Hot Jobs Asia Portal

A dissertation submitted for the Degree of Master of Information Technology

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UCSC

Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of

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Abstract

Hot Jobs Asia is a comprehensive and fully integrated human resources company, managed by multi-cultural and highly qualified professionals. Their vision is to revolutionize the concept of e-recruitment in Sri Lanka. Their main objective is to provide the clients with dependable, value-driven and cost-effective career resources and recruitment services across the globe. Hot Jobs Asia portal is geared towards identifying and fulfilling specific skills and job profiles that are currently in demand in the Local and other International markets.

The proposed system has considered the development life cycle and uses the open source platform to further modularize and deliver customized functions. This has turned out to be an efficient, stable and expandable system with cost effective implementation. The system is expected to cope with the high demand in the business of recruitment, interacting with clients and candidates in a multi-interactive system.

The system is amended using the Joomla open source platform, having Apache web server as the server environment, PHP as the development language and MYSQL as the database management system to provide a low cost-efficient solution for the client. Supporting system is developed with PHP, MYSQL, Java script libraries. With the stable open source platform, high expandability is expected with years to come.

The System is enriched with many e-recruitment functions, such as Job post and management, Job Search, Job application and management, viewing applied jobs, Seeker-Employee interaction, Resumes management, Scheduling interviews and more. It also includes a high-end interviewing room which facilitates an authentic candidate screening process.

The system in a nutshell, is a high-end recruitment platform, which eases the hiring for companies with correct resources for any vacancy.

Acknowledgment

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List of Abbreviations

CMS	………………………….	Content Management System
CSS	………………………….	Cascading Style Sheet
CV	………………………….	Curriculum Vitae
ER diagram	………………………….	Entity Relationship diagram
HJA	………………………….	Hot Jobs Asia
HR	………………………….	Human Resource
HTML	………………………….	Hyper Text Markup Language
IE	………………………….	Internet Explore
JD	………………………….	Job Description
MVC	………………………….	Model–View–Controller
OCC	………………………….	Online Career Center
PHP	………………………….	Hypertext Pre-Processor
RAD	………………………….	Rapid Application Development
SMS	………………………….	Short Message Service
TMB	………………………….	The Monster Board
UAT	………………………….	User Acceptance Test
UCSC	………………………….	University of Colombo School of computing
UFI	………………………….	User Friendly Interfaces
UML	………………………….	Unified Modeling Language
URL	………………………….	Uniform Resource Locator
WAMP	………………………….	Windows Apache MYSQL PHP bundle
WWW	………………………….	World Wide Web

Chapter 1: Introduction

1.1 Introduction

An Online job portal, also known as a hiring portal, is a modern approach that helps candidates find jobs and helps companies to locate their ideal matches. Job portals offer a broad range of jobs in a vast number of fields, such as government organizations, nonprofit organizations and private sectors. Nevertheless, it is unable to satisfy both companies and candidates objectives thoroughly. There's no doubt that most organizations are spending their valuable time and funds to find the right strategies. However much, there are websites that focus on sharing advice in composing resumes or CV's; how to achieve well in job interviews along with tips for job hunters; yet you will find challenges in fulfilling the interaction between recruiters and job applicants.

This system is implemented with a web based recruitment function, improving the usability of a quality system by increasing availability for companies and job hunters. It has a common room for candidates and employees, where they could interact with one another in an effective way. Whenever a company wants to start their own hiring campaign, they must handle a big HR team for the process or they must look for head hunters to cherry pick the correct candidates. Through the system, companies have less hassle in managing and resourcing for the task and with this, the vacancies can reach to several potential seekers. At the same time, less learning curve is required, having high usability of the system. Core features in the system are job posting and management; job search and apply process; interview room; recruiter and seeker interaction; admin based administration and supporting system by providing multimedia based video explanations and function level guidance.

1.2 System Background

Job advertising is a typical way to find suitable candidates to right positions. Following the massive growth of internet and Information Technology has facilitated most of the companies to have proper hiring strategy based on their capacity of investment and resources.

There is a massive growth in the job market and each day new jobs are being introduced from all sectors. In the other hand, there are remarkable growth in education and professional studies and thousands of talents are waiting to get employed with qualified skills. So, electronic recruitment systems are highly in need to cater and ease the task of hiring.

1.3 Problem domain and Motivation

Job advertisement and hiring are the crucial tasks for organizations to acquire ideal talents for the required openings. Usually, the HR management team of an organization are involved in performing these tasks. The typical hiring methods are:

- Advertising vacancy in papers or through traditional marketing channels such as radio, Television, notice board, etc.
- Signing up with Recruitment Agencies.
- Outsource form other Companies.
- Recruitments via phone interview; walk-in interviews or internship programs from Universities.

