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Improve The Effectiveness Of User Website Navigation Using ART

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ABSTRACT

Unfortunately, it is hard – but not impossible – to visualize a large number of dimensions of numerous items in a workable manner. We face many problems related to the web site navigation and some problems are mention below-

(1)Pages can't be merged in order to modify the structure.

(2)Adding, deleting and modifying links should be considered at the sometime.

(3)It's difficult to find out user's need on web site.

In this paper we are going to analysis about the web site navigation .Here we predict the users demand and improve the effectiveness of user web site navigation using ART (Adaptive Resonance Theory) with the help of a mathematical model. In this analysis we addresses how to improve a web site without introducing substantial changes .We are going to predict the user's demand or we can say that find out the instruct of user. We know that, already various methods have been proposed to improve navigation of a web site using navigation data and to predict a new unpredictable method is difficult.

General Terms

Navigation, Mathematical model programming, User efficiency

Keywords

Web Mining, Adaptive Resonance theory

INTRODUCTION

With the help of web structure design, we improve the efficiency of the web site navigation. Sometime user finds out very different structure of website navigation that's why user becomes frustrate because user may lose their orientation. So to solve this kind of problem we analysis such a structure which is not change frequently and propose a mathematical programming model to achieve better navigation efficiency with the help of web structure design. At first we going to find out the problem of poor web site design, the region behind that is the understanding of web developers through the web site structure and user's demand. It's very difficult for the developer to clearly understand the user's need, so the developer organizes the web pages based on his own judgement. But we know that the web site effectiveness calculate on the basis of user's satisfaction in place of the developer's understanding. Users interest and their relationship in navigation is more important rather than the developer, so the web site administrators find out the problem and then improve that problem and make their web sites more easily.

It's very important for the administrators to know all information related to the users and their need, because if administrators know all things about user and he provide better web pages or find the interesting pages for the user. We all know that www (World Wide Web) is the source of useful information or data. WWW (World Wide Web) develops going to improve the efficiency of web site and reduce the size, traffic and difficulty of web site.

We solve our all the problems related to the web site navigation with the help of Adaptive Resonance Theory (ART), which is a theory developed by Stephen Gross berg and Gail Carpenter on aspects of how the brain processes information. It describes a number of neural

network models which use supervised and unsupervised learning methods, and address problems.

Web usage mining, the analysis of user navigation paths through web sites, is a common technique for evaluating site designs or adaptive hypermedia techniques. However, often it is hard to relate aggregated clusters or measures to actual user navigation behaviour. Several approaches to reduce the amount of data, such as clustering, binding, filtering and hierarchization of documents or usage patterns, have been applied in various systems. In this paper we presented the Navigation Visualizer, a web usage analysis tool that combines the mathematical, high level approach of web usage mining with interactive graph based visualizations.

RELATED WORK

Website navigation has been based on the most important design features across many domains, including finance, e-commerce, entertainment, education, government, and medical, from human computer interaction's perspective, interface, including graphical design, layout design and usability analysis also play an important role in website design. System design including hardware design, cache scheduling, affect the website performance. Besides, structure design, including hyperlinks configuration and information structural design, has a great effect on the website navigation. We know that previous research has taken a different place in history. Navigation is one of very common tasks of web search activity, and information finding task accounts for 25% of search activity. The information make suitable on shortest path will not change by adding a link. Literature shows that adding shortcut may reduce average number of searching steps. However, as number of link increases, the complexity of graph increases and the search time may not decrease by adding shortcuts.

Old mathematical programming model is used to improve the navigation effective for a website while minimizing changes to its current structure; an important issue has not been examined in the literature. Model is particularly appropriate for informational websites whose contents are relatively stable over time. It improves a website rather than reorganizes it and hence is suitable for website maintenance on a progressive basis. The tests on a real website showed that our model could provide significant improvements to user navigation by adding only few new links. Optimal solutions were quickly obtained, suggesting that the model is very effective for real world websites. In addition, we have tested the mathematical programming model with a number of synthetic data sets that are much larger than the largest data set considered in related studies as well as the real data set. The mathematical programming model was observed to scale up very well, optimally solving large-sized problems in a few seconds in most cases on a desktop personal computer.

In old paper the Navigation Visualiser, a web Usage analysis tool that combines the mathematical, high level approach of web usage mining with interactive graph based visualizations. It facilitates tracing and understanding user actions, which would be harder to do with either one of the approaches. Furthermore, the Navigation Visualiser provides means for pre-processing complex user data for further analysis in statistical packages.

This study aims to improve Web navigation efficiency by reorganizing Web structure. To avoid users to lose their orientation, structure stability is taken into consideration. This analysis proposes a mathematical programming method to reorganize Web structure in order to achieve better navigation efficiency. User can specify the requirements and how stable the website structure should be. Navigation efficiency is defined systematically and an e-banking example is given to illustrate how the method works. This study has the advantage of improving navigation efficiency mathematically and relieving the designer of tedious chore to modify the structure in transformation. If some constraint, e.g. structural stability constraint, is relaxed, there is still room for improvement.

Some improvements are significant but will saturate or even decrease as after adding a certain number of links. Research Contribution and Managerial Implications We proposed a quantitative method to improve navigation efficiency systematically. From problem solving, we identify some potential important research areas that has not been explored or paid attention to. For the website designer in the company, it is very important to evaluate the efficiency quantitatively Moreover, to improve a website should be put on schedule after the assessment if the result is not satisfactory.

