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Web Usability Recommendation Model: An Approach to Enhance Web Usability

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Abstract: *The success of any business mainly e-business is mostly depends on its website. To attract and sustain web users is one of the biggest challenges for any e-business. Web Usability plays key role to retain web user. Amongst all parameters Web site Navigation is one of the crucial parameter of web usability which needs to be improved for better web usability. Unstructured navigation path increase navigation burden on the users and leads them to leave the site without finishing their intended purpose to visit the web site. In this paper we proposed a recommendation model to overcome the issues of web site navigation. Web mining techniques like pattern discovery and pattern analysis are used to provide useful recommendations to web admin. The model collects row usage data from server log files and user actions data by performing cognitive walkthrough then analyze data and offer web usability recommendations which will supportive to improve overall web usability.*
Keywords - *Web Usability, Pattern Analysis, Pattern Discovery, Cognitive Walk Through*

I. Introduction

As per ISO 9241 usability means the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environment. Web usability refers to an ease with which visitor use the website. Complete his task. Gets the needed information accurately and efficiently and satisfied with his visit. Web usability is one of the leading factors to retain web users to the site and hence it should be improved to provide better service to visitors. Various parameters that play key role to improve web usability are: Identity, Content, Ease of Use, Trust, Download Delay, Customization, Responsiveness, Promotion and Emotion [1]. This research focus on ease of use parameter by proposing a usability recommendations model which provides informative suggestions to improve web usability based on web log data and user actions.

II. Related Work

Rashid Ahmed and Zhang Li identify the aspects which degrade the Navigational burden of users. They present a methodology to measure navigational burden and proposed automation measurement of web usability [2]. Jian Li Duan and Shu Xia Liu design a tool that uses web log data to understand user behaviors to find common usability issues and present the result in visual form. This tool is based on web log data. [3]. Rajni and Pramila use web log data and proposed 'suggest' an Online Recommender system that is based on web mining, which is capable to generate a list of links to pages of possibly interest for the user [4]. Babak and Babak design an agent to dynamically change web links positions and structure based on the data collected from user behaviors. Agent helps the web admin to implement customize navigation structure [5].

Above discussion indicates that sincere efforts have been made to improve web usability and to provide usability recommendations using usage behaviors. Previous attempts were limited and more focused up to server log files for data collection but server log files have such limitations like Log files don't include what user wants, what he/she wants to search, It doesn't indicates that weather user satisfied or not?, Log file doesn't indicates that weather the content provided to user was easy to use or not? [6]. We in this paper proposed a recommendation model which not only works on data gathered from usage behaviors but also on data gathered from user actions by performing cognitive walk through, which helps to provide better recommendations to improve web usability. Combined data collected from server log files and cognitive walk through provides better information to evaluator to enhance overall web usability.

III. Usability Recommendation Model

Web site navigation is one of the leading parameter for usability of any web site. Poorly designed navigation makes some serious issues like

- Broken Links.
- Increase navigation burden on end user because more clicks and time required performing task.
- Difficult for user to search relevant information.
- Force user to think and remember path.

To overcome the above mentioned problems we proposed a web usability recommendations model that will use row usage data and user actions data to discover new patterns to provide usability recommendations to web admin. Fig 1 shows the proposed recommendation model.

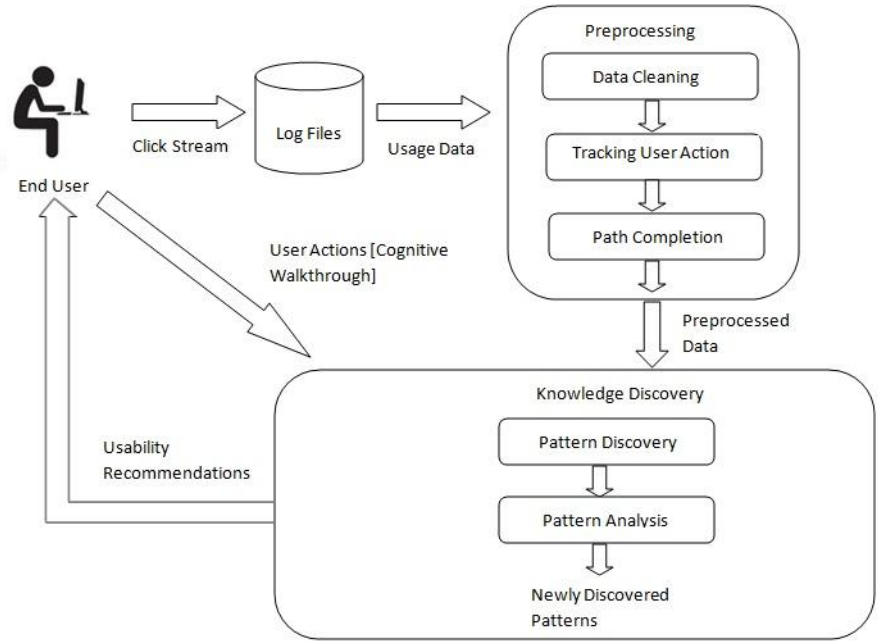

Figure-1: Usability Recommendation Model

Usability Recommendations Model is divided in 3 main phases:

