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Effective Website Accessibility Through Optimization Using Knapsack Programming Model

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***ABSTRACT* - Designing high efficient websites to facilitate effective webpage access has long been a challenge. A primary reason is that the web developers understanding of how a website should be structured can be considerably different from that of the users. While various methods have been proposed to relink webpages to improve accessibility using user access data, the completely reorganized new structure can be highly unpredictable, and the cost of disorienting users after the changes remains unanalysed. This paper addresses how to improve a website without introducing substantial changes. Specifically, we propose a mathematical programming model to improve the user access on a website while minimizing alterations to its current structure. Our model not only significantly improves the user access with very few changes, but also can be effectively solved. In addition, we define two evaluation metrics and use them to assess the performance of the improved website using the real data set. Evaluation results confirm that the user access on the improved structure is indeed greatly enhanced. More interestingly, we find that heavily disoriented users are more likely to benefit from the improved structure than the less disoriented users.**

Keywords: Mathematical Programming Model, Website Optimization

I. Introduction

A primary cause of poor website design is that the web developers' understanding of how a website should be structured can be considerably different from those of the users. Such differences result in cases where users cannot easily access the desired information in a website. [1] This problem is difficult to avoid because when creating a website, web developers may not have a clear understanding of users preferences and can only organize pages based on their own judgments. However, the measure of website effectiveness should be the satisfaction of the users rather than that of the developers. Thus, Web pages should be organized in a way that generally matches the user's model of how pages should be organized.

II. Literature Survey

"Web Services – Problems and Future Directions" by Hong bing Wang, Joshua Zhexue Huang, Yuzhong Qu, Junyuan Xie[2008] briefs about the web services based on existing internet protocols and open standards provides a flexible solution to the problem of application integration. Elements of web services such as WSDL,UDDI and SOAP have made web services more popular in web applications.Web service architecture faces various problems like security.This paper discusses about three aspects-Service security,Service compositions and Service semantics which makes the deployment of web services successful.

"A Survey on Web Service Discovery Approaches" by Debajyoti Mukhopadhyay, Archana chougule [2010] briefs about the web service applications which are interoperable and can work on any platform. Finding a suitable web service is a very difficult task. This paper uses the keyword traditional web service discovery approach**.** It provides

various ways for finding the most suitable web service and uses them. Such ways includesearching using UDDI, Semantic based searching, syntax based searching and informational retrieval searching. Some approaches suggest that enhancement in web service request is based on metadata about web services generated by feedback of other users.Efficiency, accuracy, security and considering QOS factors must be considered while providing discovery mechanism. Finally automatic discovery is found to be good while searching and choosing the required web service.

"Web Service Composition Methods-A Survey" by E.Pegman, Y.Rastegari, P.Majlesi Esfahani, A.Salajegheh[2012] briefs about the web service composition –a challenge. It says that the number of service providers are increasing and they offer they request multiple services with the same functionality, so the problem of web service composition becomes complex. This paper presents web service composition methods. some methods were based on evolutionary algorithm (eg. Genetic algorithm) and some were based on non-evolutionary algorithm(eg. Dynamic programming, Heuristic approach).This paper focuses on web service composition is based on QOS. Non-evolutionary algorithms seem to be more efficient in small scale environment and business that are simple whereas evolutionary algorithms seems to be more efficient in large scale environment and business that are complex.

III. Description

We propose a mathematical programming model to optimize the web pages to improve the user access on a website while minimizing alterations to its current structure. Results from extensive tests conducted on a publicly available real data set indicate that our model not only significantly improves the user access with very few changes, but also can be effectively solved. In addition, we define two evaluation metrics and use them to assess the performance of the improved website using the real data set. Evaluation results confirm that the user access on the improved structure is indeed greatly enhanced. More interestingly, we find that heavily disoriented users are more likely to benefit from the improved structure than the less disoriented users.[2] Here we create an profile for the user and we get the website link from the user as an input then in first step it checks the errors that are present in the given website then in next step we have a provision for user to choose which errors are to be optimized then the user selects them and then optimization starts. Then in last step a performance graph and optimized page is displayed.

EG Algorithm

```
KnapSack(u,w,n,W)
{
  for(w=0 to W)V[0,w]=0;
   for(i=1 to n)
    for(w=0 to W)
      if(w[i]<=w)
        *V[I,w]=max{V[i-1,w],v[i],v[i-
        1,w-w[i]]};/
      else
         V[I,w]=V[i-1,w];
         return V[n,W];
}
```

This problem deals with the given set of items having their mass and values, to determine that how many number of each given items to be selected such that the total weight selected is less than or equal to the given limit value such that the total value must be high.[8]From the various knapsack algorithms, we have chosen **Greedy Algorithm** for web optimization.***Greedy Algorithm** sorts the given set of items in the decreasing order of value,per unit of weight v_i/w_i.Insert the values onto the sack continuously,until there is no space in the sack to insert values.[3] If unlimited values are supplied to fit into the sack,then M is the maximum value that can fit into the sack,then this algorithm is used to achieve at least a value of M/2.From various algorithm under knapsack model,we have chosen greedy algorithm.

