



A New Approach for Automated Job Search using Information Retrieval

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Abstract- Cost effective and high quality are the ultimate fundamentals of software engineering; Thus, Searching for the most appropriate job is fulfilled these fundamentals. In this article, the cost effective fundamental is accomplished carefully through Automatic Job Search (AJS) software to effortlessly and quickly assist applicant to obtain high quality job. AJS firstly searches all suitable opportunities for applicant based on his curriculum vita (CV) in all online advertisements available then a list of proper jobs will be displayed with links for each job corresponding to parts of CV. Moreover, AJS searches all applicants' CV and presents to employers a list of candidates who could fit the vacant positions or jobs then presents a list of jobs with link to their correspondent employers to Job seeker.

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I. INTRODUCTION

Certainly, independence and professionalism are very high intents. Job seekers are usually interested in attaining these requirements. Working independently, is among many ways of achieving the aforementioned requirements. Such an approach requires an appropriate position with cooperated employers and Job seekers. Therefore, every user can demonstrate his professionalism to work in the expected job.

Many ways are available for either job searching or job offering these are announcement in traditional media, recruitment agencies, headhunting, job sites and others [2]. Upon the job searching process, usually, the job seeker tries to find the Job that meets his demands. Currently, Jobs' opportunities are highly competitive based on corresponding qualifications and capabilities. Yet, job search techniques offer jobs' seekers to find his expected Job [6]. Typically, in the process of searching for a job the applicant submits the job application which will be processed by the job offering firm [7]). It is obvious that this process consist of two sides.

The first one, is the job seeker who is usually looking for getting the best available job that satisfies certain specifications. While, the job offering firm seeks for highly qualified and skilled employers who could fit the vacant position. However, meeting the demands of both sides is a tricky and complicated task which requires trough and elaborate analysis [3] One of the

available applications that are used for performing such an analysis is the Application Tracking Systems (ATS) [4]. ATS is the applications that enables the electronic handling of recruitment needs. ATS is somehow similar to Customer Relationship Management system (CRM) while CRM capable of managing relationships with candidate for the job [5]

Nowadays, large companies use at least just part of the prepared forms of ATS to collect candidates' applications and manage these applications. Some companies use traditional ATS systems (e.g. HR in the IT industry proofing systems use programming skills of candidates) to perform this process.

The primary function of the tradition ATS is to ensure the collection and storage of data in a central database. Applications of candidates are normally collected by the external application forms provided by the ATS for the company recruiter. Most owners of ATS sites collaborates with producers ATS applications and thus enable their customers to migrate data from one system to another.

As stated above, The problem in most of these systems is utilizing databases, which leads to the loss of some important information for job seekers. Our proposed system tries to solve this problem by using natural language processing, and information retrieval techniques, by using the keywords from the job description in job seekers' CVs and cover letter with job announcements to increase the chances of returning a match from company's website (careers /employment page) and job seekers documents.

II. PROPOSED SYSTEM

Our Automated job search (AJS) searches all job opportunities documents of all advertisers, searching within job seekers' CVs and find common links between them. The outcome of this process is to make a list of job seekers within the specifications required in the job opportunities documents, as well as a list of proposed functions within the qualifications for job seekers.

AJS searches job seekers' CVs for the important information needed in the proposed job such as qualifications, work experience and education. AJS system solves many occurring problems using the database, by using the keywords paraphrasing job requirements. AJS employs the saved keywords and

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their synonyms and acronyms in the table. Table (1) lists all the professionalism that will be searched in.

