

Job Portal-A Web Application for Geographically Distributed Multiple Clients

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Abstract—Acquiring knowledge and specific job skills have become the main objectives for students in the universities. Knowledge is necessary to make informed decisions, especially, in a critical situation. Knowledge and knowledge management (KM) in any organization are crucial to give it a competitive edge in today's challenging and globalised environment. In this paper authors have proposed a design of on-line recruitment system, that allows employers to post their job advertisements, which job seeker can refer to, when looking for jobs. This job portal is able to capture job requirements based on industry needs.

Keywords- web portal; job portal; WISDM; simple search; advanced search

I. INTRODUCTION

In recent years, there has been continuing trend among youths to pursue higher education in their quest to become better qualified and better skilled. New technologies, especially, the internet have made a huge impact on knowledge management and information dissemination in education. The web portal as a knowledge management system is very popular topics in many organizations including universities. Universities have been at the forefront of website development, which later led to the development of web portals to provide more compressive links to information resources [1-2].

Portals have different applications or services to solve various problems. One of the main purposes of web portals is to allow information sharing over the Internet. For example, in a university, the new students in the faculty need access to information resources to select courses and to decide on the different majors available, in the faculty. This need can be addressed through a knowledge portal which must contain sufficient data and information about the requirements of the students. The number of jobless graduates has become one of the serious problems existing both in the developing and developed countries, today [5]. The Internet has changed the way of looking for jobs, through the development of job portals. A job portal is a kind of web portal that provides an efficient ways for searching the Internet or the web for vacant job positions available. This research will look at various types of web portals but will, in particular look, at job portals as a knowledge management system based on a standard framework. This project will focus on the

information on jobs available, as needed by job seekers. Web portals have become more important than ever because of the need to get access to find information and to acquire knowledge, through the Internet. Existing web portals are studied to come out with the conceptual framework for the web portal to be developed in this project. The problems to address in this project would be on how to improve services to the job seekers by using the internet. Some issues pertinent to this project to consider include:

Most jobseekers do not have enough basic knowledge on how to select a specialized job available.

- 1) Job seeker expectations in terms of job specifications are often different from that of company.
- 2) Often students cannot find the right jobs after graduation.
- 3) Many new graduates, who become unemployed because they do not have the job skills needed

by the industry, pose a big challenge for any country in the world. For example, in Malaysia it was reported that about 70% of graduates from institutions of higher learning were unemployed in 2006 (Suresh Ram, 2006). This project will address the communication gap between job seekers and employers by providing them same platform for interaction.

A. Design Objectives

This paper aims to develop a web portal that will allow the employer companies to share relevant data and information with job aspirants, as well as to make available information on online-recruitment.

The objectives of this project are:

- 1) To design, implement and develop a web portal as a knowledge management system.
- 2) To identify the needs of the companies and jobseekers which will be incorporated in to a knowledge management system with updated information?
- 3) To understand the meaning, features and categories of web portals as a knowledge management system.
- 4) To design an on-line recruitment system for that allows employers to post their job advertisements, which job seeker can refer to, when looking for jobs. This job portal is able to capture job requirements based on industry needs.

The above objectives cover the overall study of the web portals, and the significance of the objectives is to meet the

companies and job aspirants' need for a system that contains knowledge and information relevant to their needs. This web application is developed to provide the facilities to various job seekers [6]. In this developed application there are three main users, which have the different privileges. These users can perform the various operations through this application. In this application the provided facilities according to the user type are as follows:

- 1) Administrator has the following facilities
 - i. Administer can add new company.
 - ii. Administer can add new user member.
 - iii. Administer can provide username and password to members on registration of their accounts.
 - iv. Administer can delete the existing account.
 - v. Administer can edit the existing account.
 - vi. Administer can chat with other members.
- 2) Company has the following facilities
 - i. Company can edit its account.
 - ii. Company can upload the documents that job seekers can view.
 - iii. Company can chat with administer or other members.
 - iv. Company can view their profile.
- 3) User has the following facilities
 - i. User can view the particular company profile.
 - ii. User can view the list of companies.
 - iii. User can download the files from the company's profile.
 - iv. Users can contact companies directly at the contacts provided by them

The rest of paper is organized as follows. Section 2 discusses the requirements and specifications of the project along with the technology used for the software development, the tools used, and the methodology. Section 3 discusses the proposed web portal, its design and development. Implementation of design of the portal is discussed in Section 4. The final conclusion is drawn in Section 5.

