On-line Job Hunting Support System Using Multi Agent Approach

Shein Phyu Ou
Computer University (Maubin)
sheinphyu@gmail.com

Abstract

This paper presents multi-agent system and forwards-chaining algorithm. This system intends to support the internet users who are interested in searching for the job from online processing. It hunts job depending the user's input data. The job seekers need not look for the job advertisement. But the seeker needs to fill in CV form. As well as, admin needs to get job position as companies need. Afterward, the user can easily searches jobs as he like. This system includes three agents such as user agent, comparison agent and job agent. As the agent matches the data which user inputs with the data that companies need and then shows the job list to the user. The jobs have different priorities. Therefore, this system has to take one post one rule type and also used on rule based reasoning. This system generates the rules regarded with the job priorities. Forward chaining algorithm is used as the matching from the knowledge base that is stored companies job data to come out with the reliable job list in these all companies.

1. Introduction

With the rapid expansion of the Internet, an increasing number of users require access to a huge amount and variety of information sources in order to accomplish their works. Job hunting related research on the internet where to find information that will help you hunt specifically, such as company research, salaries, fields, and moving [6].

Job hunting does not require some research. And as salary level rises, as the required experience and skill set of the applicant goes up, as the responsibility inherent in the prospective job increases, so does the amount of research required to identify the field, the job, the company you would most like to work for, and the person there who has the power to hire you. In a world where the internet is accounting for more and more job hunting activity, this means that you must be able to identify your skills, research the fields and industries where you skills can be used, locate the companies in those industries near you, and identity the companies you are interested in working for [7].

Although the increasing the amount of information that the job seeker can access in the internet , it makes more difficult for the process of hunting the accurate and reliable job that match the user's need. So, the most companies in the world takes help for searching workers from agents which users computerized job hunting program. In this system intends to support these agents. This multi agent system includes user agent, comparison agent and job agent. These three agents are relation with each other and support data from each other.

Currently, most of the web sources are still plain HTML pages. They constitute only a fraction of information available on web; since most parts are hidden in the database of pasting sources. It is also difficult to search the relevant job within the several independent sources. Therefore, a method of forward chaining, so that only the most appropriate post gets, is required.

The proposed system implements the forward chaining and multi-agent based job hunting support system. The system generates rules by forward chaining algorithm dynamically. The system matches the user data with companies' data and report the job list to the user. The most profound benefit of on-line job hunting support system using multi-agent approach is the potential for facilitating system evolution to hunt user's input data.

In section 2, we briefly describe the architecture design of our proposed system. Section 3 presents about multi agent system and included agents. In section 4, we present the background method of forward chaining algorithm. Section 5 describes the experimental results of this system. Finally, section 6 is also taken to conclude our system.

2. Architecture Design

This work presents an architecture design of on-line job hunting system that integrates three agents: namely, user agent, comparison agent and job agent to gradually build finding jobs for the job seekers. These three agents are related in the system according to the data communication. A user is kept this system by using the companies' vacant position

table and the personal table in Knowledge base (KB). The companies table stored data including with job position such as position name, company name, address, number of post and etc. In personal table, this system saves job seekers who make use of personal data. We present online job hunting support system in Figure 1.

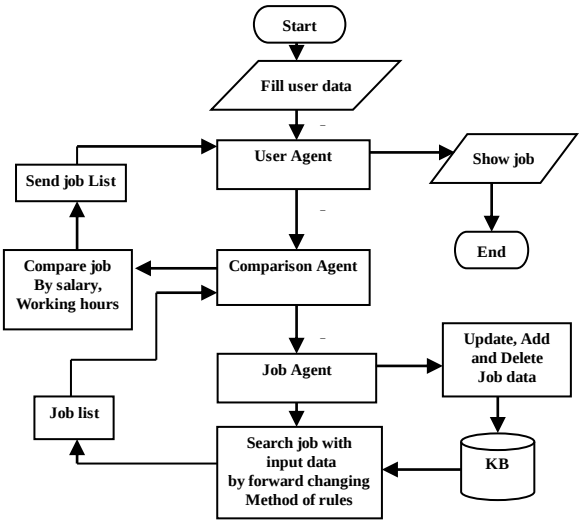

Figure1. Architecture design of the online job hunting support system

In the beginning, while the job seeker searches to hunt the job as aspiration, this seeker congests the personal data in curriculum vital (CV) form. In the user agent portion, this system accepts seeker's personal data and sends these personal data to the comparison agent portion of the system. From comparison agent of the system, these data are gotten and are filtered according to the companies required data. Subsequently, the comparison agent sends these data to the job agent. In job agent portion, this system accepts these data and searches for the reliable job matching concern with the require jobs in companies in the knowledge base by using forward chaining rules. According to these rules, the matched job list in the knowledge base is returned from the job agent to the comparison agent. Afterward, the comparison agent performs these matched job list to obtain the listing by salary descending order and by working hours ascending order. These listing data are transmitting to the user agent portion of the system. The companies introduce the necessary job vacancies to the knowledge base in the system. In the knowledge base, require position, minimum and maximum age, sex, education, salary, skill, require post and experience are set from the company side of view. As a result, the job seeker or user perceives the appropriate job with relative to this job seeker's personal data. In addition, the job agent arranges companies' data consistent with the company needs for adding new position, updating the numbers of vacant job post, deleting the position when the limited data is expired and etc.