1. Data Collection
2. Preprocessing
3. Knowledge Discovery

1. Data Collection: In the proposed model row usage data is collected from server log files. These usage data is not in proper format and it contains some noisy data so Data Preprocessing is required on collected data.
Data preprocessing performs mainly three processes.

I. Data Cleaning: where collected data are cleaned. Log data contains some improper data like missing data, data with error, Crawler visit data etc. hence such data need to be cleaned before we apply any knowledge discovery techniques. All such kinds of data will be cleaned in data cleaning method.
II. Tracking User Action is the method where we need to identify user session. With this step we come to know that who visit our pages and what they visit. It will help to identify our users and their needs.
III. Path Completion is the method of completion of broken paths. Some times during the visit of user some paths of the visit were broken because of reasons like browser back button etc. In this technique such paths should identified and completed.

The result of preprocessing technique is the cleaned data. At this stage model has raw data which we collect from preprocessing techniques. Raw data which is collected from server log file is not sufficient because of the limitations of log files like log data doesn't provides information about users age, sex, expertise, it doesn't show what user wants? Whether he gets the information he wants? How much time it takes? What was the difficulty level for user to complete his task? Hence we collect second set of data from user using cognitive walkthrough method. The cognitive walkthrough method is a usability inspection method used to identify usability issues in interactive systems, focusing on how easy it is for new users to accomplish tasks with the system [Source: Wikipedia]. In cognitive walk through evaluation, group of users will be asked to perform set of task in the web site and then the responses of individual participants will be collected and observed by the experts to check that

- Whether the participants are able to perform the task which was assign to them?
- Whether they perform the task as per expectations?
- Whether they made any mistakes?
- Whether they follow the actual sequence?

To collect data from user they have assigned some task to perform on the web site and they have asked to finish it and then their responses are majored and stored which is our second input data for the model. In this method some limitations of server log file are removed like we know the users in advance, we know what they want, what they do and what they don't. Evaluators can use these data to find out the user behaviors and can modify the web site structure as per recommendations. These data is the second input for the model and used for further processing. Fig 2 shows how cognitive walkthrough is performed.

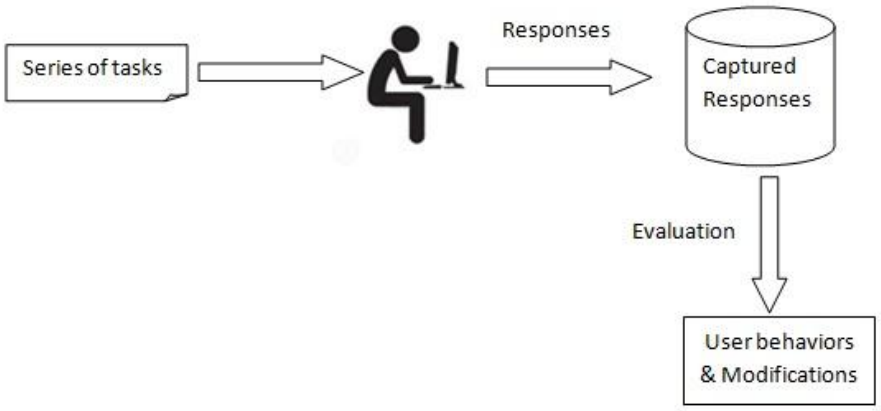

Figure-2: Approach to perform Cognitive Walkthrough

On this data, knowledge discovery techniques can be applied. In knowledge discovery the first technique is Pattern Discovery where newly user patterns were discovered. Data mining algorithms can be applied on the preprocessed data to identified new patterns and rules like mostly visited pages, patterns of page visit etc. Later on Pattern Analysis techniques can be applied to find interesting patterns and rules from the newly discovered rules and patterns. These rules and patterns can be provided to the web admin to improve the overall usability of the site by making the structural changes in the site.

IV. Conclusion and Future Work

This paper works on web mining techniques to discover new patterns which are unknown to web admin and which will helpful to improve overall usability of the web site. To discover new patterns, a web usability recommendations model is proposed that analyze the raw data collected from server log files and cognitive walk through. Combination of such variety of data will be more beneficial to improve overall web usability. In future this model can be implemented and tested in live environment and results should be compared.

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