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Adaptive Resonance Theory Implementation in Intelligence Website Navigation

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ABSTRACT

Adaptive Resonance Theory (ART) is a theory developed by Stephen Grossberg 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 such as pattern recognition and prediction.

Already ART is implemented in matrix based concepts like Neural Network. Now we implement this in website navigation for maintaining the visited links in more proper manner.

We have to design the ART implementation in which the search algorithm be faster, track all path of websites that are surfed already, management of all links and many more facilities has to be managed.

Strong site navigation makes it easy for visitors to quickly find the information that interests them. It also helps in searching the required webpage information efficiently and effectively.

We have following points to improve our website navigation with the help of Adaptive Resonance Theory:-

- *Keep it consistent.*
- *Divide categories clearly.*
- *Make all navigation elements clickable links.*
- *Use accurate navigation titles.*
- *Ensure your search feature works.*

General Terms

Navigation, Mathematical model programming, vigilance

Keywords

Web Mining, Adaptive Resonance theory

INTRODUCTION

The purpose of this paper is to provide an implementation of Adaptive Resonance Theory (ART). Basically ART is based on matrix and cluster based algorithm. A clustering ART algorithm takes as input a set of input vectors and gives as output a set of clusters and a mapping of each input vector to a cluster. Input vectors which are close to each other according to a specific similarity measure should be mapped to the same cluster.

Every website has some form of navigation. But navigation of many website is not good. Most of the time, a website's navigation is put together by Web designers who know a lot about making pretty websites, but very little about marketing a website or creating a website built for the customer.

According to website programming Navigation should be clear for user that one knows where they go according to requirement and save time also. Navigation can make or break your website's overall performance when it comes to retaining visitors, keeping them engaged and driving them through the conversion funnel.

Conversely, poor navigation does more harm than good. It confuses visitors and sends them scurrying for the exit. Generally visitors may confuse at the searching time if poor navigation occurs in the website.

Cluster based ART design the matrix and on the basis of Matrix filtration we fetch the required page with Cluster mining. This model is best model among ART models.

When implementing this algorithm it is necessary to deal with the restriction of limited process flow. The algorithm allocates a fixed amount of process to work on, assuming that this will be enough. Mainly the process may be complex or design the web of surfed webpages.

Basically ART model implementation presents best navigation technique for betterment of website. The steps involved for achieving main goal of ART implementation on the Intelligence Website Navigation:-

1. Run any website.

2. Given the current state ***s***, for each available Webpage links.

3. Based on the value functions computed, select an action that is starting point where we will compute the different WebPages as in the form of cluster.

4. Perform the action **a**, observe the next state ***s'***, and receive the reward ***r*** (if any) from the environment.

5. Estimate the value for new value as new link.

6. Learn new link on the corresponding state, action, and reward.

7. Update the current state by *s*=*s'*.

8. Repeat from Step 2 until *s* is a terminal state.

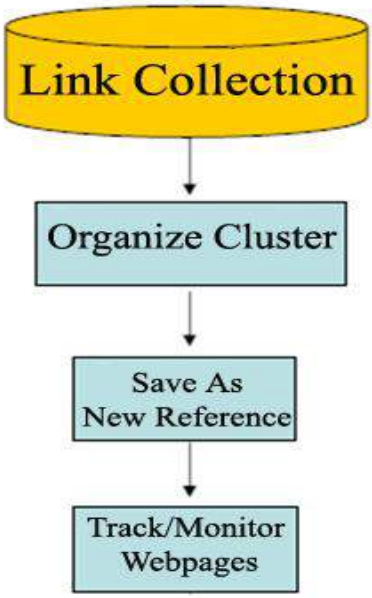

Fig. 1 Process Flow

Different Steps involved for Intelligence Website Navigation are:-

Search–Getting the information

Organize- (clustering/categorizing)–Putting things in perspectives

Analyze- (data mining)–Discover hidden knowledge

Share- (knowledge management)–Saving for reference and sharing

Track–Constant monitoring

RELATED WORK

Min Chen and Young U. Ryu had announced the research based on Effective User Navigation through Website Structure Improvement in which they concerned primarily with transformation approaches. The literature considering transformations approaches mainly focuses on developing methods to completely reorganize the link structure of a website.

Although there are advocates for website reorganization approaches, their drawbacks are obvious.

First, since a complete reorganization could radically change the location of familiar items, the new website may disorient users.

