RELATED WORK:

There has been a lot of related work in the fields of job recruitments online. Currently the Human Resource Semantic Web applications are still in an experimental phase, but their potential impact over social, economical and political issues is extremely significant .From a brief discussion of each of these works we can find the scope of further work from our behalf.

We shall begin by referring to the SEEMP project [1].They use an ontology based approach to facilitate the job matching and recruitment process. The different countries of the European Union have different languages and dialects which makes it difficult for a job seeker to get employment beyond their location. What SEEMP aims to do is, it has local ontologies for every employment services (public and private) in the EU and a reference ontology that acts as a template for the local ones. When a CV is posted to any one of the ES it is passed through the local ontology and forwarded to every other ES’s local ontology via the reference ontology. If a match is found at any of the ES’s it is sent back to the original ES as a job offer from the respective ES. The SEEMP connector goes through the job offers and ranks them in accordance with the details provided by the job seeker. As a result, the job seeker not only gets job offers from the ES he has originally applied at but also at other ES’s all over the EU. SEEMP heavily relies on the Web Service Language and the concept of semantic web. However we see that SEEMP will not be able to offer jobs to the people of the unorganized sector as they have no criterion for any kind of informal education. It will work as per the CV submitted to it only disregarding the people who may belong to the unorganized sector not possessing formal CVs.

We see in [2] the presentation of the methodological approach they followed for reusing existing human resources management standards in the SEEMP project. In order to build a common “language” called Reference Ontology they have reused some existing ontologies like NACE, FOET and ISCO-88(COM). They have specified using competency questions the necessities that the ontology has to satisfy and have selected the standards that cover most of these necessities. The Reference Ontology was developed using engineering tool Web ODE.

In [3] it is described a competency model and a process dedicated to the management of the competencies underlying a resource related to e-recruitment (mainly CV or a Job Offer).

There is an effort described in [4] whose mission is to promote semantic web technology into HR/e-learning standards and applications. Its current focus topics includes: semantic interoperability, semantic of HR-XML etc. Bizer et al presents in [5] a scenario for supporting recruitment process with Semantic Web technologies but just within German Government.

There has also been plenty of work on semantic matchmaking for job recruitment such as in [6] and [7]. We know that currently for human resource recruitment the Internet is mainly being used to place online job advertisements, resume searches and acquisition of information about skills and competencies of individuals. To assist this process, the paper promotes the development of automated techniques. They have used an OWL-DL ontology called SkillOnt and have used DL for their matching process. The ranking is done using similarity based ranking model. In addition to satisfying advertised job requirements, other factors such as job seekers’ and recruiters’ preferences, cultural fit, ability to adapt to the company’s marketplace and ability to grow with the organization play an important part in selecting employees. Furthermore, when considering individuals for teams, complexities arise when considering the fitness between an individual and other team members.

Furthermore there has been a skill ontology-based model for quality assurance in crowd sourcing [8]. For our work crowd sourcing is of prime importance for the development of our ontologies. The model maintains a dynamically evolving ontology of skills, with libraries of standardized and personalized assessments because checking every single submitted response is costly, time consuming and threatens to invalidate most of the crowd sourcing gains. It has an ontology merger that transfers a new skill defined by a requester from the temporary ontology to the skill ontology once it has been proved popular and verified. However uncertainty is inevitable when dealing with crowd sourcing results. The solution of redundancy and repeated labeling was first expanded in [9], which took into consideration the response’s quality based on the workers.

In almost all the existing systems and approaches, the focus has been either on building and maintaining ontology-based skill catalogs like in [4] and [10], or searching for individuals that match certain requirements such as in[11] and [13]. As such, the reasoning has been limited. In [12] we see some work done on the reasoning about skills and competency. Furthermore, existing approaches have mainly focused on binary matching and do not take into account the cases where skills do not completely match existing requirements. They have used FOL (First Order Logic) as the basis of their skill ontology which is an extension of the Process Specification Language. However they did not evaluate the ontology according to knowledge representation criteria such as consistency and completeness, as well as systems performance criteria like efficiency and scalability.