II. REQUIRMENT ANALYSIS

A. Project Requirements

Following is a list of functionalities of the system. More functionalities that you find appropriate can be added to this list. And, in places where the description of functionality is not adequate, you can make appropriate assumptions and proceed. There are HR group who will create vacancies, create applicants (persons applying for a vacancy), initiate interviews and close vacancy. There are interviewers who will be intimated about the interview schedule and finally enters the result [7][10]. The requirements are as follows:

1. Generic:

- a. Login to the system through the first page of the application – *the welcome message should display the Name and Employee number of the person.*
- b. Change the password after login to the application
- c. See his/her details and change it.
- d. Help from the system

2. Recruiting companies :

- a. Should be able to create a new vacancy.
- b. Should be able to change any of the editable details for the vacancy.
- c. Should be able to create a new applicant.
- d. Should be able to change any of the editable details for the applicant.
- e. Should be able to search on Applicant Number and vacancy Number.
- f. Attach an applicant to a vacancy - *The relationship between applicant and vacancy should be many: many.*
- g. Should be able to schedule the interview and enter details of the interviewer and date/time.
- h. Should be able to postpone or remove the interview.
- i. HR person cannot 'close' the vacancy which is not owned by them.

3. Administrator

- a. Should be able to create a new applicant.
- b. Should be able to change any of the editable details for the applicant.
- c. Should be able to search on Applicant Number and Vacancy Number.
- d. Attach an applicant to a vacancy - *The relationship between applicant and vacancy.*

Job Seeker:

- a. Should be able to view all vacancies scheduled to be taken.
- b. Should be able to view the details of the company.
- c. Should be able to view the details of the vacancy.
- d. Should be able to search on vacancies, Applicant Number and Vacancy Number.

3. Other details:

- a. The vacancy should have the following details:
 - i. System should generate a Vacancy number sequentially. *This should be unique and cannot be changed later on.*
 - ii. Date of the creation of the vacancy should default as today – *This cannot be changed later on.*
 - iii. Owned by – *This should default to the HR employee creating the vacancy. This employee will become the owner of the vacancy. This can be changed later on.*
 - iv. Status of the Vacancy – Open/Close/Suspended. *This should default as open but can be changed later by HR.*
 - v. Title of the Vacancy (like Java Developer)
 - vi. Detailed description about the vacancy
 - vii. Number of job opening under that vacancy (like 5 numbers of Java Developers required). *Once all these job openings are filled i.e. 5 people are hired, the vacancy should close itself.*
 - viii. Department in the company – *this should come from a drop-down box which have the Department list.*
 - ix. Date by which the vacancy should be fulfilled/gets closed – *this can be left blank otherwise the vacancy will close on that day by default.*