3. Multi Agent Systems

Multi-agent systems are multiple interacting computing elements, known as agents. Agents in a multi agent system may have been designed and implemented by different individuals, with different goals. They may not share common goals. Because agents are assumed to be acting autonomously. They must be capable of dynamically coordinating their activities and cooperating with others [4]. Multi agent system are typically distributed systems in which several distinct components each of which is an independent problem solving agent come together to form some coherent whole [3]. Multi agent system offers distributed and open platform architecture and hence can support dynamically changing system. In this system, each agent interacts and coordinates with each other in order to achieve goals to perform production activities [2].

This paper is interested in job hunting domain. There are 3 agents in this domain. They are the user agent, the comparison agent and the job agent. They work their duties independently from each other. But they cooperate their activities with each other.

3.1 User Agent

User agent is interfacing with user and this system. Firstly, the user agent accepts the data that job seeker fills the personal data in CV form. Consequently, transfer these data to the comparison agent. The user agent receives the appropriate job list from the comparison agent. Finally the user agent shows the reliable job list with company name, position, salary and so on.

3.2 Comparison Agent

Comparison agent gets personal data from the user agent. The comparison agent generates the selecting of appropriate attribute from personal data which transfers from the user agent. The comparison agent sends to these selected data to the job agent. This agent received the reliable job list that will not systematically order from the job agent. The comparison agent performs these job lists with salary descending order and working hours ascending order. The comparison agent returns the suitable job list to the user agent.

3.3 Job Agent

Firstly job agent fills the companies' data that they want to get the vacant post. One post have many field name to store in KB such as position name, age, gender, company address and so on. The job agent performs these data to keep in KB. This agent modifies the companies data what they want to prepare as they adds new position, extends the numbers of labor, expire the limited date position and so on. Consequently, the job agent gets the personal data that selects from the companies required data from the comparison agent. This agent fills these data in the personal table. This agent searches the suitable job list matched with the user's input data and companies required data by using forward chaining method of rules. This agent returns the appropriate job list to the comparison agent.

4. Background Method

Chaining is one method of a complex skill. Chaining involves the step by step instruction of a sequence of skills leading to accurate completion of the entire task [5]. Forward Chaining is a data-driven approach. Start from available information (input data) and then draw conclusions. It then normalizes the information with appropriate symbols. It preprocesses the given information to transform as a form of IF-THEN rules. The computer analyzes the problem by looking for the facts that match the IF portions of IF-THEN rules. As each rule is tested the program works its way toward a conclusion. Forward chaining starts with the available data and uses interferences rules to extract more data until a goal is reached [1].

4.1 Sample Process of Forward Chaining Rule

Sample rules: Let us assume that our knowledge base collects these five rules according to the data of some company that have job vacancies:

R1: IF job-seekers have got B.Com and have 3 to 5 years experiences and gender is Female, THEN they may get the Assistance Accountant.

R2: IF job-seekers have got B.A (Eco) and have LCCI-3 and have 3 to 5 years experiences and gender is Female, THEN they may get the Assistant Accountant.

R3: IF job-seekers have got B.A (Eco) and LCCI-3, THEN they have got B.Com.

R4: IF job-seekers have more than 5 years experiences, THEN they have got 3 to 5 years experiences.

R5: IF job-seekers have got Assistance Accountant and have more than 5 years experiences, THEN they may get the Chief Accountant.

Then, we examine the symbols for variables in these problems.

A = Have got B.Com
B = Have got B.A (Eco)
C = LCCI-3
D=Have 3-5 years experience
E = Have more than 5 years experiences
F = Female
G = Assistance Accountant
H = Chief Accountant

These above rules can be written as follow:

R1: IF A and D and F THEN G
R2: IF B and C and D and F THEN G
R3: IF B and C and THEN A
R4: IF E THEN D
R5: IF G and E THEN H

4.2 Sample Process of Forward Chaining Method

Assume: The job-seeker has got B.A (Eco) and LCCI-3 and have more than 5 years experiences and gender is Female.

According to the input data: B (true) and C (true) and E (true) and F (true) then the process will get the Chief Accountant.

