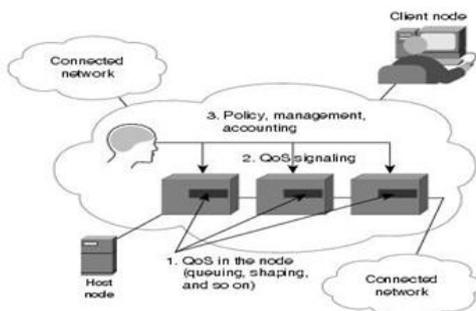


Figure.1. A Basic QoS Implementation

point, and a gene is comparable to a component of the design vector. It is an optimization method based on population and is based on Darwin's theory of evolution. In GA, each possible solution is represented by a chromosome. An initial population is taken randomly and it is used as a starting point. A fitness function is calculated for each chromosome so that it is known whether the chromosome is suitable or not. Crossover and mutation functions are performed on the selected chromosomes and off springs for new population are created. This process is repeated until enough off springs are created. Basic steps of GA are:

- Evaluation
- Crossover
- Mutation
- Selection

II. PARTICLE SWARM OPTIMIZATION

Particle swarm optimization (PSO) is a stochastic optimization strategy, patterned on the cultural conduct of chicken flocks. PSO is a population-based research method wherever in actuality the persons, named contaminants, are arranged proper in to a swarm. Each chemical in the swarm presents prospect methods to resolve the optimization problem. In a PSO process, each chemical is "flown" through the multi dimensional research room, modifying their place exploring room relating using its knowledge and that of neighboring particles. A chemical thus employs the top place undergone due to it and the top place of their neighbors to place it self toward an perfect solution. The consequence is that contaminants "fly" toward an perfect, while however exploring a wide place about the prevailing most useful solution. The efficiency of each chemical (i.e. the "closeness" of a chemical to the world wide minimum) is tested relating with a predefined conditioning Purpose which pertains to the problem being solved. PSO has some benefits around different related optimization methods such as for example for example GA, specifically the following:- 1) PSO now's better to apply and you will find less variables to adjust. 2) In PSO, every chemical recalls their prior economical along with a regional most useful; thus, it comes with a more effective storage capacity set alongside the GA. 3) PSO is more efficient in sustaining the range of the swarm (more similar to the excellent cultural connection in a community), because every one of the contaminants utilize the data associated with one of the most effective chemical to have the ability to increase themselves, although in GA, the worse answers are extracted and just the great people are preserved; thus, in GA the citizenry evolves about a the main best individuals.

1. For each particle
2. Initialize particle
3. End for
4. Do
5. For each particle
6. Evaluate the value of fitness
7. if the fitness value is better than the best value
8. set current value as pbest
9. End
10. select the particle with best fitness value as gbest
11. For each particle
12. evaluate particle velocity
13. update particle position
14. End
15. while maximum iterations or minimum error condition is not achieved.

Zaheeruddin, et al.(2017)[1] proposed real time multimedia applications, Quality-of-Service (QoS) based multicast routing has emerged as an active area of research. The fundamental requirements of many multimedia applications are cost minimization and bounded end-to-end delay. In addition, video data traffic is sensitive to packet loss and delay variance. Hence, multiobjective optimization seems to be the most appropriate method for such complex problems. We, therefore, formulate QoS based multicast routing as a multiobjective optimization problem using Elitist Nondominated Sorting Genetic Algorithm (NSGA-II). To enhance the performance of NSGA-II, we propose a new encoding scheme that aims to achieve a diversified solution set and faster convergence of search towards optimal Pareto front. It has also been observed that identical solutions cause loss of diversity which degrades the performance of NSGA-II algorithm. To overcome this drawback, the second enhancement based on replacement strategy is used. Hua Ma, et al.(2017)[2] surveyed the diversity involving individual features, the uncertainty and also the deviation traits involving quality of service (QoS), by means of exploiting the continuous tracking info involving clouds solutions, the following document suggests a multi-valued collaborative approach to calculate the unfamiliar QoS ideals through period sequence evaluation intended for prospective users. In this particular approach, the multi-valued QoS critiques composed of single-value info and also period sequence info from rrrndividuals are transformed into clouds types, and also the variations amongst prospective consumers along with buyers atlanta divorce attorneys period usually are assessed according to these clouds models. Against the scarcity of present strategies to similarity rating amongst clouds types, the following document reveals a different vector comparing procedure combining the positioning similarity and also measurement being similar to boost the perfection involving similarity calculation. Zhen Chen, et al.(2017)[3] presented the world wide web providers using comparative features yet various superior usually are increasingly becoming on the actual Online, predicting the actual mysterious QoS importance of the Website need to an engaged person exactly who has not yet used the actual service formerly is normally important for Website service suggestions plus composition. Current collaborative selection techniques have problems with the actual expected sparsity plus cold-start troubles plus undervalue the actual position of physical information and facts this inherently is out there within user-service report driven model. The key commitment for applying physical information and facts within Website service QoS prediction comes from the actual declaration which the evaluations Website providers perform usually are affected appreciably by their particular physical location, a well known fact that's validated by the empirical information analysis to the real-world QoS dataset WSDream. Hence, it can be of curiosity to add in this implicit way to obtain information and facts within QoS prediction. Kai Su, et al.(2017)[4] proposed a quick development of service-oriented computing, fog up computing and big data, a lot of functionally similar world wide web products and services will be entirely on a Internet. Top quality associated with Service (QoS) gets to be a differentiating reason for products and services to get customers. Since the QoS associated with products and services may differ commonly among users because of the sudden community, place of business as well as other intent things, lots of Collaborative Filtration structured approaches will be not too long ago consist of to calculate a not known QoS by way of employing the famous user-contributed QoS data. Nonetheless, almost all current approaches forget about the data standing

