Multi-Agent System to Suggest Daily Commodities on Social Networking Websites

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Abstract: Multi agent system is a rapidly growing field of distributed artificial intelligence that has gained significant position because of its ability to solve complex real world problems. Researches on social networks have received increasing attention in multi agent systems due to the popularity of social networking sites. In this paper, we are going to draft a blueprint of Multi agent architecture for social networking websites to suggest daily life commodities/items, based on general trends and interests. Usually websites show their advertisements or user interest information in the form of pop ups. This information is generally tied up with the most recent searches the user has made on the web browser .These ideas provide may or may not be related with his personal interests. So, he becomes frustrated at some times. But our system is capable of handling the situations intelligently. It extracts the required information from profiles and associates the results with it; providing up-to-date and significance information and making the web search a fascinating experience.
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1. Introduction

Our world has become a global village. Technological development has brought people closer. Initiation of social websites provides a virtual community for people to share their daily activities with their friends and family. By virtue of which they can share their interests as well as increase their circle of acquaintances. Social Networking Sites (SNS) have attracted millions of users. Some of these sites provide services to different audiences, while others draw attention based on their common interests, languages or cultural, religious or nationality based identities.

While SNSs have provided a wide variety of technical features, their strength is to display the profiles of formulated lists of friends who are the users of the system. Usually users have to create their profiles containing information about themselves. They can also upload their pictures, post blog entries for others to read, search for other users with similar interests, and compile and share lists of contacts. To protect user privacy SNSs usually have control that allow users to choose who can view their profile, contact them, and so on. Recently, it has also become common for an organization to create profiles to advertise their products and services.

An analysis of the most current business models for SNSs suggests that websites should become more active and personalized. Intelligent agents can provide the possibility to their users to enhance the features of SNSs according to their interests as mentioned in their profiles. Like if a person as adores a personality anything new related with him is automatically provided to the user. Or if he has an interest in a specific field say fashion, all the news related with the new trends is provided without any wastage of time as well energy in searching and browsing the internet.

Generic Models can be used as a template or as patterns for variety of agents as well as application domains. Frances, Jonker, Treur in their paper (Brazier et al., 2002), present an agent model GAM that provides a well-defined conceptual structure for agents. They basically used a compositional development method DESIRE to design it. In (Brazier et al., 1998), they described the compositional multi-agent system development. Furthermore a multi-agent architecture based on a generic broker agent model is also presented in (Jonker et al., 1999). A well-defined comparison of a multi-agent and a single agent has been practically identified in (Balaji and Srinivasan, 2010).

Many Computer-assisted systems are available that help their users to select various commodities that are helpful to them in daily life including giving information about the latest trends or helping them to select their makeover (Mehra and Nissen, 2011) (Sjoblom and Zingmark, 2007). A computer-assisted color selection system bases on aesthetic measure for color harmony and fuzzy logic theory suggests clothing by matching skin color (Hsiao et al., 2008). In the similar way, a Web based application i.e. the online car Selection using a decision support system allows the users to access the web to get information and helps the potential buyer to make the best decision on selection of a desired car

(http://www.library.utem.edu.my, 2011) However, none of these systems uses SNS for suggesting daily life items to their users. So in this paper we design and develop an agent-based system which can be incorporated within the SNS sites for intelligently suggesting daily commodities to its users. The generic agent based architecture for intelligent websites presented here offer these possibilities. This architecture not only provides the enhanced features or multiple agents working together in an environment but also polishes their properties of reactivity, pro activeness and social interaction. Our goal is to provide the user with the information on the basis of their interests, trends, norms, culture and so on.

2. Material and Methods

In this section, we sketch out structural design of Suggestion System and put some light on its different components.

Figure 1 shows the architecture of the system that consists of activity capturing agent, a temporary storage, data processing agent, personal assistant, web crawler that interact with the outside world which consists of number of web applications and one knowledge mart. The multi-agent structure of this system relies on two major components that is personal assistant and website crawler. Based on their role in the system, each agent is given a specific name. The Role, each agent is playing, is illustrated in this section.

The application domain, to illustrate the architecture, addresses the design of an active, intelligent Social Website that suggests daily life commodities to its users. The system gives an idea and up to date information about new items, events, trends, happenings according to the user's interests and needs.

Activity Capturing Agent: This agent is capable to capture/monitor activities performed by the user. Once it has captured a specific amount of information/data, it performs initial data filtering and cleaning. It then pushes the initially filtered data/facts into a temporary data repository for further crackdown.

The temporary data storehouse holds data for a very short period and then is flushed out. The data can be in the form of text files/ statements. For Example, if a user is performing activity related to search of Air conditioner (AC) from section of home appliances. The capturing agent captures information like the model, made and range of AC.