PROPOSED METHODOLOGY

In this paper, we proposed a mathematical programming model to improve the navigation of a website to minimize the changes of its current structure. This model is used for improve the web site with the help of substantial changes or we can say that this mathematical model is very useful for maintenance of a web site. This kind of model provides good user navigation only by adding new links and with this model we find out better improvement. We analysis in this model is very correct and optimal solution were optimize and this model is very effective for the website navigation .In most cases on a desktop PC; we can solve large sized problems in a few seconds with the mathematical model.

Fig. 1 Web Navigation

To improve the web site performance of this model as Fig 1, we proposed two metrics which is used for the evaluation of already improved website with the help of simulation's technique. So the results of these improvements show that, now our user's navigation is more effective and facilitated. When we add some more new links, we can analysis the result that we using small path which give us better outcomes. When we compare our model with old one we have a result that prove that our model is much better than heuristic model, because its navigation is improved and some more new links are added in to the website, which provide small path every user.

To validate the performance of our model, we have defined two metrics and used them to evaluate the improved website using simulations. Our results confirmed that the improved structures indeed greatly facilitated user navigation. In addition, we found an appealing result 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. Experiment results also revealed 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 navigation and the number of new links needed to accomplish the task when selecting appropriate path thresholds. Since no prior study has examined the same objective as ours, we compared our model with a heuristic instead.

As another example, this model has a constraint for out-degree threshold, which is motivated by cognitive reasons. The model could be further improved by incorporating additional constraints that can be identified using data mining methods. Web Usage Mining has been widely adopted in various fields such as optimizing site structure, user-behaviour analysis, personalized web services and system performance tuning.

Sometimes developer is not understand that how a web site should be structured and how we can make a web site different from other, so because of this region it become a primary cause of poor website design . This kind of problem is difficult to avoid because when a developer creating a website, one can not understand the need of users' demand and create web site on their own judgments. However, the measure of website effectiveness should be the satisfaction of the users rather than that of the developers. Such type of cases appears where user can't easily define the needed information in a web site.

Mathematical programming model which is proposed by us is use for improve the user navigation on a website to minimizing changes on its current structure. In our model real data set indicates that our model not only improves the user navigation with very few changes, but also can be effectively solved. Here we define two kinds of evaluation metrics and use them to assess the performance of the improved website using the real data set. Evaluation results confirm that the user navigation 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.

With the help of ART (Adaptive Resonance Theory) we can solve many problems according to this paper. ART network and algorithm maintain the plasticity required to learn new patterns, while preventing the modification of patterns that have been learnt previously. This capability has stimulated a great deal of interest. But many people have found, the theory is difficult to understand. The mathematics behind ART is complicated, but the fundamental ideas and implementations are not.

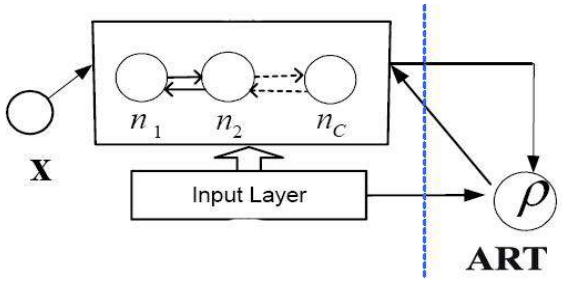

Fig. 2 ART Control

x: $\mathbf{x}=(n_1,n_2,\ldots\ldots,n_c)$, is set

C: number of WebPages

ρ *:* Vigilance by ART

Adaptive Resonance Theory (ART) model are based on neural networks that perform clustering and can allow the number of clusters to vary with problem size. There are basically two types of ART (Adaptive Resonance Theory)-ART1 and ART2. These models help us to improve the features for make this paper easier.

We will transform the Web navigation with specific user requirements.

(1) Minimize additional work for web users. We will protect the site's original design from destructive changes. Limited number of links can be added or removed, and also limited number of pages can be created or destroyed.

(2) Make the Website transformation for everyone, especially first-time users and casual users. Customization is very useful for experienced users, but does not benefit first-time users.

(3) We proposed a model which fulfil the user's need.

With the help of Fig 2 we can easily understand the navigational concept that shows we can increase and decrease the effectiveness of web structure. Here ART Adaptive Resonance Theory) is use for the prediction for user and the user is connected with network.

Here we predict the users demand and improve the effectiveness of user web site navigation using ART (Adaptive Resonance Theory) with the help of a mathematical model.

ART Algorithm Implementation

ART has a self regulating control structure that allows autonomous recognition and learning. ART requires no supervisory control or algorithmic implementation. ART encompasses a wide variety of neural networks. The basic ART system is an unsupervised learning model. ART neural networks are capable of developing stable clusters of arbitrary sequences of input pattern by self-organizing. ART-1 can cluster binary input vectors. ART-2 can cluster real valued input vectors. ART system is well suited to problems that require online learning of large and evolving database.

APPLICATION DOMAIN

- This kind of analysis is use for to improve Web navigation efficiency by Web structure.
- To negate users to lose their orientation, structure stability is taken into consideration.
- This analysis introduces a mathematical programming model to reorganize Web structure to achieve better navigation efficiency.
- User can specify the requirements and how static the website structure should be. Navigation efficiency is defined systematically and an e-government example is given to illustrate how the method works.

CONCLUSION

Our aim is to improve Web navigation efficiency by minimum changes in Web structure. To avoid users to lose their orientation, structure stability is taken into consideration. This analysis proposes a mathematical programming method to reorganize Web structure in order to achieve better navigation efficiency and also increase our features which help to improve the user navigation.

This analysis has the advantage of improving navigation efficiency mathematically and relieving the designer to modify the structure in transformation.

We have proposed a mathematical programming model to improve the navigation effectiveness of a website while minimizing changes to its current structure, a critical issue that has not been examined in the literature.

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