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# An efficient technique to provide webpage recommendation based on domain knowledge and web usage knowledge

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***Abstract*—** Now a day's use of world wide web is going on increasing to get various kind of related information. By considering this fact, there is a need to provide Web page Recommendation to get a relevant result to the user search. There are different kinds of web recommendations are made like images, video, audio, query and web pages. This paper focus on providing web page recommendation to the web page in website based on domain knowledge and web usage. So it proposes models for web page recommendations. The first model is an Ontological Model for finding domain terms. The second model is semantic network analysis model to find out the relationship between domain terms and WebPages. The third model is Conceptual Prediction Model to find out web usage knowledge from web pages .On this basis, web page recommendation is provided to the web page that gives a more relevant result to user search than any other web pages present in that particular website.

***Keywords***- *web page recommendation; ontology; semantic network analysis,; domain knowledge ; web usage knowledge.*

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## I. INTRODUCTION

The popularity of world wide web[1] goes on increasing as various kind of services are available at lowest rate with fast access and efficient to use. So a use of internet increases with high demand[2]. But there is a need to provide better relevant information to a user as per requirement for that purpose web mining must be necessary. Which is the technique of data mining to extract relevant information from websites. Here the final aim of any system is to provide what user want .[3] Most of the time user get search result from websites. So website consist of various web pages that consist of relevant information. So there is a need to provide web page recommendation given to particular web page in the website so a user can get more relevant information to his search. Now a day's web page recommendation becomes popular a user using a large amount of website for their work. When a user browses a website the sequence of visited WebPages during a session from the period of starting from existing browser by which the user may generated. So web sessions are created as S= I1,I2….I k where k is the kth visited webpage.[4]

Here the core techniques in webpage recommendation are the learning and prediction models that learn users' behavior and evaluate what users would like to view in the future. So particularly, it can suggest interesting items from a large set of items based on the knowledge gained about an active user[5]

## II. LITERATURE REVIEW

In particular www has all related technology that has evolved the way people live. Here paper reviews how each of the approaches meets user needs and give examples associated with some of these techniques which are usable. Then this paper also mentions some issues in other research in this domain, based on the survey conduct. At the end, paper concludes a promising future of this area of research by Chhavi Rana.[1]

In this chapter we present an idea of Web personalization process viewed which is application provided to data mining which is essential for phases of data mining. The phases include data collection and preprocessing, pattern discovery and evaluation by Bamshad Mobasher, this discovered knowledge acts as a mediator between the web and user.[2]

With the rapid growth of internet technologies, Here web has become the world's largest repository of knowledge. So webmaster perform challenging tasks which organize the contents of the particular websites to gather the needs of the users. Here This paper presents a new framework for a semantic-enhanced Web-page recommendation (WPR), and a suite of enabling techniques which include semantic network models of domain knowledge and Web usage knowledge, querying techniques, and Web-page recommendation strategies by Jose Borges.[3]

Here it has been shown that Semantic Web technology opens a positive point of view of Web development for example, Thi Thanh Sang Nguyen . Then integration of semantic knowledge with Web mining plays an important role in the development of robust recommender systems. Particularly, domain ontology is useful for clustering documents, classifying pages or searching subjects.[4]

Here Web mining is a very interesting research topic which combines two of the activated research areas: The data Mining and World Wide Web. So with the huge amount of information available online, the World Wide Web is a fertile area for data mining research. Then Web mining research relates to several research communities, such as database, information retrieval, and AI. The World Wide Web (Web) is a popular and interactive medium to disseminate information today. Then Web is huge, diverse, and dynamic and thus raises the scalability, multimedia data, and temporal issues respectively by Abraham, A.[5]

The multidimensional (MD) approach for recommender systems which provide recommendations based context

information with the particular information on users and entities used in various recommender systems. Here it supports multiple dimensions, hierarchical aggregation of recommendations. This method capable for selecting segments of two-dimensional ratings to the recommendation context and then applies collaborative other traditional two-dimensional rating techniques to these segments by Adomavicius G. Then comparison between rating approaches which are the multidimensional and two-dimensional is made, and the difference between the two are taken into consideration. Even more, the article also introduces a combined rating method, where the MD approach done such situation identifies the standard two-dimensional approach and make a use in situations and the standard two-dimensional approach for MD approach . So Finally, the article presents study of the combined approach, uses recommender system as a multidimensional movie that was developed and implementing this approach and performance is tested.[6]