- x. List of all the applicants already ‘Selected’ for a job openings in the vacancy.
- b. Applicant details should have the following:
 - i. System should generate an Applicant number sequentially. *This should be unique and cannot be changed later on.*
 - ii. Date of the creation of the applicant should default as today – *This cannot be changed later on.*
 - iii. Status of the Applicant – Not in Process/In Process/Hired/Banned.
 - iv. The Applicant Status should default as ‘Not in Process’ on creation of the applicant but as soon as a single vacancy is attached, this should default as ‘In Process’. No more vacancy can be attached to the applicant, if the status is either ‘Hired’ or ‘Banned’ - *The status can be changed manually by HR Group.*
- c. Applicant-Vacancy data should have the following:
 - i. This should display the Applicant Number and Name.
 - ii. This should display the Vacancy Number and Title
 - iii. Display the date on this the Applicant is attached to the vacancy
 - iv. Status of the Applicant/Vacancy – Interview Scheduled/Selected/Rejected/Not Required.
 - v. Checkbox stating – ‘Schedule Interview’.
 - vi. As soon as the interview details are added and saved, an email notification should go to the Interviewer with the details.
- d. As soon as all the number of job openings is filled, the vacancy status should change to ‘Close’ by default.
- e. HR group should not be able to attach an applicant to vacancy if the status of the Vacancy is ‘Close/Suspended’.
- f. Once closed, a vacancy cannot be reopened or suspended in any case.
- g. If Open, the status of the vacancy can be changed to ‘Close’ or ‘Suspended’ by the HR.
- h. If ‘Suspended’, the status of the vacancy can be changed to ‘Close’ or ‘Open’ by the HR.
- i. Once the status of the Applicant-Vacancy becomes ‘Selected’, the status of the Applicant should change by default to ‘Hired’.
- j. The required security needs to be implemented.
- k. HR group is the Employees from ‘HRD’ department.
- l. An email notification should be send to the owner once the vacancy gets closed.

B. System Requirements

The design of the web portal takes into consideration the requirements identified from the research on internet and from the literature review. The successful running of any project primarily depends upon hardware and software used in its compilation. The hardware used in the machine should be such that it supports the software that is to be mounted for assembling the project. This project deals with the hardware and software, which is available readily and easy on each and every machine given to the user[8][9].

Hardware requirements are given in Table 1, which include processor, memory, storage, and video card. Table 2 gives

TABLE I. HARDWARE REQUIRMENTS

Number	Description	Alternatives (If available)
1	300 MHz Pentium Processor	Not-Applicable
2	256 MB RAM	
3	40 GB hard disk	
4	1.44 MB Floppy Drive	
5	CD-ROM Drive	
6	16-Bit color display, 640x480 resolution	

TABLE II. SOFTWARE REQUIRMENTS

Number	Description	Alternatives (If available)
1	Microsoft Visual Studio 2010 (Developing Tool)	Visual Basic 6.0
2	Microsoft SQL Server 2008	Oracle 8, SQL Server 2000
3	Windows Xp	Alternatively, Windows 98 with IIS Server Installed.
4	C#(Front end)	

the software requirement. Software plays an important role in any project development. One should understand that which software he/she should use to develop the project. Window XP was used as the operating system. The application has been developed using:

- 1) Front End: C#
- 2) Back End: Microsoft SQL Server
- 3) Picture Tool: Photoshop

The choice of tools to use to develop a system is critical, as this will eventually influence the quality and efficiency of the system. Hence, it is important for a programmer to select suitable tools for designing and developing the system. In this project, ASP.NET was selected for web programming and SQL server 2005 for designing the database.

C. Web Information Systems Development Methodology (WISDM)

The Web Information Systems Development Methodology (WISDM) is an ISD methodology, developed by Richard Vidgen, David Avison, Bob Wood and Trevor Wood-Harper (Vidgen 2002). This method adapted the traditional system development methods, web development technology and the hypermedia development methodology. Hypermedia is a mix of rich texts, graphics, audio and video, and uses hyperlink to link to other pages and sections of an application. The main framework of WISDM is extracted from Multitier. Multitier is a methodology with user participative approach that includes many stakeholders like computer experts who are responsible for developing the system and users who are using the system. Therefore,

Multitier focuses on both the human and technical aspects of Information System. The framework of the WISDM that helps in the development of a Web-based Information Systems considers two aspects: one relating to the organizations, people and technology; the other relating to the analysis and design. Figure 1 shows the different stages of Web Information System development processes.