issue in addition to are thus at risk of a difficult to rely on QoS data provided by way of shady users. To cope with this problem, many of us recommend a trust-aware strategy TAP to get reliable personalised QoS prediction. Yanbin Kou, et al.(2017)[5] presented the dynamic potential portion device in accordance with the High quality of Service (QoS) a variety of cellular people (MU) with 60 GHz radio-over-fiber (RoF) community obtain networks. The actual proposed device is actually capable regarding collecting the obtain info of MUs to develop the whole listing of MU potential needs and service sorts for the Central Company (CO). A new crossbreed algorithm formula is actually coming to implement the capability portion which often can fulfill the requirements unique MUs in unique multi-level traffic loads. In contrast to extra weight vibrant casings mission (WDFM) scheme, the Hybrid scheme is able to keep higher concern MUs with lower hesitate in addition to conserve the supply damage charge a lot less than 1% simultaneously. Antonio Frangioni, et al. (2017)[6] used a new multilevel where by heavy fair-queueing schedulers are used at intervals of website link, a new flow is usually certain the end-to-end worst-case setbacks which in turn will depend on the incidence accessible it at intervals of website link it traverses.

Consequently, it's possible to estimate resource-constrained paths this connect with concentrate on hold up difficulties, plus enhance a few critical functionality analytics (e.g., reduce the actual earmarked fee, make best use of the volume from bottleneck backlinks, etc.). With this newspaper, all of us produce plus solve the best course calculations plus reference allowance difficulty regarding a broad type of heavy fair-queueing schedulers, coming from individuals emulating a new Many times Processor chip Giving fluid hosting server so that you can variants involving Deficit Rounded Robin. Murat Karakus, et al.(2017)[7] supported the end-to-end Superior associated with Service (QoS) within current circle architectures is usually an ongoing problem. Whilst research workers out of both equally academia and also field currently have planned a lot of solutions to resolve the QoS limitations from the present networking, many of them possibly unsuccessful and also are not implemented. Application Outlined Social networking (SDN) paradigm possesses come forth in reply to limitations associated with traditional networking architectures. We prepare the attached experiments in line with the areas that happen to be the most well known strategies QoS can usually benefit from the very idea of SDN: Multimedia systems streams the navigation mechanisms, inter-domain the navigation mechanisms, source booking mechanisms, line supervision and also organizing mechanisms, Superior associated with Encounter (QoE)-aware mechanisms, circle overseeing mechanisms, along with QoS-centric mechanisms for example virtualization-based QoS provisioning and also QoS policy supervision etc.

III. RESEARCH GAP

As discussed by Xuancai Zhao et.al [21] , an evaluation product is appropriately shown to spell it out the common effect of system protection and QoS, and a multi-objective genetic algorithm NSGA-II is adjusted to enhance the multi-objective model. By conducting the survey, it is found that the existing researchers have neglected many issues i.e. the use of multi objective optimization is ignored in the most of the existing literature and the Genetic algorithm suffers from poor convergence speed.