Here Improving Business through Semantically, also by using Grid Computing, and also Enterprise Integration by Jerey T. is an required to read for all Semantic Web users from CIOs to CTOs and architects to managers. Then a business perspective is also add in this paper ,which is useful to read in upper class perspective. So it includes all background information, various, kind of recommendations, different solutions, and product alternatives along with case studies. Also gives technical advances over past decades Milan the University of Illinois at Urbana-Champaign. So to design a semantic system this techniques are enough for managers, with enough technical briefs for developers.[7]

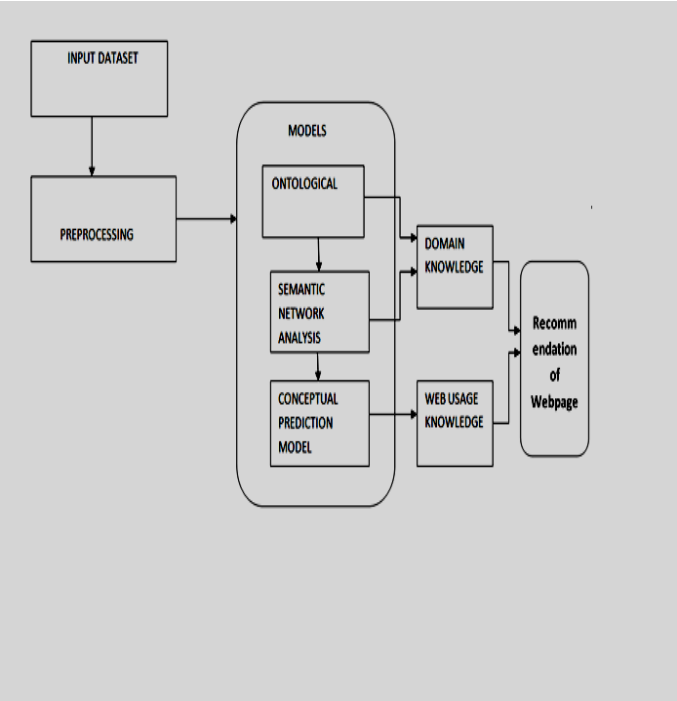
Here essential tool is the smooth communication is for the success of construction projects. So these tools provides easy-to-use, richer text, and high-capacity communication tool, now blogging can get popularity in construction industry. Here ,discussion is carried about the characteristics of blogging technology and how it is beneficial for construction organizations are presented. So to even more improve the effectiveness of blogging technology, blogging system is proposed is an ontology-based semantic .Which is expansion of conventional blogging also ontology is the key technology required for it. It composed of a network of concepts contains domain-ontology-based semantic blogging site, which are clearly defined and explain according to their context and express to certain behaviors. Then paper reports how in blogging system e-Congas ontology is implemented and also in which manner it unction's performed by system to process its contents. It concludes there is an great enchantment in information sharing between construction professionals by using ontology-based semantic blogging site and it is a very useful tool for construction organizations to publish and share their experience by Cynthia Changxin Wang.[8]

By using World Wide Web various type of content are generated in large amount, which gives relevant result to user web search as recommendation become important part of web application. In the web recommendation are available which are of different kinds to the user per day that has web page ,audio, query suggestions, video etc. This paper has aim to give framework to webpage recommendation effectively. Here we describe firstly types of web mining and basis of web mining. The second is Details of each web mining technique. Third by Modraj Bhavsar propose personalized web page recommendation architecture.[9]

Here, to overcome limitations of present systems and improve the recommendations performance quality web page Recommendation systems can take ideas of semantic network. Then paper briefs a personalized-web-recommendation system, representations of items and user-profiles based on ontology used by a system user in order to describe semantic applications with personalized services. Then uses domain ontology to improve the personalization on the other hand, user's point of interest are taken into account in a correct way and efficient manner by using a domain-based inference method on the other hand our content-based filtering approach uses , the stemmer algorithm , which measure of the a identity between an item and a user, which enhanced using a semantic similarity method. In web page recommender systems and web personalization system the web usage mining plays an important role by Arundhati Patil. Then proposed approach uses semantic knowledge for and personalization processes and web usage mining.[10]

