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Intelligent human resources (HR) portalbased on knowledge engineering

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Abstract- The paper describes the features of constructing anintelligent HR portal based on knowledge bases including the use of ontological approach and semantic web.

Keywords- Big Data, knowledge engineering, common information space, human resources management, research and development enterprise, portal, semantic web, semantic networks.

Introduction

Currently, constructing an effective HR management process atenterprisesandingovernment agencies is one of the most relevant tasks demanding immediate solution. This paper describes the results of intelligent software development of human resources data organization and exchange based on knowledge engineering technologies. ThemajorgoaloftheprojectistoincreasetheeffectivenessofHRmanagementat state and commercial organizations. This goal canbeachievedbydevelopingan intelligentHRportals an expertsystemallowing selectingthe most suitable candidates to fill vacancies due to the use of semantic requests.

1 Problem Statement

Intelligent HRportalshould provide an opportunitytoselectthecandidatesandthevacanciestothesetrequirements, tobuild up andtomanagethecandidate pool of the organization,toassessttheeffectivenessofworkingcapacityofboththeorganization staff, andprospectivecandidatesfora vacant position.

Thesystemshould solvethechallenging problem of effective hiring the human resources at the enterprise or the organization on the basis of intelligent approach, including the use of knowledge bases used while making management decisions, which allows to relate it to expert systems class.[1]

Inaddition, themainobjectivesoftheprojectarethemethodsofestablishing educationalprocessforthe organization employees,prospectivecandidatesforthevacantjobsandthe persons, whoarereceiving education at secondary, further and higher educational institutions.

The portal development is based on the following principles:

- openness– theuserswillbeabletoregistereasily, to be included in candidate pools of organizations, to openly match their skills and abilities to the requirements set to vacancies; [2]
- continuity– the updating of the requirements to vacanciesand candidates' abilities leads to recalculation of the ratings;
- objectivenesswhiletheselectionofcandidatesto enter the candidate pool;
- personaldevelopment–themajor content is formed by the users themselves and meets their demands;
- theusers' motivationfortraining – thecreationofvacancies(a demand for them) is the main vehicle for the candidates' growth;
- the provision of equal opportunities for the persons, included in the candidate pool to fill vacancies;
- objectiveevaluationofcompetences and qualifications of an employee;
- buildingupaneducationalprocessforemployees, candidatesandstudents aimed at gaining qualification and competences.

2 Solution Vision

To solve the problem of effective HR management using the proposed intelligent portal there should be implemented a specialized software solution to capture and process the data needed for decision-making support. We proposed to introduce an ontology acting as a knowledge base and a set of specialized software components for its maintenance. Ontology in general can be represented by a semantic network (see Fig. 1), which contains basic concepts interlinked by semantic relations specific for the problem domain.

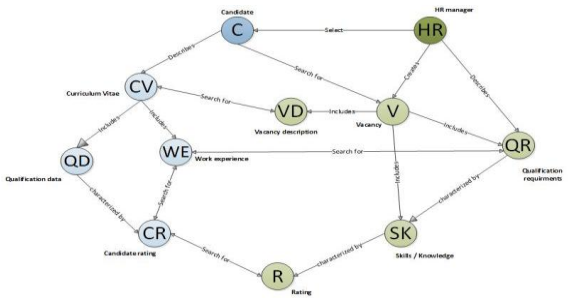

Fig. 1. HR Semanticnetwork fragment

Thesemanticnetworkintheproposedsystemcontains, on the one hand,thedescriptionofvacancies, qualificationstandardsandrequirementsset to the vacancies, thedescriptionofskillsandknowledgenecessaryforpotentialcan didatestofillthe vacancies, and,ontheotherhand, writing a CV, thedescriptionofworkexperience, theskillsandtheinformationaboutqualificationsof the candidates– employees.

Within the system there was developed a specialized software solution for management and ontological description of knowledge base, on the basis of which there isthe development of the structure and content filling of the system [3]. This functionality provides the following major opportunities:

- structured descriptionofvacancies, qualificationstandardsandrequirementstocandidates, informationaboutskills, workexperience, etc. intheformof presentation of knowledge;
- structured description of the candidates' CVs, includingtheirworkexperienceand skills, data about qualification, etc. intheformofpresentation of knowledge;
- automatic ranking of candidates according to the way their qualifications meet the competition requirements or the qualification standards;
- improving the process of selection of candidates to fill vacancies or to enter the candidatepool.

Knowledge engineering is provided by the following components:

- Application designer of distributed ontology of knowledge bases, which enables the formation of the knowledge base structure, as well as necessary updating of the knowledge base (adding, editing, deleting information);
- Module of universal display (rendering) of information from the knowledge database, which allows to take into account not just the updating of content filling, but also structural changes in the knowledge base, the appearance and modification of relations between the semantic elements of knowledge bases [4].

3. Implementation

The system consists of two subsystems (modules).

Themodule "Employer" isresponsibleforworkingwiththesystemon the part of the employer, and the following opportunities must be implemented here:

- Registrationandcreationoftheaccount for the employer;
- Creationandeditingof the profile of theorganization – employer;
- Creationandthe updatingoftrainingcourses run by the organization;
- creation, theeditingandthe closure of a vacancy;
- selection of candidates for the vacancy;
- work with the candidates' pool.

Themodule«Searchofajob» is responsibleforworkingwiththeSystemonthepartofthecandidate, employee, and the following opportunities must be implemented here:

- creation,updating and the deletion of the candidate's profile;
- creation,updatingand closure of CV;
- selection of suitable vacancies;
- overview of current state of the pools by CV;
- selection of coursesto gainthe qualification.

Conclusion

The paper presents the solution for intelligent HR portal implementation based on ontology-driven knowledge engineering. The results can help increasing theeffectivenessofHRmanagementat state and commercial organizations.

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