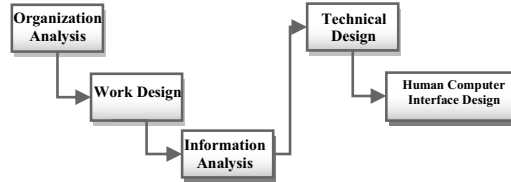


Figure 1. Stages in WISDM

WISDM is selected as system development methodology for this project. WISDM is a new information system development that mixes the traditional methods with the web development technology

III. SYSTEM DESIGN

Based on information from the literature review, as well as the identified job aspirants' requirements, a new web job portal was proposed. This portal is a knowledge management system for the job seekers and employers [11]. The main aim for designing this system is to achieve the objectives of this study. The job seekers' requirements for the new portal were identified from the findings of the surveys, discussed in the previous chapter. The new portal serves as a web-based tool which caters to the needs of: students and users who are already employed as general users; unemployed as the job seekers in the system, and organizations as the employers. The Admin is considered as a different category of user that manages, controls, and views the whole process in the system.

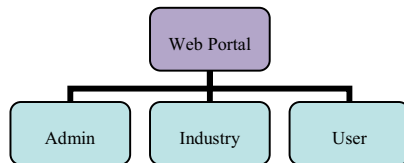


Figure 2. The Proposed Framework for Job Web Portal

Figure 2 shows the external schema of the web portal framework.

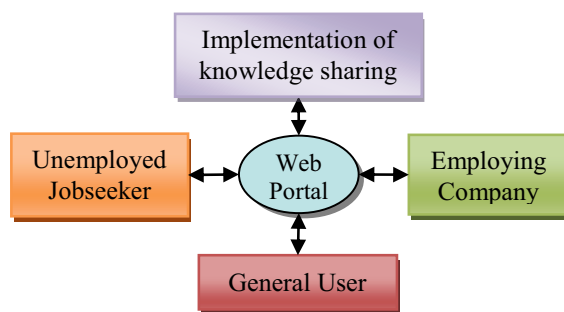


Figure 3. Data Flow Diagram (Context Diagram)

Figure 3 shows the data flow schema of the proposed web portal, in illustrating the relationship between the job seekers, the general users and the potential employers.

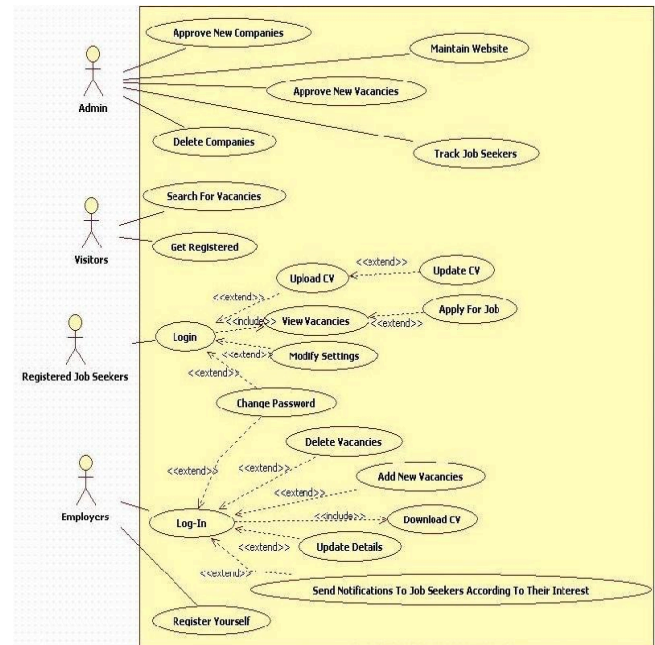


Figure 4. Used Case Diagram

According to the objectives of this study, this portal also acts as a knowledge management system, which provides information to job seekers to help them in selecting desired future careers. Also, this system should contain information on the industries. Hence, the importance of having a job portal that shares knowledge and provides information is highlighted [4]. This section of the portal design provides information about the different job vacancies which are offered by companies and how they relate to future jobs in the industry. A knowledge portal is a website which presents online information and services to its users. In addition, this knowledge portal can be a suitable medium for the job seekers to establish a link with the employers or HR managers. Moreover, this portal which provides updated information about the job vacancies and other related topics is a good way to satisfy the job seekers' requirements. A main feature of knowledge portals is the sharing of information from authenticated or authorized sources. This section of the portal is open for to users and will be more helpful, especially, for the students who are deciding to choose the major and selecting the courses to study and how the courses they take can affect the type of jobs, in future. In designing a system, the functional requirements reflect a set of inputs, the actions and the outputs of the system. They define the reactions of the designed system in different situation. The developed portal which also acts as a job portal also to help fresh graduates and final year job seekers to search for jobs has three sections- Admin, non-registered users and registered users [3].

