

JRDP: A Job Recommender System Based on Ontology for Disabled People

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ABSTRACT

Despite the high number of people with disabilities, there are only a few job recommender systems that cater to their needs. This study analyses the implementation of an ontology based recommender system (JRDP) that offers suitable jobs to the disabled. The system considers whether or not an assistive technology exists to address certain disabilities in a specific application domain. If so, a list of available jobs from the application domain would be recommended to the disabled workforces. Two modules are considered as main components of the framework; knowledge-based and recommendation modules. 10 applicant with various disabilities participated in the testing session. The T-test evaluation demonstrates that JRDP requires less time for the recommendation process compared to ontology-less recommendation systems. The mean values for each construct of questionnaire can be calculated using the usability test, with the average mean reported to be 4.55. Cronbach's Alpha was used for testing the reliability of questionnaire, reporting a value of (0.759), which confirms its reliability.

KEYWORDS

Assistive Technology, Disability, Job Recommender System, Ontology, Semantic Rule

INTRODUCTION

People can use recommendation systems to look for jobs. However, the system is designed for people who lack disabilities. (Ali, Schur, & Blanck, 2011) pointed out that there is almost no difference between people's desire with/without disabilities vis-à-vis getting a job. Having a job is one of the most important human needs, especially for disabled people, due to medical expenses. There is a direct and significant relationship between having an income and being employed. This issue can be viewed from two perspectives; employers and applicants. Employers often collect the necessary applicants' information, such as their abilities and skills, which will be used to make decisions pertaining to a candidates' employability. The process is time consuming and rather complex. Based on the applicants' perspective, everyone has preferences and priorities when it comes to factors such as salary, location, bonus, and types of job. Different tools and methods can be used by the applicants to find a suitable job, such as traditional door-to-door searching method, which is difficult and time consuming. Alternatively, job recommender systems can be used to help applicants to look for jobs quicker and more conveniently. In addition, Applicant's preferences are considered by the job recommender systems when searching for available jobs. However, the majority of the available job

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recommender systems are meant for applicant with no disability. Despite the fact that the number of people with disabilities in the community is significant, there are only a few recommender systems that address their needs. Disabled people are as likely as those without disabilities to express a desire to get a job. However, in most of the societies, they are given less opportunities to actively seek for their desired jobs. Similar to healthy citizens, people with disabilities also need to feel usefulness through working and serving their societies in one way or another.

From a job seeking point of view, unemployed people with disabilities and their healthy counterparts differ from each other in terms of their respective preferences (Ali et al., 2011). Often, the preferences in the former are related to their disability types. Moreover, even when the percentage of interest in the same job is equal amongst people with and without disabilities, disabled applicants have to spend additional costs and time to apply for the job (Ali et al., 2011).

There are several barriers preventing disabled people from finding appropriate jobs relevant to their types of disabilities. For example, finding job for people with psychiatric disorders is more difficult than others (Boman, Kjellberg, Danermark, & Boman, 2015). People with disabilities search the web to find jobs based on their preferences, but most will be unsuccessful due to the lack of semantic searching (Singto & Mingkhwan, 2013). Specific words for each job are uploaded by organisations offering jobs. If the keyword does not match the stored keyword, the search will fail. Furthermore, there are some jobs titles in the web that people with disabilities are not aware of but are qualified for them.

The job recommender system proposed in this study can be used to offer suitable jobs to the disabled based on their preferences, which can be divided into categories such as the amount of income, type of disability, education level, skill, abilities and other personal characteristics, such as the necessity and availability of an assistive technology addressing their disabilities. Despite the number of studies carried out in this field, most are not based on semantic technology. There are many job seeking websites on the internet for disabled applicants. These websites pose specific questions pertaining to their disabilities so that they can narrow down the searchers to suitable jobs. These systems use traditional relational database search via SQL queries, focusing on categorised jobs titles based on their disabilities. Some jobs share common disabilities, but with different names. This shortcoming can be addressed via the semantic meaning of the ontology structure. A well-defined knowledge base that forms the core part of the desired recommender system can be constructed by a hierarchical structure of ontology that represents the relationships between concepts in the aforementioned domain. Assistive technology can be used in our Job Recommender system for Disabled Peoples (JRDP) as an enabling technology for disabled people.

In this research we proposed and implemented a recommender system that offers suitable jobs to the disabled job seekers based on their disabilities and existing assistive technologies that address their disabilities with regards to the jobs that they want to apply for. The proposed recommender also accounts for other important parameters, such as age, gender, race, education, and marital status.

The article is structured as follows. Firstly, we give an overview of recommendation techniques and survey various job recommendation systems' characteristics. Then, the ontology as a prerequisite part for the framework is designed, after that, the framework of the system is presented and each module of the framework is described separately. The experimental study and the statistical evaluation based on the finding are mentioned in the next section. Finally, after reporting the main findings and result, the paper concludes by avenues for future research.

RELATED WORKS

People can use the recommendation system to search for jobs. There are comparatively more recommendation system and job seeking applications for healthy candidates than their disabled counterpart. Due to the fact that people with disabilities have different preferences, their job seeking approaches should naturally be different as well. The recommendation system can be divided into

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