IJCRT.ORG ISSN : 2320-2882
INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)
An International Open Access, Peer-reviewed, Refereed Journal

# OPTIMIZATION OF INTERNET SIGNALS USING QOS PREDICTION IN ARTIFICIAL INTELLIGENCE

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**Abstract**

In the fast-moving world, the internet plays a vital role in part of every individual, business, and sector. So the internet is ruling nooks and corners of the world. The main goal is to provide quality internet services without any interruptions. As we can see the falling in internet signals or lost signals may affect each individual to a gigantic business. So to provide a signal in the correct strength can overcome the issue of the quality services on both customer and internet provider side. Here we are implementing a recommendation system to optimize the quality of service to the persons or sectors who are using the internet. This makes the service providers satisfy the customer and increase the business process further with the help of the recommendation system. Based on locations every time the signal differs according to the locations and hence when a customer confronts the signal issues, the service provider equalises the query of the customer by providing the signal to the requested customer based on the location. By doing this, we are not only efficiently solving the problem of the customer but also increasing the customer counts by providing the quality of the internet providing services using the recommendation system.

**Introduction**

The scope of the proposed system includes providing the quality of internet services. Providing quality of service depends on rectifying the problem of signal strength on time. So providing the right signal strength at the right time to the requested customer is a big concern in the internet providing services. When a service provider updates a plan it has to maintain the plan without any interruptions. But when a signal is weaker on the customer side it is important to sort out the issue. So, the service providers determine the strength of the requested customers. But when the customer continuously faces the problem in network signal. The Internet service provider efficiently sorts it out by providing the recommendation system. By using the logical implementation of Qos prediction model our recommendation system will provide another network location to the customer to make use of the internet. The main aim of the proposed system is to provide more reliable internet signal services to the customers in an efficient manner. Since no existing proposed systems implements the multiple complaints and changing location of the network provided to the customer.This recommendation system helps in all terms of providing a good quality network to customer as well as the work of an internet service provider also reduces by time.

**Literature Survey:**

1.Jian Wu, Liang Chen, Yipeng Feng, Predicting Quality of Service for Selection by Neighbourhood-Based Collaborative Filtering (March 2013) Quality-of-service-based (QoS) service selection is an important issue of service-oriented computing. A common premise of previous research is that the QoS values of services to target users are supposed to be all known. However, many of QoS values are unknown in reality. This paper presents a neighbourhood based collaborative filtering approach to predict such unknown values for QoS- based selection. Compared with existing methods, the proposed method has three new features: 1) the adjusted-cosine-based similarity calculation to remove the impact of different QoS scales; 2) a data smoothing process to improve prediction accuracy and; 3) a similarity fusion approach to handle the data sparsity problem. In addition, a two-phase neighbor selection strategy is proposed to improve its scalability. An extensive performance study based on a public data set demonstrates its effectiveness. With a growing number of alternative Web services that provide the same functionality but differ in quality properties, the problem of selecting the best performing candidate service is becoming more and more important. In this paper, we have presented a neighborhood-based CF approach called ADF to predict the unknown QoS values.Different from the previous methods, we have use A-cosine equation to compute the service-based similarity, add a data smoothing process to improve the prediction accur

2.Eyhab Al-Masri, Qusay H.Mahmoud’s QoS-based Discovery and Ranking of Web Services(May 2014) Discovering Web services using keyword-based search techniques offered by existing UDDI APIs (i.e. Inquiry API) may not yield results that are tailored to clients' needs. When Discovering Web services, clients look for those that meet their requirements, primarily the overall functionality and Quality of Service (QoS). Standards such as UDDI, WSDL, and SOAP have the potential of providing QoS-aware discovery, however, there are technical challenges associated with existing standards such as the client's ability to control and manage discovery of Web Services across accessible service registries. Standards such as UDDI have enabled service providers and requestors to publish and find Web services of interest through UDDI Business Registries (UBRs),respectively. However, UBRs may not be adequate enough for enabling clients to search for relevant Web services due to a variety of reasons. One of the main reasons hindering the efficient discovery of Web services is the fact that existing search APIs(i.e. UDDI Inquiry API) only exploit keyword-based search techniques which may not be suitable for Web services particularly when differentiating between similar functionalities.

Furthermore, many software vendors are promoting their products with features that enable businesses and organizations to create their own UBRs (i.e. IBM WebSphere, Microsoft Enterprise Windows Server 2003, and others). In this case,organizations may preferably deploy their own internal UBRs for intranet or extranet use which will cause a significant increase in the number of discrete UBRs over theWeb. This adds to the already existing complexity of finding relevant Web services of interest in the sense that there needs to exist an automated mechanism that can explore all accessible UBRs, mainly a Web services' discovery engine.

3.Huifeng Sun, Zibin Zheng, Michael R.Lyu's Personalised Web Service Recommendation via Normal Recovery Collaborative Filtering (Dec 2013) ith the increasing amount of web services in the Internet,personalized web service selection and recommendation are becoming more and more important.

In this paper, we present a new similarity measure for web service similarity computation and propose a novel collaborative filtering approach, called normal recovery collaborative filtering, for personalized web service recommendation. To evaluate the web service recommendation performance of our approach, we conduct large-scale real-world experiments, involving 5,825 real-world web services in 73 countries and 339 service users in 30 countries. To The best of our knowledge, our experiment is the largest scale experiment in the field of service computing, improving over the previous record by a factor of 100.The experimental results show that our approach achieves better accuracy than other competing approaches.There are several challenges when applying CF methods to service recommendation. First, the existing CF methods are usually designed for product recommendation (e.g., movie recommendation, book recommendation), and they do not take characteristics of web service QoS into consideration. Second, the scale of experiments of the existing web service recommendation approaches is too small to verify the recommendation results. As far as we know, the largest scale experiments in the field of service computing only contains 150 users and 100 web services. To attack these challenges, this paper proposes a normal recovery collaborative filtering approach and conducts large-scale experiments to advance the current state-of- the-art in service recommendation.