IV. METHODOLOGY

5.1 Proposed Methodology

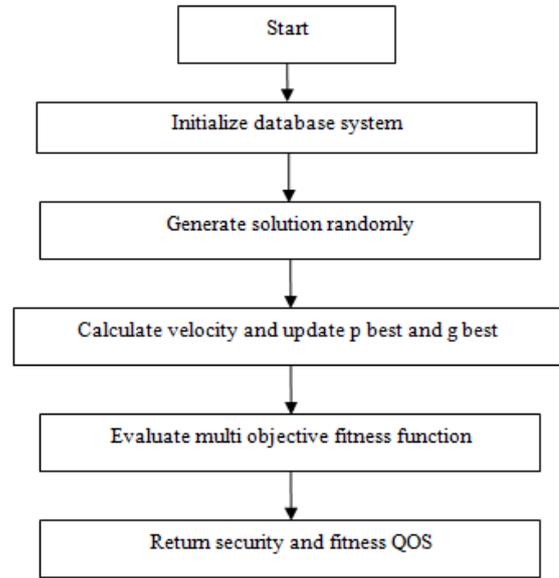


Figure.3. Flow chart of Proposed Methodology

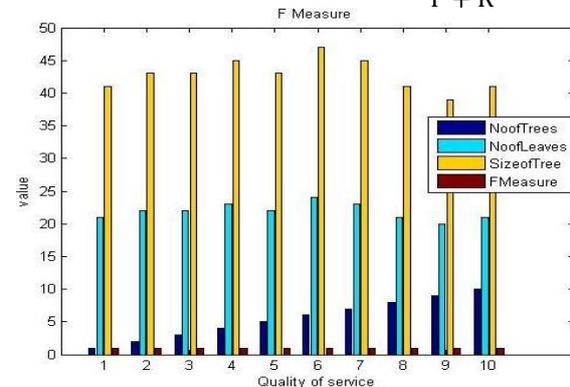
5.2 Performance analysis

The proposed technique is designed and implemented in Matlab tool and weka tool. Weka contains tools for data pre processing, classification, regression, clustering and visualization. So the evaluation of the proposed technique is done on the basis of following parameters i.e. F-measure and kappa statistics based on no of trees 10, size of tree is 39-47 and no of leaves is 10. The comparison has been drawn between existing technique and proposed technique.

1. F- Measure

F-Measure is also called F1 score. It contains both precision and recall. It is generally use to check the accuracy and reliability. It computes the mean of precision and recall. Basically, it uses as best and 0 as worst when both precision and recall are used. F-measure can be calculated with using the formula given as:

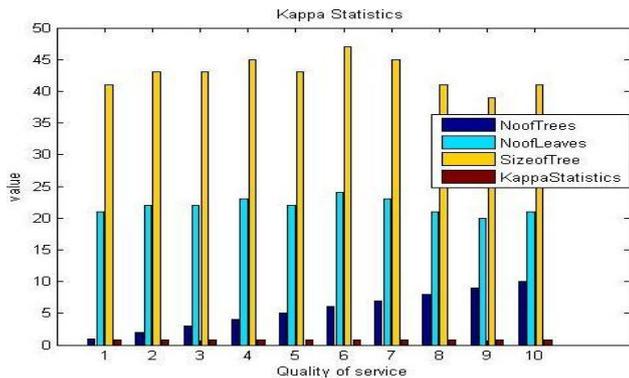
$$F - Measure = 2 * \frac{P * R}{P + R}$$



2. Kappa Statistics

When same thing is measured by two binary variables that are used by two individuals, kappa statistics can be used in both individuals. It measures the data values and arrangement of data values for agreement in the table. It is measurement between classification and true classes that is between two variables. It is ratio of observed agreement to the maximum

possible agreement. Kappa coefficient is often a statistic which often measures inter-rater understanding for qualitative (categorical) objects. It is generally thought to be a better made measure as compared to simple percentage agreement computations, since k considers the understanding deal occurring by means of chance.



V. CONCLUSION

This paper represents the real-time database system is designed, which is aimed at optimizing QoS and security by dynamically changing the security configurations according to the requests from users. So there is a need to improve the global optimum solution and convergence speed. In this we proposed multi-objective particle swarm optimization for enhancing the QoS and security of database system. It has been designed and implemented the proposed technique in Matlab tool weka tool. So the comparison has been carried out between the proposed technique and existing technique is done on the basis of following parameters i.e. F-Measure and kappa Statistics with number of trees is 10, size of tree is 39-47 and no of leaves is 10. By applying the proposed technique it gives the global optimum solution easily and improved the convergence speed. The future scope of this work is additional parameters can be evolved for future work for more comfortable and pleasing results.

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