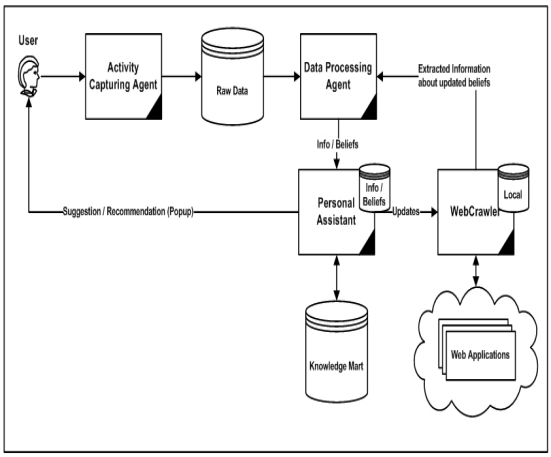

Figure 1: System Architecture Diagram

2.1 Data Processing Agent

The presence of data alone does not guarantee that decisions can be carried out smoothly. There is a compelling constraint for the data to be carrying great weight or, in other words, data quality is of utmost importance. The major role of this agent is to monitor short-term data repository for recently arrived data. The data provided to this agent will be in the form of flat files and raw facts. The initial cleaning of data is performed; so on the initially captured/filtered data low level cleaning is performed. This agent will eliminate any irrelevant material from the data and transform the data into something meaningful.

This information is further processed to generate meaningful patterns which are consumed by the Personal Assistant agent and helps to update beliefs and information. The identified patterns are accountable for processing local information repository of Personal Assistant.

The processing agent is further subdivided in three major methods. One of them is data cleaning agent which has discussed above. The Second is used for communication between PA and user. It is responsible for monitoring the information captured by the Activity Capturing Agent which will collect information like norms, trends, fashion, profile information etc.

The last method is consumed for communicating outside world with PA. It is responsible for monitoring information that is tailored by the web crawler when crawling is initiated by personal assistant once the new activities are performed by the user. The crawled information is further processed to generate meaningful patterns that are consumed by personal Assistant.

2.2 Web Crawler

This agent is responsible for crawling or spidering information from websites. It uses a means of providing up-to-date data. It is mainly used to create a copy of all the visited pages for later processing by a search engine that will index the downloaded pages to provide fast searches. It is also used for automating maintenance of information or tasks on a Web site.

It starts with the list of patterns or information provided or initiated by the personal assistant. It crawls or sniffs outside world on the basis of beliefs and trends identified through patterns. This collected information is further preprocessed for the refinements of facts to be consumed by the Personal Assistant.

Different web Agents are assigned to different type of websites including related to different categories such as fashion, music, videos, computer hardware and software, food, clothing, books ,magazines, music, household accessories, and so on. Each of these web Agents has autonomy to a large extent; they gather the information about their related areas and then further aggregate into useful information. The web crawler asks the related web Agents about information and then extracts the related information and further sends it back to the Personal Assistant through Processing Agent.

Viewed from outside the basic agent behaviors autonomy, responsiveness, pro-activeness and social behavior such as discussed, for example in [1] provide a means to characterize the agents. Moreover, the following Website agent concepts to define

- Interaction with the world (observation, action performance)
- Communication with other agents

2.3 Personal Assistant

This agent is responsible for performing foremost measures of the system. It interacts with the user and outside world through data processing agent. It uses two methods for the communication. One method is responsible for extracting beliefs from meaningful patterns and other is responsible for retrieving information that might be required to update beliefs or action items of agent.

The other component of personal assistant is responsible to communicate with permanent repository. One method is responsible to update beliefs and other is accountable for the storage of latest information. The method for gathering latest information is used to assist agent in suggesting commodities. This method is responsible to gather required information from latest copy. If information is not latest web crawler is initiated to collect latest patterns.

Once beliefs are update and latest patterns are identified the agent is responsible to display suggestion to the user on the basis of his interest, norms and daily trends

3. Results and Discussion

Let's consider a case study a, a user registers himself on a social website say, Social Diaries. First of all while creating an account he provides information about himself in the profile section. We have included option that asks the user if he wants to use the services of a web agent System to Suggest Daily Life Commodities on this site. If he clicks the radio button another option showing Interests is shown. In which the user identifies his interests say he chose Fashion. Furthermore he is asked about the updates if he wants daily updates or monthly etc., as shown in Figure 2.

Figure 2: Social Diaries Profile information

Figure 3: Home Page of the proposed multi agent social website (Social Diaries)

Figure 4: Home Page showing the agent with new trends in the market

After finishing the account information when the user visits his wall he finds an agent indicating the areas related to his interest, like shown in Figure 3.

When the user clicks say new trends he is shown with the new trends in the market as shown in the following Figure 4.

Similarly, the agent shows other features of interest as mentioned by the user.

4. Conclusions

The world is moving from web to semantic web. An applications like multi agents helps in making the web more intelligent. By using the multi agent system in our social websites helps the user to gain up to date information related to his interest as soon as he login; truly making a social website a site that not only keeps its user socially connected but also proves to be an information provider about the daily life commodities and interests.

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