4.You ma, Shangguang Wang, Patrick C.K. Hung's, Highly Accurate Prediction Algorithm for Unknown Web Service QoS Values (March 2015) Quality of Service (QoS) guarantee is an important component of service recommendation. Generally, some QoS values of a service are unknown to its users who have never invoked it before, and therefore the accurate prediction of unknown QoS values is significant for the successful deployment of Web Service-based applications. Collaborative filtering is an important method for predicting missing values, and has thus been widely adopted in the prediction of unknown QoS values However, collaborative filtering originated from the processing of subjective data, such as movie scores. Based on real world Web service QoS data and a number of experiments, in this paper, we determine some important characteristics of objective QoS datasets that have never been found before. We propose a prediction algorithm to realize these characteristics, allowing the unknown QoS values to be predicted accurately. Experimental Results show that the proposed algorithm predicts unknown Web service QoS values more accurately than other existing approaches. The main contributions of this paper are threefold.First, based on real Web service QoS data and a number of experiments, we find some important characteristics of objective QoS datasets that have never been found before.Second, we propose a Web service QoS value prediction algorithm HAPA to realize these characteristics, allowing the unknown QoS values to be predicted accurately. Finally, we conduct several real world experiments to verify our prediction accuracy 5.Sergey Ioffe, Christian Szegedy's Batch Normalization: Accelerating Deep Network Training by Reducing Internal Covariate Shift (Jan 2015)

Training Deep Neural Networks is complicated by the fact that the distribution of each layer's inputs changes during training, as the parameters of the previous layers change. This slows down the training by requiring lower learning rates and careful parameter initialization, and makes it notoriously hard to train models with saturating nonlinearities. We refer to this phenomenon as internal covariate shift, and address the problem by normalizing layer inputs. Our method draws its strength from making normalization a part of the model architecture and performing the normalization for each training mini-batch.  batch Normalization allows us to use much higher learning rates and be less careful about initialization, and in some cases eliminates the need for Dropout.

Applied to a state-of-the-art image classification model, Batch Normalization achieves the same accuracy with 14times fewer training steps, and beats the original model by a significant margin. Using an ensemble of batch-normalized networks, we improve upon the best published result on ImageNet classification: reaching 4.82% top-5 test error, exceeding the accuracy of human raters. This allows us to use much higher learning rates without the risk of divergence.Furthermore,batch normalization regularizes the model and reduces the need for Dropout Finally, Batch Normalization makes it possible to use saturating nonlinearities by preventing the network from getting stuck in the saturated modes.

**System design**

**System architecture**

In Recent days the internet is a very much needed facility which should be provided without any interruptions .Our problem statement is that when the network interrupts in between any usage a user complains about it and it will  take time to rectify and correct it.As we experienced a situation i.e(Covid Lockdown) which made each and every activity online like Online classes,Online grocery delivery, Work from home ..etc during this a stable connection is what everyone wants.Rectifying and correcting the issues on time is very much needed

**Modules algorithm implementation**

**QoS PREDICTION**

In QOS Prediction the input, users and services as well as contextual factors appear in the format of categorical variables to indicate readable features that affect the quality of services. However, each categorical variable implicates a number of latent features.For Example, users and IP addresses may include different configurations of hosts, subnets and autonomous systems may include distinct routing protocols and network configurations. Therefore, we set the Embedding Layer to map these explicit variables to distributed representations to capture the implicated semantics.

**Algorithm 1 :Pseudo-code for location-based reconstruction**

Input: QoS data Q

Service Location Set S

User Location Set U

The number of clusters K

Output: Reconstructed QoS Matrix Q

1:(1) k-means clustering with service location

2:initialize centroid ci ∈ (c1, . . . , ck) of each cluster

3:while no change do

4:for i = 1, . . . , N do

5:zi ← argminkDis(si, ck)

6:end for

7:for k = 1, . . . , K do

8:ck ← mean({si : zi = k})

9:end for

10: end while

11: (2) user service invocation matrix reconstruction

12: for k = 1, . . . , K do

13:for i = 1, . . . , n do

14:=xi ← {si : zi = k}

15:for j = 1, . . . , m do

16:ej ← {uj : Dis(uj , xi) = k}

17:end for

18:end for

19:Q

k ← Q({si : zi = k AND ui : ei = k})

20: end for

## Performance analysis

### Results and theory description

Inspired by the principles of deep learning, we have proposed a novel neural model for making multiple QoS predictions with contexts. In comparison with the the-state-of-arts methods. Our approach has the following advantages: It provides a powerful framework to realize multi- attributes QoS prediction, which has been not addressed by other methods so far; It achieves a much better prediction accuracy in terms of MAE by optimizing the L1 loss function; Some strategies, such as combining first-order features and two-order cross features, pre-training the embedding vector of services with exploiting the documents of services, have achieved substantial results in making use of contextual information.

## Conclusion

A recommendation system for providing the solution to the internet service providers which are facing network signal problems. Its design relies on two important principles: first, we are overcoming the problem of the customer by providing the signal whose strength is higher based on locations, and secondly, we are providing aid to the internet providing services by recommending the correct location which signal strength is good. Our results show that services can have a continuous flow.

## Future enhancements

The future enhancement includes that the drop in signals can be automated so that before the customer confronts the signal problem this automation can help service providers to identify the areas which are lower in signal strength and correct them. In this way, we can improve our quality of service and also gain fame among the customers.

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