This EG algorithm uses Explore-Exploit strategy.The URL of the website when optimized uses EG loop and checks whether to explore or to exploit.If the given condition is satisfied,then it explores and the corresponding optimization is performed.If the given condition is not satisfied,then it exploits and the next optimization is checked for EG condition.EG algorithm exits when the loop condition is not satisfied.

Knapsack Loop

In knapsack loop an algorithm is created such that the optimization proceeds and reaches to every one of the

associated links of the given web page. If a single page is optimized as 70% and the associated webpages have optimization value as 60%, 65%, 62% then they have unequal optimization which is not an ideal and perfect optimization. If the webpage is to be truly optimized then the webpage and its associated links must have same ideal optimization value. This can be achieved using an average optimization value. [7] To get this value we must form a loop such that all webpages have same average optimization value. This loop is called Knapsack Loop.

IV. Existing System

The existing system is proposed of a MP model to improve website access while minimizing changes to its current structure. [4] This model is particularly appropriate for informational websites whose contents are relatively stable overtime. It improves website rather than reorganize it hence it is suitable for website maintenance on a progressive basis.

In Existing system we proposed a MP model to optimize the website characteristics while minimizing changes to its current structure. This model is particularly appropriate for informational websites whose contents are relatively stable overtime [6]. This model has a constraint for out degree threshold which is motivated by cognitive reasons. In this system we use MP model to remove null declarations of markuplanguages, scripts, style sheets in order to improve performance of a website. This involves moving scripts to the bottom and moving CSS to the top of the web page to attain optimum performance.

It also involves checking of errors in security level such as Robo.txt and also errors in markup structures, java scripts, CSS, etc and also eliminate them to create an optimized site. [9] It generally involves setting down a threshold value 'X' and when the performance of an webpage associated with given website drops below , then we optimize the current webpage and its associated links so that it is always greater than the threshold value to maintain performance.

Drawbacks

The major drawback which the existing system faces is that, it does not differentiate the website from being static like informative sites and dynamic sites like social media. It gives optimum results for only static websites and fails to optimize dynamic websites. It fails to produce an adaptive environment to a website which is considered as true optimization. When performance is considered MP model is slow and the modern world requires faster optimizing algorithmic technique to work with the user system.

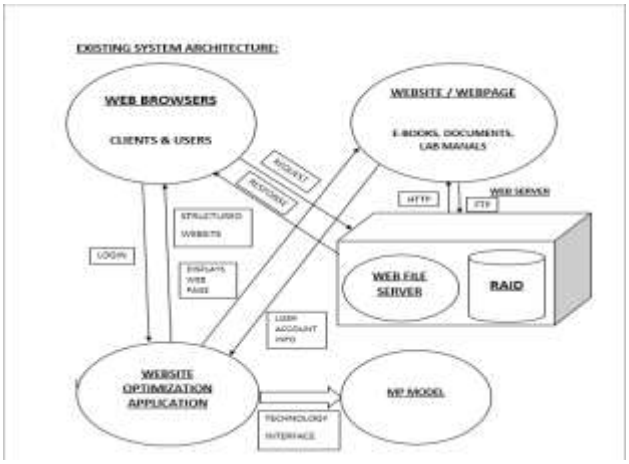

FIG 2.1 ***Existing System Architecture***

V. Proposed System

In Existing system we proposed a Knapsack Programming model which is equally called as Epsilon Greedy algorithm to optimize the website characteristics while minimizing changes to its current structure. This model is particularly appropriate for both static websites and also dynamic website making contents relatively stable overtime thus providing adaptive environment. [5] This utilizes explore and exploit strategyof E-G algorithm to bypass each of the found errors and eliminate them to optimize the webpage. The explore feature is to proceed to the next optimization if and only if previous optimization is successful, it does not proceed to next optimization until previous one commits. Whereas exploit feature is used to roll back the changes that done to the website if optimization fails it maintains consistent website.In order to achieve true optimization it uses another feature of knapsack programming model that is to create a knapsack loop to achieve optimization in each of associated links of the webpage.[10] It involves setting out a threshold value say # and those websites which have Optimization value greater than threshold value is considered as optimized. Finally Performance is truly measured by generating a graph comparing before and after the website optimization process.

Advantages

- User friendly Interface.
- More Accurate Optimization.
- Performance Achievement is high.
- On site optimization can be achieved.
- Compatibility to Larger number of websites.
- Threshold based optimization leading to true Optimization.

