Work-flow Push System Based on Kruskal Algorithm Location

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Abstract. In the recent years, social networking push technology system based on location has become one of the most active subjects in location service and social network analysis. According to the geographic space feature model of users' social activities and the relevance of their working relationships, a reasonable push technology algorithm is designed. In this paper the structural characteristics of location-based work network and social network are analyzed from the previous research, and the Kruskal algorithm are dissected. Finally, this achievement in the future will be discussed.

1. Introduction

Information push technology is a computer data publishing technology which automatically pushes the users’ selected data to the user according to the time interval specified by the users or the occurrence of the event.

For companies, in a complex environment of massive data and a large number of users it is an important factor for them to improve their competitiveness and efficiency by integrating the existing manpower, business, data and resources which makes it possible to obtain and exchange information resources in time.

There are some disadvantages in the existing information service system of the enterprise, such as the limited retrieval mode and the scattered resources. When it receives the same requests from different users, the searching results are all the same. The results are not given according to the attributes of the users, and for all the users there are same contents or customary contents.

When pushing information, all attributes of users should be taken into consideration. In addition to the individual attributes such as age, income and education, the social and psychological attributes of work, habit, interpersonal relationship, emotion, belief, preference and feeling also should be considered. Social attributes have a particular impact on the users’ experience. For the present public platform work-flow information push technology, most users’ experience research only considered the personal attributes and lacked consideration of social attributes. The response, action, and accomplishment of all the attributes of the whole process of using and serving are included in the research of the work-flow information push technology which totally presents individual requirements of users. The changes in the users’ attribute state are accurately screened by the database which would improve and optimize the work-flow push system of users.
On the other hand, the information push technology can be transformed from the passive acceptance of the user's request to the active perception of the user's information requirement to achieve the purpose of active recommendation. By means of learning interests and potential demands of users by analyzing users’ social attributes to establish expectant model, it not only can satisfy the present needs of users but also their requirements in the future. This system also can match the information to realize the individual service centered by the user.

In the fast iterative Internet industry, decision-makers tend to be more inclined to quickly launch products, quickly test and update iterations such "barbarous" ways to obtain more direct and accurate information feedback of users. It causes that in the early developing stage companies make users burn money crazily then leave them with huge complains. Therefore, good experience and consumption habits are involved into the work-flow of the enterprise. Instead of taking the user less time and effort as an evaluation indicator, a strong motivation to experience (consumer) products and services will be given to the customers which make users prefer to pay more attention to products and services for a long period.

With the popularization of the application of location signature, location sharing and location identification in many mobile networks, location Based Service (LBS) is gradually merged with various kinds of networks and the work-flow network based on location is formed. The location of the online virtual society is associated with the real world through the location of the mobile users. When the location of the user is located, the location information is shared and transmitted in the virtual network world and a variety of location services are derived. Among them, the work-flow push technology is a technological method used as the present solution of information screening and individual differentiation services.

In 2013, more than 8,200,000 users have used location-based social network services, and the global market based social network service market in 2015 has reached $1,080,000 million. Network push technology based on location not only has the characteristics of information services such as socialization, localization, mobility and other mobile services, but also can be screened and actively pushed according to the individual demands of different users.

This paper reviews the current research and development of applications of work-flow push technology system based on location. The second section outlines the features and data features of work-flow network based on location; the third, fourth sections focus on the basic framework of the location based work-flow network, the recommended methods and application types based on different levels of network data mining, and the fifth section discusses the difficulties and development trends of the research in the future.

2. Work-flow network based on location

2.1. Work-flow network based on location

Location based work-flow network users accumulate lots of location data through continuous location check-in, information sharing and online social interaction. With the Internet technology network, IPv6 and IPv4 technology coexist. This paper adopts double protocol stack of transiting IPv4 network to IPv6. The dual stack is used by hosts, servers and routers in the network to process and use IPv4 and IPv6 protocols at the same time. IPv4 is used in the Internet packet switching (IPX) network, the digital device company network protocol (DECnet) and the network based on AppleTalk, so that the dual stack protocol needs to analyze the hosts, servers and routers of the two protocols at the same time.

Users can use TCP or UDP to transfer location data as the transport layer through the IPv4 network. After the location information enters the protocol stack, it is encapsulated into the IPv4 packet, then it is sent to the network interface of the nearest node, and the value of the network protocol ID field based on the location is 0X0800. Users can use TCP or UDP to transfer location data as the transport layer through the IPv6 network. After the location information enters the protocol stack, it is encapsulated into the IPv6 packet and is sent to the network interface of the nearest node, and the value of the network protocol ID field based on the location is 0X86DD. As it is shown in Figure 1.
2.2. Kruskal algorithm introduction
The unoriented connectivity graph is set as $G = (V, E)$ and the minimum spanning tree of $G$ is $T = (U, H)$, its initial state $U = V, H = E$. Therefore each vertex in the $T$ forms a connected branch, and then selects the edges of the side set $E$ in sequence according to the order of the weight from the edge to the large order. If the two vertexes of the chosen edge belong to two different connected branches of $T$, the edges are added to the $H$ and the two connected branches are connected to a connected branch at the same time. If the selected two nodes belong to the same connected branch, the edges are rounding to avoid the loop. The rest of the operation is same. When the number of connected branches in $T$ is 1, the connected branch is a minimum spanning tree (MST) of $G$.

2.3. Work-flow push system based on Kruskal algorithm location
C represents the user geographic location class: $C_1, C_2, \ldots, C_k$. The interval between $C$ is exactly the length $d$ of the $k-1$ edge in the minimum spanning tree, which is the length of the next edge added automatically by Kruskal algorithm.

Now the class $C'$ formed by many protocol environments in a certain area is considered and the geographical location area is divided into a non empty set: $C_1', C_2', \ldots, C_k'$. $C$ is not necessarily the same as the adjacent ones $C'$, but there must be a clustering rather than any subset of $K$ sets. So there is a point: $P_i, P_j \in C_r$.

As shown in the Figure 2, there are the mobile network $C$ class based on the geographic location and many different terminal nodes, in which the mobile network $C$ class $P$ uses the IPv4 protocol stack and $p_1$ uses the IPv6 protocol stack. Mobile Internet $C'$ class $P'$ uses IPv4 protocol stack and $p_j$ uses IPv6 protocol stack. Because $p_1$ and $p_j$ belong to the same connected branch, all the edges on $P$ are formed. This means that when $p_1$ and $p_j$ communicating with data, the length of each side is $d$ at most. ($P$ and $P'$) is automatically added by the Kruskal algorithm.
3. Conclusion
This paper focuses on the algorithm of the shortest path location. It draws the idea of the minimum spanning tree algorithm, and gives the work-flow push system based on the Kruskal algorithm position. Through the example analysis, it is concluded that the selection path of Kruskal algorithm is more accurate and stable and has the advantage of time. Further simulation experiments or practical projects will be implemented to get relevant supporting experimental data to verify this achievement.

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