Here 3 models are used _rst s ontological model for abstracting domain terms, second is semantic network analysis model for abstracting relationship between domain terms and WebPages and third is Conceptual prediction model for extracting web usage knowledge. By using these three model we are providing webpage recommendation to webpage. Then result is compared by using terms Precision and Recall by Modraj Bhavsar .[11]

## III. BASIC SYSTEM ARCHITECTURE



**1.Input Dataset:-**

Here when a user sends a request to a web server, a session is created for the a user. Then during session when the user browses a website the list of the page that user visits are stored as a session data. Such sequence can be organized and stored as web session W = p1, p2, p3, where pi = page ID of the ith visited page. Here the main goal is to predict web page from the user session data and other user data. [1] In short we can say, a data set is nothing but a history of user surf record. Which contains web pages, Tiles and paths of visited pages.

**2.Preprocessing:-**

The preprocessing phase is the one of the component in system architecture. Web server log file records, which is the main source of input, contains irrelevant data. So Preprocessing phase consists of data cleaning, users identification and session identification, tasks. While preprocessing Web server log files are required to eliminate irrelevant requests like requests made by software agents like Web crawlers and search engines and non-responded requests. So the cleaned and filtered weblog file is a pass to ontology based weblog parser and all the ontology represented instances by the WebPages are extracted converting the weblog to a sequence of semantic objects. Lastly, This preprocessing tasks results in collective structures such as user transaction file, contains semantic objects.[1]

**3.Model construction:-**

3.1. Ontological Model:-

A domain ontology generally used for semantics of WebPages of a website. So it shows that domain knowledge along with Web usage knowledge improves the performance of recommender systems with ontology- based Web mining techniques [3]–[5].We can say an ontology is a knowledge representation technology whose implementation can be machine-understandable using the ontology language, such as OWL. Ontology gives the concepts and their associations in an application domain. For that purpose in the context of Webpage recommendation, it is necessary to have an ontology that expresses the meaning of WebPages for better understanding Web usage patterns and discovering viewed domain terms for supporting more effective Webpage recommendations. A domain ontology construction allows the ontology to be confident, rich and detailed because of basing on a domain expert's experience. So The ontological description of domain terms and WebPages allows the machine to understand the meaning of WebPages by reasoning about terms associated with the WebPages and vice versa, so this domain ontology is sufficient to support Web-page recommendation in recommender systems[6].

3.2. Semantic network analysis Model:-

The Traditional ontology construction is a labor-intensive and time-consuming task and highly relies on human experts. Also, such constructed ontology are often fixed to a specific domain of interest. So This often leads to the difficulties of reusing existing ontology. It makes hardly possible to automate fully the knowledge acquisition process that includes knowledge discovery, knowledge base construction, and knowledge utilization. So With the rapid development of websites in quantity and quality, the manual construction of domain ontology are no longer feasible for coping with the changeable websites. So it becomes highly desirable to develop an efficient method to automate knowledge acquisition, representation, and application. Then the semantic network of WebPages refers to domain concepts and the relations between these concepts as well as WebPages and the links between the domain concepts and WebPages. We can say this automatic approach to the semantic network construction of WebPages aims at supporting automated knowledge discovery and knowledge representation in Webpage recommender systems.[6]

3.3. Conceptual Prediction Model:-

According to the Markov model [7], a kind of model Which efficient to represent a collection of navigation records, CPM is developed as a self-contained and compact model On the basis of domain terms and relationship between web pages and domain terms we cannot recommend web page correctly. For that reason, the third model used is CPM[8], i.e., Conceptual Prediction Model, which can extract semantic web usage knowledge from a particular web page. [9]So recommendation becomes easy and correct.

**4. Web page Recommendation:-**

Finally We can recommend webpage on the basis of :-
1] Domain terms by using ontological model
2] Domain terms and relationship between WebPages by using semantic network analysis model.
3] Web usage knowledge using Conceptual Prediction Model.

By using these three models we can recommend web pages of a website.

## IV. CONCLUSION

In this way, this paper provides webpage recommendation using novel methods.ie. the first model is the ontology-based model that can be provide domain terms related to WebPages then second model is semantic network analysis model which provides relationship between domain term and WebPages and third model is Conceptual Prediction Model which provides web usage knowledge.

In future Key information Extraction Algorithm is used to improve performance of web page recommendation using precision and satisfaction.

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