In recent years, enterprise social networking has also been considered as a different approach

for employee profiles. The resulting profiles, however, lack commitment by the organization, especially with respect to the vocabulary used. Another limitation is the lack of mechanisms for reasoning about individual’s skills and proficiency and inferring skills that were not explicitly mentioned. To address these limitations, ontology-based approaches have been proposed. Previous works in this regard have primarily focused on building and maintaining skill catalogs in a domain of interest. In the KOWIEN project [14], research to build up and maintain a detailed ontology-based skill catalog is carried out. [7] And [10] develop HR ontologies by integrating existing standards and classifications for supporting the recruitment process.

In [15] they have used the ontology design and evaluation methodology of [16]. Similar to the previous reference FOL and PSL have been used for representation and ontology extension respectively. To stay competitive within the market, organizations need to accurately grasp the competency of their human resources. This is particularly important for organizations that engage with multiple and changing clients such as consulting firms and software development companies since these organizations need to be able to flexibly respond to internal and external demands for skills and competencies. The bottleneck of this work lies in the fact that they have designed no system to verify the information received from external sources, the trust-belief factor is a given in this situation.

Current recommendation systems consider only a part of the recruitment process, concentrating on matching job offers with CVs. However, the selection of the most appropriate job board regarding an offer is also very important for the optimization of this fully digital recruitment process. [17] aims to provide a tool which can help recruiters to i) select the most relevant job board for a new job offer, ii) diffuse more effectively job ads, that is to say at the right place at the right time, iii) provide tools to connect candidates and offers automatically. They’ve proposed a recommendation system based on a hybrid model combining both modular semantic classification, and time series forecasting, within a big data platform. The semantic classification of job boards and job ads requires a textual analysis of the content of the job offers using a business classification vocabulary which is given by a public French organization (ROME code). Recommendation phase takes place in two stages: the identification of the most similar class of job offers regarding a new offer; then, the recommendation of job boards.

In [18] they have designed, developed and deployed an online JRS (Job Recruitment System) for choosing the suitable recommendation approaches based on users’ characteristic. To improve the accuracy and effectiveness of the system, they’ve first investigated four existing online JRSs from four different aspects: user profiling, recommendation strategies, recommendation output, and user feedback. Then they’ve summarized the advantages and disadvantages of these online JRSs and highlighted the differences between the JRS and the generic RS for generalizing the challenges in building high-quality JRSs. To address the challenge caused by a single recommendation approach in a JRS, they group users into different clusters and employ different recommendation approaches for different user clusters. However the accuracy and effectiveness of the JRS can be largely improved. Similarly [19] proposed adaptive methods to recommend jobs for different groups of users based on clustering users. The proposed methods include CB-Plus, CF-jFilter and HyR-jFilter based on analyzing user’s applying history to measure correlation of a specific applying job to a user’s preference. Besides that, a filter is added to the proposed methods to omit unsuitable jobs.

A critical problem in a recruiting system is how to maximally satisfy the desires of both job seekers and enterprises with reasonable recommendations or search results. In [20] they investigate and compare various online recruiting systems from a product perspective. Based on the observations and key functions, they’ve designed, implemented and deployed a web-based application of recruiting system, named iHR, for Xiamen Talent Service Center. The system utilizes the latest advances in data mining and recommendation technologies to create a user-oriented service for a myriad of audience in job marketing community. A similar approach is seen in [21] where the job recommendations to the target candidate are made on the basis of content based matching as well as candidate preferences, which are preserved either in the form of mined rules or obtained by candidate’s own applied jobs history. Through this technique a significant level of accuracy has been achieved over other basic methods of job recommendations.

In [23], the efforts were put to take into consideration the job preferences of the candidates along with the content based profile matching, providing SMS based recommendation. Also the jobs are recommended from the online website like naukri.com, etc. The first type of recommendation is done through web portal by using keyword based search and second type of recommendation is done through profile matching and sending notification to the students.

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