Table 1: lists all the professionalism that will be searched in

Classification	Jobs Titles
Management	president, vice-president, executive officer (CEO); director, deputy director, managing director, financial director, marketing director; general manager, assistant manager, manager; personnel manager, production manager, marketing manager, sales manager, project manager; supervisor, inspector;
Office	office clerk, receptionist, secretary, typist, stenographer;
Banks	banker, bank officer, accountant, bookkeeper, economist, teller, cashier, auditor;
Medicine	doctor, physician, family doctor, general practitioner; eye specialist, ear specialist, throat specialist, heart specialist; cardiologist, surgeon, pediatrician, psychiatrist, dentist, dietician, pharmacist, veterinarian; nurse, paramedic;
Restaurants	chef, head cook, cook; maitre d', headwaiter, waiter, waitress, bartender, barman;
Sales and stores	sales representative, sales manager; salesperson, salesman, saleswoman, salesgirl, salesclerk, cashier; seller, buyer, wholesale buyer, wholesaler, retailer, distributor, advertising agent;
Art and creative work	musician, composer, singer, dancer; artist, painter, sculptor, architect; film director, producer, art director, actor, actress, cameraman; writer, author, playwright, dramatist, scenarist; journalist, reporter, correspondent, photographer; designer, fashion designer, dress designer, interior designer, furniture designer, graphic designer;
School and college	principal, dean, professor, teacher, student, pupil; schoolteacher, college teacher, university teacher; head teacher, senior teacher; English teacher, history teacher, maths teacher (BrE), math teacher (AmE), music teacher;
Construction	engineer, technician, mechanic; builder, construction worker, repairer; welder, bricklayer, mason, carpenter, plumber, painter;
Science	scientist, scholar, researcher, explorer; mathematician, physicist, chemist, biologist, astronomer; historian, archeologist, economist, philosopher, psychologist;
Computer & internet	computer programmer, computer operator; systems analyst, software specialist; web developer, web programmer, webmaster, web designer;
Travel	pilot, flight engineer, flight navigator, flight attendant; driver, taxi driver, bus driver, truck driver; car mechanic; travel agent;
Beauty	hairdresser, hairstylist, barber, beautician, cosmetologist; cleaning lady, cleaning woman, janitor
Law and order	judge, lawyer, attorney, legal adviser; police officer, policeman, traffic officer, detective; guard, bodyguard;
Other	expert, specialist, analyst, consultant, adviser; firefighter, librarian, farmer, tailor, model, politician, priest,

AJS takes into consideration many parameters that help both of the job seekers and the job offering firm in obtaining an optimum decision based on the requirements for both parties.

Our new system is expected to produce different results with different sentences which make the output dynamic and not limited to a single template as other research. Moreover, AJS follows the information

retrieval and text mining techniques methodologies to extract information with intelligence trends to deeply mine the user C.V. and from the job announcement; in terms of Part of Speech (POS) and tags; these significant features that used for information extraction. In addition, some of indicator words used to recognize the proper matching.

As demonstrated in figure 1, it can be seen that our model consists of two algorithms; the first one deals with the data were provided by an interested firm, while

the second one takes inputs were provided by a job seeker.

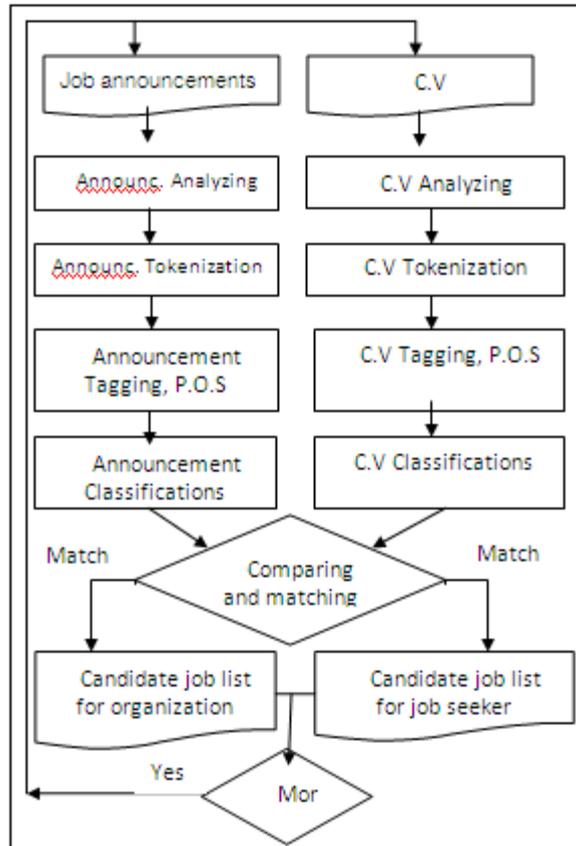


Fig 1 : AJS model

Algorithm 1 for employer

Inputs : Announcement

Output :list of candidate persons

1. Analyzing Announcement finding the job classification
2. Read C.V documents and analyzing
 - 2.1 Tokenization
 - 2.2 World tagging and part of speech
 - 2.3 Search for the job titles or any Synonyms
 - 2.4 If any job found
 - 2.4.1 Compare the job qualification with C.V
 - 2.4.2 If Job seeker found, AJS adds Job seeker to candidate list.
3. If there are more C.V document go to 2.
4. End

Algorithm 1 are used to find a list of candidate qualified persons for a specific job in the organization, first of all the announcement for the job is analyzed to finding the job title, the job descriptions, the qualifications, and experienced for the job.