Second, the reorganized website structure is highly unpredictable, and the cost of disorienting users after the changes remains unanalyzed. This is because a website's structure is typically designed by experts and bears business or organizational logic, but this logic may no longer exist in the new structure when the website is completely reorganized. Besides, no prior studies have assessed the usability of a completely reorganized website, leading to doubts on the applicability of the reorganization approaches.

Finally, since website reorganization approaches could dramatically change the current structure, they cannot be frequently performed to improve the navigability.

They focused on flowing points:-

First, we explore the problem of improving user navigation on a website with minimal changes to the current structure, an important question that has never been examined in the literature. We show that our MP model not only successfully accomplishes the task but also generates the optimal solutions surprisingly fast. The experiments on synthetic data indicate that our model also scales up very well.

Second, we model the out-degree as a cost term in the objective function instead of as hard constraints. This allows a page to have more links than the out-degree threshold if the cost is reasonable and hence offers a good balance between minimizing changes to a website and reducing information overload to users.

Third, we propose two evaluation metrics and use them to assess the improved structure to confirm the validity of our model. The evaluation procedure developed in this paper provides a framework for evaluating website structures in similar studies.

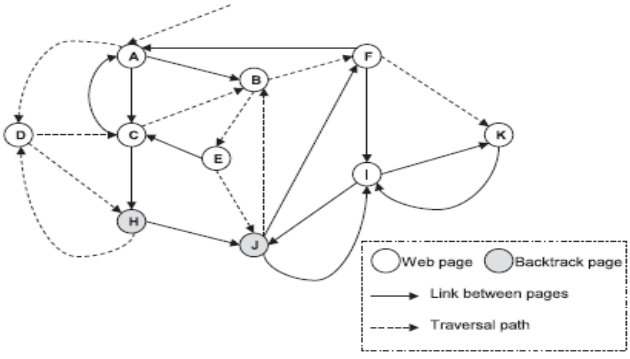

Fig 2. A website with 10 pages

In the example shown in Fig. 2, the user has traversed three paths before reaching the target. An intuitive solution to help this user reach the target faster is to introduce more links. There are many ways to add extra links. If a link is added from D to K, the user can directly reach K via D, and hence reach the target in the first path. Thus, adding this link "saves" the user two paths. Similarly, establishing a link from B to K enables the user to reach the target in the second path. Hence, this saves him one path.

PROPOSED METHODOLOGY

Ultimate aim of our research paper is implementation of ART Algorithm. By implementation of ART we announce Cluster and Matrix based Algorithm and manage all website links in high educated manner that user surf the website in more specified manner.

First of all let us clarify what is meant by an ART algorithm that is a special part in Neural Network.

There are two basic methods of training ART-based neural networks: slow and fast. In the slow learning method, the degree of training of the recognition neuron's weights towards the input vector is calculated to continuous values with differential equations and is thus dependent on the length of time the input vector is presented. With fast learning, algebraic equations are used to calculate degree of weight adjustments to be made, and binary values are used. While fast learning is effective and efficient for a variety of tasks, the slow learning method is more biologically plausible and can be used with continuous-time networks.

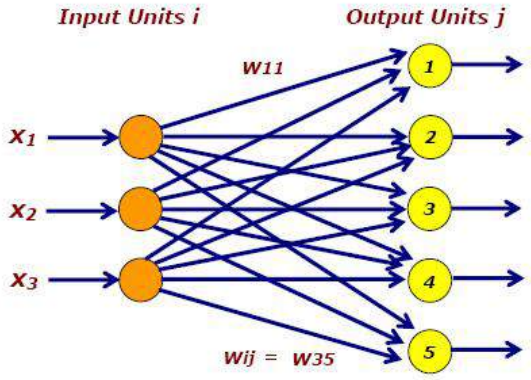

Fig. 3 Basic ART Architecture

We implement ART for making intelligent website Navigation on the basis of cluster.

Cluster - A clustering algorithm shell with incremental update of prototype vectors and a variable number of clusters.

We organize the cluster that is useful for link mining and fetch the record according to user requirement based on cluster ART Model.

•Organize clusters
–collect website links in similar pattern

•Inserting Clusters
–Indicate preference on groupings

•Merging clusters
–Indicate preferences on similarities

•Splitting clusters
–Indicate preferences on differences

•Link Mining based on user choice

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

The implementation of ART Algorithm makes the website more superior with high qualifies navigation support. In the implementation phase we consider the search algorithm be faster, track all path of websites that are surfed already, management of all links and many more facilities has to be managed. Mainly we concentrate the proper cluster related to similar websites.

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