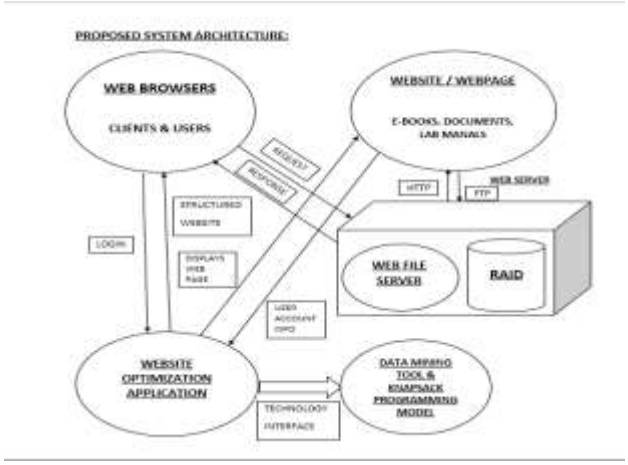

FIG 3.1 ***Proposed System Architecture***

VI. Implementation

Fig 4.4: ***Error Checker II***

Fig 4.5 ***Optimizer***

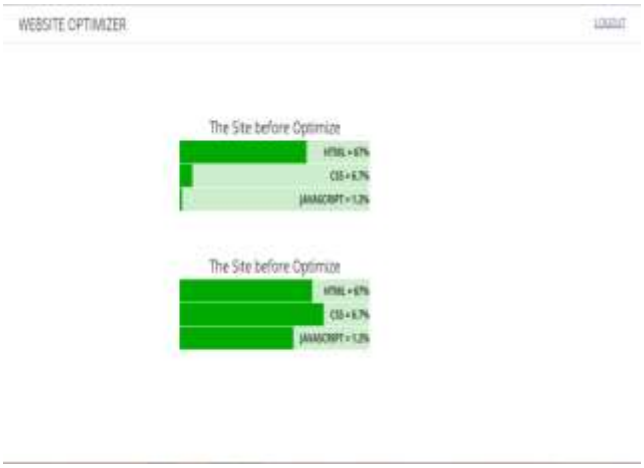

Fig 4.6: ***Performance Graph***

VII. Conclusion

In this paper, we have proposed a Knapsack programming model to improve the accessibility of a website while minimizing changes to its current structure, a critical issue that has not been examined in the literature. Our model is particularly appropriate for both static websites and also dynamic websites whose contents are relatively stable and changing over time. It improves a website rather than reorganizes it and hence is suitable for website maintenance on a progressive basis. Optimal solutions were quickly obtained, suggesting that the model is very effective to real world websites. The MP model was observed to scale up very well, optimally solving large-sized problems in a few seconds in most cases on a desktop PC.To validate the performance of our model, we have defined two metrics. In addition, we found an appealing that heavily disoriented users, i.e., those with a higher probability to abandon the website, are more likely to benefit from the improved structure than the less disoriented users. Our paper also reveals that while using small path thresholds could result in better outcomes, it would also add significantly more new links. Thus, Webmasters need to carefully balance the trade-off between desired improvements to the user accessibility and the number of new links needed to accomplish the task when selecting appropriate path thresholds.

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References

[1] James L. Noyes , Professor Emeritus of Computer Science Wittenberg University, "Optimization and Mathematical Programming: Modelling and Problem Solving, Instructor's Version 2008.

[2] May Wang, Benjamin Yen, Faculty of Business and Economics in The University of Hong Kong, "A Literature Study on Website Restructuring" , 11th Pacific – Asia Conference on Information Systems.

[3] Enrique Castillo, Antonio J. conejo, Pablo Pedregal, Florida Institute of Technology, Dept of Mathematical Science, "BUILDING AND SOLVING MATHEMATICAL PROGRAMMING MODELS IN ENGINEERING AND SCIENCE". Revised version sep 2002.

[4] Robert Fourer - Northwestern University, David M. Gay - AMPL Optimization LLC, Brian W. Kernighan - Princeton University. "AMPLA Modeling Language for Mathematical Programming". Book Edition: second.

[5] Pablo A. Parrilo - Massachusetts Institute of Technology – "Mathematical optimization techniques and their applications in the analysis of biological systems". Available at URL – www.mit.edu/~parrilo.

[6] Ms. Jissin Mary Kunjukutty, Ms. A.Priya, ME, Assistant Professor, Dept. of CSE, Sasurie College of Engineering, Vijayamangalam, Tamilnadu, "Optimizing User Access with Pattern based Web Site Restructuring Scheme", Issue - Vol.2, Special Issue 1, March 2014.

[7] Mohan Krishna D. V , N. Yedukondalu , D. Arun Kumar Reddy, *Assistant Professor, CSE, Sir Vishveshwariah institute of science and technology India,* "Effective User Navigability through Website Structure ReorganizingUsing Mathematical Programming Model". Issue - International Journal of Computer Trends and Technology (IJCTT) – volume 10 number 3 – Apr 2014.

[8] DebajyothiMukhopandhyay, ArchanaChougule, Department of Information Technology – Maharastra University of Technology, " A Survey on Webservice Discovery Approaches " .

[9] en.wikipedia.org/wiki/knapsack_problem

[10] en.wikipedia.org/wiki/Mathematical_Optimizations

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