5. Experimental Results

This system will display appropriate job list depends on the user's input data. Firstly, job seeker fills input data in CV form (name, N.R.C.NO, Father Name, Date of Birth …). It is shown in Figure 2. The user agent receives the personal data and transfers these data to the comparison agent. The comparison agent filters these data according to the companies require. We will see in Figure 3. This agent sends these filtering data to the job agent. The job agent searches job using forward chaining method of rules. The job agent returns job list that matched the personal data with companies' data priorities to the comparison agent. Then the comparison agent generates job list by descending order salary and ascending order working hours and sends to the user agent. Finally the user agent

displays suitable job list according to the job seeker's input data to the user. We presents in Figure 4.

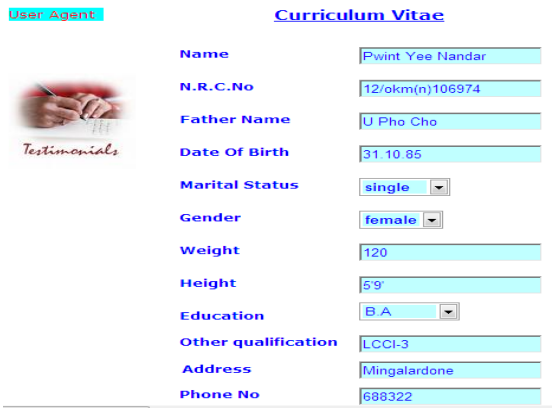

Figure 2. Filling the user's input data in CV form

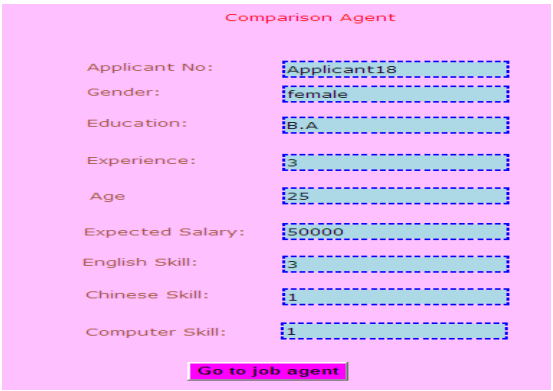

Figure 3. Selecting the user input data to match with companies' job list

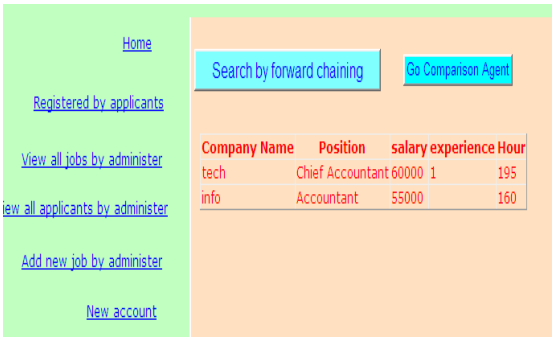

Figure 4. Show job list that have matched personal data

6. Conclusion

Most applications of multiagent approach on using user agent as the representative of user and the comparison agent actions around the network performing tasks on behalf of user. The job agent paradigm is much powerful and extremely well suited for designing large-scale applications like on-line job hunting system.

In these days, the most company in the world search the workers through the agents. This system gives goal effectiveness to the job seekers and companies using internet. This system presents the on-line job hunting support system by using multi agent approach which overcomes difficulties of job finding.

This multi agent system helps the job hunter using on line search as they input data to the system and provides the companies with their priorities for the jobs. This multi agent system includes three agents such as the user agent, the comparison agent and the job agent. This system is used on rule-based system because it generates the rule for every post as their priorities by forward chaining algorithm. This system provides for the only job hunters and companies. Job seekers can save of time in searching required job and able to hunt more effective job position by using this system.

References

[1] E.Turbon, "Expert Systems and Applied Artificial Intelligence", California State University at Long Beach, in collaboration with Louis E.Frenzel, Jr.

[2] Hewitt, C. 1986. Offices Are Open System. ACM Transactions of office Automation Systems 4(3) : 274 – 287

[3] Michael Luck, " Understanding Agent Systems", second edition, school of Electronics and Computer science, University of Southampton, Southampton SO171BJ, United Kingdom, mml@ecs.soton.ac.uk

[4] Michael Wooldridge. An Introduction to Multi Agent Systems. ISBN 047149691X. Published by Biddles Ltd, 2002

[5] Spooner, F. and Spooner, D. (1984). A review of chaining techniques: Implications for future research and practice. Education and Training of the Mentally Retarded, 19, 114-129

[6] http://www.jobhuntersbible.com/

[7] http://www.jobhuntersbible.com/jobhunting/index.php