

Personalized Mobile Search Engine

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Abstract — In this paper we propose a personalized mobile search engine (PMSE) that captures the users' preferences in the form of concepts by mining their clickthrough data. Due to the importance of location information in mobile search, PMSE classifies these concepts into content concepts and location concepts. In addition, users' locations (positioned by GPS) are used to supplement the location concepts in PMSE. The user preferences are organized in an ontology-based, multifaceted user profile, which are used to adapt a personalized ranking function for rank adaptation of future search results. To characterize the diversity of the concepts associated with a query and their relevance's to the user's need, four entropies are introduced to balance the weights between the content and location facets. Based on the client-server model, we also present a detailed architecture and design for implementation of PMSE. In our design, the client collects and stores locally the clickthrough data to protect privacy, whereas heavy tasks such as concept extraction, training, and re-ranking are performed at the PMSE server. Moreover, we address the privacy issue by restricting the information in the user profile exposed to the PMSE server with two privacy parameters. We prototype PMSE on the Google Android platform. Experimental results show that PMSE significantly improves the precision comparing to the baseline.

Index Terms— clickthrough, content concept, location concept, ontology

I. INTRODUCTION

Mobile devices have evolved to provide bigger full-color screens, enhanced processing power and faster and permanent broadband Internet connections. These technologies have brought the World Wide Web to mobile devices introducing new requirements and expectations. But the most majority of web sites and search engines are usually designed with desktop computers in mind. For that reason, current mobile search experience is far from satisfactory. Search engine analysts, being aware of this problem, have designed mobile-oriented views to provide the same service from a smaller interface. Mobile Web Search introduces new challenges not present in traditional web search. Users normally own modern cell phones which allows them to be permanently online anywhere, anytime. A typical mobile web search scenario consists of a user outdoors with an information need. At this point he takes his phone and uses a web search engine to find an answer to a query. Furthermore, he is probably doing something else at the same time, like walking or talking to a friend. In such situation the user needs a short, fast but also accurate answer to his query. Most of the current web information is developed based on HTML. Semantic assigns a meaning to a document and the Semantic Web is a high end automated intellectual technology that allows not only humans but machines to understand information. In order for a machine to take information from web and work, there has to be simple semantics for the machine to process. Semantic Web exists to express such semantics in a standardized method. Observing the need for different types of concepts, in this paper present a personalized mobile search engine [PMSE] which represents different types of concepts in different ontologies. By mining content and location concepts for user profiling, it utilizes both the content and location preferences to personalize search results for a user.

II. PERSONALIZED MOBILE SEARCH ENGINE

The World Wide Web contains an enormous amount of information, but it can be exceedingly difficult for users to locate resources that are both high in quality and relevant to their information needs. Issues that have to be dealt with are the

detection of relevant information, involving the searching and indexing of the Web content, the creation of some meta-knowledge out of the information which is available on the Web, as well as the addressing of the individual users' needs and interests, by personalizing the provided information and services. Search Engine provides the gateway for most of the users trying to explore the huge information base of web pages. Search engines are programs that search documents for specified keywords on search for information on the World Wide Web and return a list of the documents where the keywords were found. A Search Engine is really a class of programs; however, the term is often used to specifically describe systems like Google, Bing and Yahoo! Search that enable users to search for documents on the World Wide Web.

Data Mining, also known as Knowledge-Discovery in Databases (KDD), is the process of automatically searching large volumes of data for patterns. Data Mining applies many older computational techniques from statistics, machine learning and pattern recognition. Steps involved in KDD process: Knowledge discovery as a process consists of an iterative sequence of the following steps:

1. Data cleaning (to remove noise or irrelevant data)
2. Data integration (where multiple data sources may be combined)
3. Data selection (where data relevant to the analysis task are retrieved from the database)
4. Data transformation (where data are transformed or consolidated into forms appropriate for mining by performing summary or aggregation operations, for instance).
5. Data mining (an essential process where intelligent methods are applied in order to extract data patterns) .
6. Pattern evaluation (to identify the truly interesting patterns representing knowledge based on some interestingness measures).

The actual data mining task is the automatic or semiautomatic analysis of large quantities of data to extract previously unknown interesting patterns. Some of the data mining tasks are classification, regression, clustering, summarization, and dependency modeling and deviation detection. The five major elements in data mining are Extract, transform, and load transaction data onto the data warehouse system. Store and manage the data in a multidimensional database system. Provide data access to business analysts and information technology professionals. Analyze the data by application software. Present the data in a useful format, such as a graph or table.

Data mining nowadays plays an important role in searching the information on the web that include a high variety data types. For reaching this goal, data mining techniques for automatic discovering and extracting the web based information has been used as web mining. Every day, the WWW grows by roughly a million electronic pages, adding to the hundreds of millions already on-line. Because of its rapid and chaotic growth, the resulting network of information lacks of organization and structure. Moreover, the content is published in various diverse formats. Due to this fact, users are feeling sometimes disoriented, lost in that information overload that continues to expand.

Goals of Search Engine:

- (1) Quality-Means effectiveness can be defined as to retrieve the most relevant set of document for a query. Process text and store text statistics to improve relevance be used.
- (2) Speed-Means efficiency may be defined as a process queries from users as fast as possible For it specialized data structure should be used.

Quality of Good Search Engine:

- (1) Ability to produce the most relevant result to any given search.
- (2) A true search engine is an automated software program that moves around the web collecting WebPages to include in its catalog or database.
- (3) It searches when user requests information from a search engine has its own catalog or database of collected WebPages, so you will get different results. Hits by using different search engines.

The proposed personalized mobile search engine is an innovative approach for personalizing web search results. By mining content and location concepts for user profiling, it utilizes both the content and location preferences to personalize search results for a user. This proposed search engine profiles both of the user's content and location preferences in the ontology based user profiles, which are automatically learned from the clickthrough and GPS data without requiring extra efforts from the user. Here propose and implement a new and realistic design for PMSE. To train the user profiles quickly and efficiently, this design forwards user requests to the PMSE server to handle the training and re-ranking processes.

Advantages

1. The proposed personalized mobile search engine is an innovative approach for personalizing web search results. By mining content and location concepts for user profiling, it utilizes both the content and location preferences to personalize search results for a user.
2. It studies the unique characteristics of content and location concepts, and provides a coherent strategy using client-server architecture to integrate them into a uniform solution for the mobile environment.
3. PMSE incorporates a user's physical locations in the personalization process. We conduct experiments to study the influence of a user's GPS locations in personalization. The results show that GPS locations help improve retrieval effectiveness for location queries.

III.CONCLUSION

The proposed personalized mobile search engine using content and location concept is an innovative approach for personalizing web search results. By mining content and location concepts for user profiling, it utilizes both the content and location preferences to personalize search results for a user. In this paper, personalized the search results based on user's clickthrough preferences. Search queries are classified according to preferences. Most existing location-based search systems, require users to manually define their location preferences (with latitude-longitude pairs or text form).But PMSE automatically learn from clickthrough and GPS data without requiring extra effort from the user. Here we store personal information in mobile. At the time of search we pass this information to server.

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