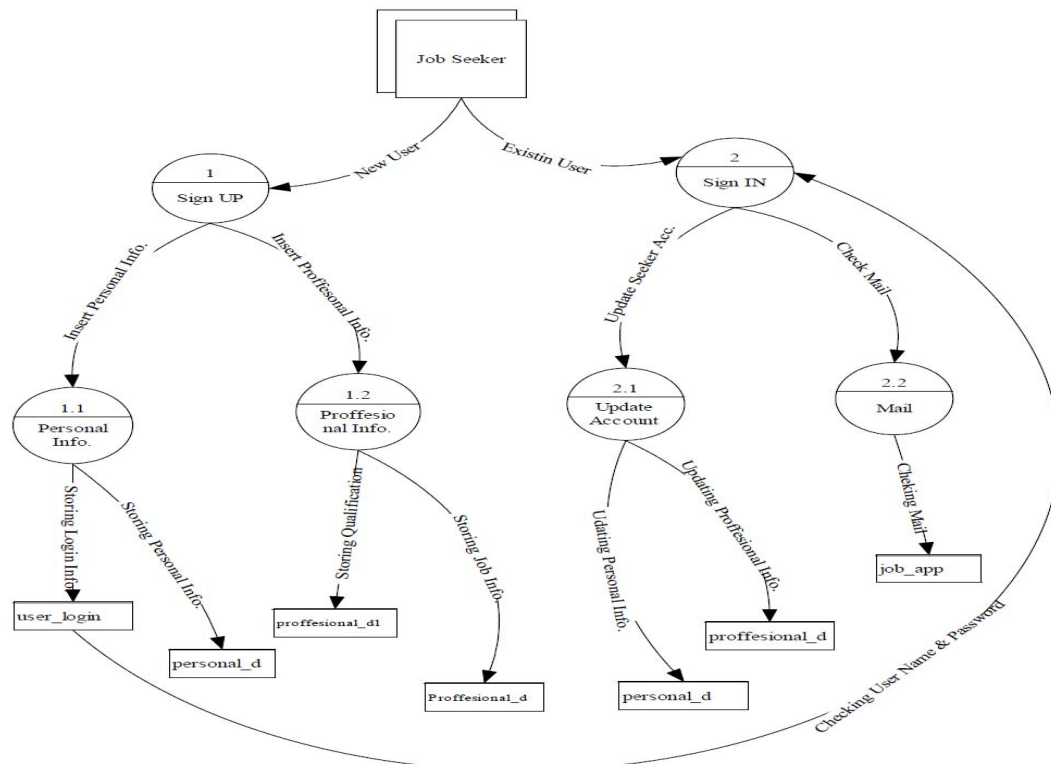


Figure 5. Job Seeker DFD

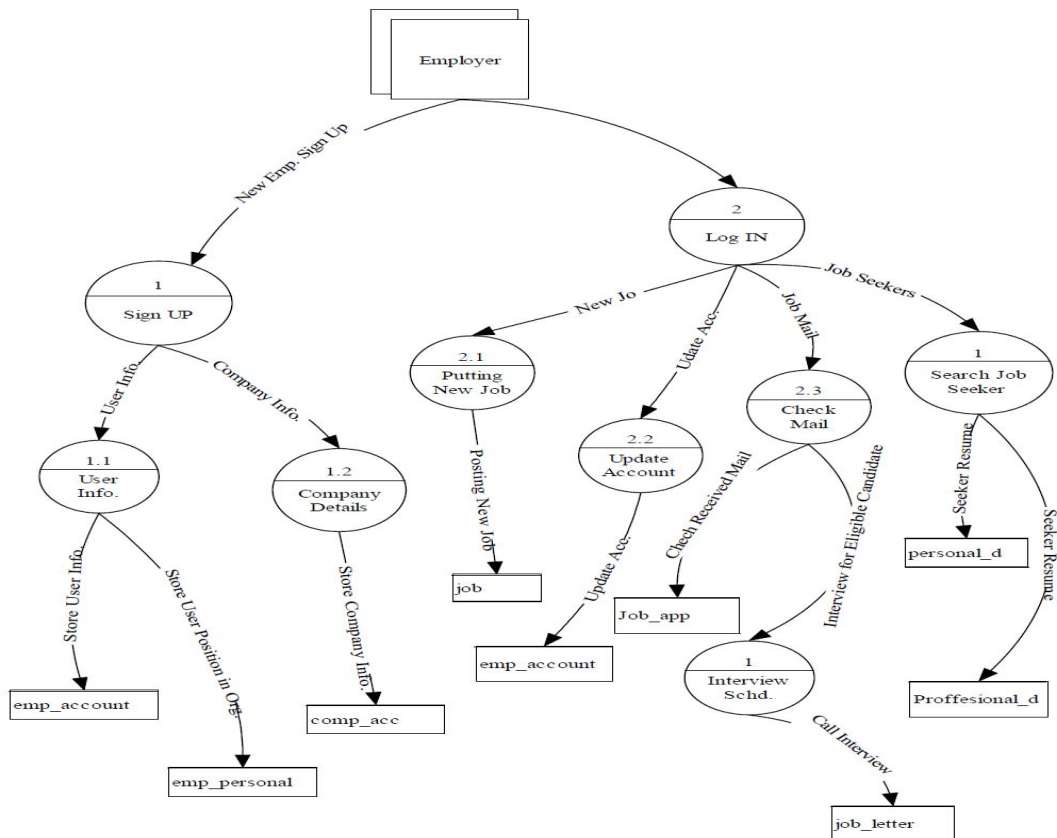


Figure 6. Employer DFD

IV. IMPLEMENTATION AND DEVELOPMENT

Photoshop is used for the design of the graphics in the interface of the portal. It was selected because of its simplicity in designing the graphics for web pages. Figures are a screenshot of the web portal home page. One screen shot of web module that was design during the implementation of this work is shown in Figure 7.



Figure 7. Screen Shot of Designed Web Module

Two search algorithms have been used in the project for simple search and advanced search separately.

• Here's the pseudo-code

do

if (text letter == pattern letter)

 letter of text

else

 move pattern down text by one letter **while** (entire pattern found or end of text)

For advanced search, a Fast Multiple String-Pattern Matching Algorithm has been used for this purpose.

struct hash_entry {PAT p; PATMASK pmask; struct

hash_entry * next}; struct hash_entry

HTBL[HASH_SZ]; /* HASH_SZ = exp(2,H) */

PAT HMASK; /* a mask for hashing */

for (i=1; i<=n; i++) insert_pattern_into_hash_table(P[i]);

 T = encode_ncharacters(text, S);

 i = S+1;

while (i <= Tlen) {

if (HTBL[T&HMASK] != NULL) {

 candidate = HTBL[T&HMASK];

while(candidate) {

if (!(candidate->p ^ (T & candidate->pmask)))

 report_pattern_match(candidate);

 candidate = candidate->next;

 }

 }

T = T<<E | ENCODE(text[i]); i

++; }

V. CONCLUSION

The developers challenged various issues to develop a system for responding some problems that job seekers and companies are facing today. The main aim of this work is to develop a web portal, which caters for various types of users and is easy to use. The advantages of the new portal are as follows:

- 1) Achieve the main targets of the Project
- 2) Standard content, services and display
- 3) High level management and flexibility

This work had focused on improving the online job portals and tried to reduce some problems that existed in them by developing a knowledge system that also acts as a job portal. Thus, this portal can be more beneficial with further enhancements the services and features. The developers divided the future enhancement of this system into three areas of improvements, as follows:

- 1) Graphic improvements
- 2) Contents improvements
- 3) Technical improvements

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