AJS search the web and find any CV that match this properties which will be as follow:

- After finding C V with the job classification, splitting this document to tokens.
- By using tagging and part of speech, if any job is founding matching the qualification of the person, then add this announcement to the set of candidate person, the rules and the features used to extract the required information, A set of P.O.S patterns

was extracted by examining the job seekers C.Vs. and the announcements. Ppatterns are used to be one of the

- This search will be continuing for all CV documents.

Algorithm 2 for the job seeker:

Input: C.V

Output: list of vacant jobs

1. Analyzing C.V finding (from table) the job classification
2. Read announcement document and analyzing
 - 2.1 Tokenization
 - 2.2 Word tagging and part of speech
 - 2.3 Find the suitable job and there Synonyms from classification
 - 2.4 If any job or synonyms found
 - 2.4.1 Compare the job seekers qualification with Announcement
 - 2.4.2 If Job is found, then AJS adds it to vacant job list.
3. If there is more announcement document go to 2.
4. End.

The procedure for algorithm 2 is explained as shown in the following sequence.

As shown in the previous algorithm, the person who seeks about a job he/she will link his CV web page to AJS, the AJS will analyzing this CV and find the proper job classification and there synonym and acronyms from Table (1).

Searching for all announcement documents with the job classification will be as follow:

- After finding document with the job classification, splitting this document to tokens.
- By using tagging and part of speech, if any job is founding matching the qualification of the person, then add this announcement to the set of candidate jobs, the rules and the features used to extract the
- required information, A set of P.O.S patterns was extracted by examining the job seekers C.Vs. and

the announcements. patterns are used to be one of the features that help finding the optimum job title.

- This search will be continuing for all announcement documents.

The second algorithm describes the AJS procedure from employer viewpoint as depicted in the following sequence.

III. RESULTS

The result from this system will be to lists (reports) one for the job seeker, and the other for the organization.

The second list that is presented for the organizations that search for a qualified persons to fill a job, the list show all the candidate persons and their qualifications and experiences for this job, table 2 show an example of this list.

Table 2 : example for list of job seekers

AJS			
Organization name : AAAA bank			
Job title :cashier			
Job descriptions : cashier			
Candidate name	Qualifications	Experiences	Contact
J. S. Jobseeker		3 years	
		4 years	
		2 years	

The second list will be for the person who tries to find the optimal job for him, so there will be a list of all organization and the jobs description and the contact

ways for this organizations that match the qualifications and experience for this job seeker. Table 3 gives an example for this list.

Table 3 : example for list of jobs

AJS			
Job seeker: J. S. Jobseeker			
Qualifications:		Experiencers :	
Date: 2-2-2015			
Organization	Job title	Descriptions	Contact
AAAA bank	cashier		AAA@BANK.COM
BBB COMPANY	cashier		<u>BBB@MAIL.COM</u> ++99 88 77777777
CCC OIL	cashier		<u>CCC@COM.NET</u> ++99 77 66666666
DDD INVISTMENT	cashier		<u>INDD@MAIL.NET</u> <u>WWW.DDDINVISTMENT.NET</u>

III. CONCLUSION

Our proposed system AJS produced two lists; first list is presented for each Organization that contains their vacant jobs and corresponding with qualified job seekers' contacts who have appropriate skills and experience, while second list is presented for each job seeker who linked his CV by AJS with suitable vacant jobs and correspondent organizations' contacts.

IV. FUTURE WORK

The researcher is expected to extend this system by adding third party as administrator who prioritizes the two lists based on the experience and qualified skills of job seekers for organization list and based on organizations' offers for job seeker list. The administrator uses right decision support system to make the prioritization

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