Once job hunters notice an opening via media channels, candidates apply for the position. This approach needs a fair time to interact with companies and sometimes they never get a response back. Also, whenever an organization comes with urgent openings they can't locate an ideal person immediately. The Human resource crew must look for all submitted resumes and grade all those credentials manually and match to the requirements for a pick. It really requires manual work and usually takes lot of man efforts and time.

However lately almost all organizations are having websites and they advertise vacancies through their sites or obtain services from head hunters, which in most cases do not meet the requirements timely. Organizations are losing time and funds to look for suitable applicants in this manner.

This in turn inspired to develop the proposed system, where it contributes greatly to the organizations in several means to beat issues mentioned above. As the Information Technology and Internet usage are growing dramatically within the community, the online job portal that is proposed to be developed, might be an excellent prospective to organizations to acquire competent employees in the demanding job marketplace.

1.4 Goals and Objectives

The most crucial goals and objectives of the system are to automate manual recruitment activities; cut down lead time; manage the recruitment process; reduce the cost and produce a

new approach for the hiring method and lower the human resource needs in an organization. The milestones are:

1.4.1 Features for job applicant.

- Creating and uploading resumes.
- Organizing interviews and exams with company or HR.
- Applying for jobs online in real time and verifying current number of vacancies.
- Tracking status of applications or maintain status of the jobs for which they applied.
- Maintaining multiple resumes and marking resumes as searchable.
- Job filtering mechanisms based on interests, knowledge, company or locations based on a region.
- Job applicants can view company profiles and news and can maintain own profile with social media links.

1.4.2 Features for Employers.

- Capable of managing advertisements. (Job posting and closing)
- Capable of acquiring resumes from numerous job applicants and to shortlist the resumes as per the requirement.
- Capable of maintaining different profiles for company.
- Capable of interacting with all applicants.
- Capable of approving/rejecting applications based on basic qualifications and grant status for approved applicants or share feedback / reasons for rejection or selection, and schedule interview over the system.
- Capable to post career guidance and hints

1.5 Project Scope

This software includes range of modules to render standard ways to posting vacancies; obtaining resumes from applicants and shortlisting the resumes based on requirements. Employers, job applicants and admin users are able to carry out an effortless interaction within the system. The system expects to be error tolerant, easy to access and effective and efficient for the hiring process. It also enriches with high end real time interaction and usability.

1.6 Dissertation Outline

Chapter 1-Introduction

Describes the problems being faced currently and how to address all those problems with the proposed system. Project scope, goals and dissertation structure is also provided.

Chapter 2-Background

This chapter targets a crucial review of matching systems and technologies and related applications. Additionally, it is aimed for the evaluation of hiring process and justification of tool and technology selections with quotation.

Chapter 3-Analysis and Design

Provide description of ER diagram, UML diagrams and the methodological approach that are applied in the program designing. Also, consists of the requirement analysis, functional and non-functional requirements of the system design.

Chapter 4-Implementation

Appropriate coding and implementation tools and techniques which are used to developing the system are included.

Chapter 5-Evaluation

Developed system is tested against the user requirements, which are gathered at the beginning. Actual data from the client's environment is used. The chapter also includes aspects such as test plan, test cases, use of test automation tools and testing frameworks.

Chapter 6-Conclusion and Future work

This chapter summarizes the work; discusses its findings and contributions; points out limitations of the current work and outlines directions for future research.

Chapter 2: Background

2.1 Introduction

Recruitment known as hiring or sourcing means the overall approach of advertising, targeting, selecting and appointing suitable candidates for employment in an organization. Hiring can also refer to the process of looking for individuals for voluntary positions, such as emergency aiding roles or unpaid trainee roles. Currently, hiring measures are categorized into the following main types:

- E-Recruitment or web based recruitment.
- Traditional recruitment using media channels.
- Head Hunting using agent services.

Traditional hiring falls into paper based job posting, employment services, walk-in interviews and university or institute based internship with non-computerized recruitment process. Head hunting is basically a black hat hiring method to pick and choose most talented individuals from markets, offering more benefits using an agent. E-Recruitment stands for computer and internet based hiring strategy, focusing on high availability and less paperwork. With the enhancement of Information Technology, this has turned to be a good strategy to reach and select the best skills around the globe for a very feasible cost.

2.2 Evaluation of hiring exercises

2.2.1 Advertisements

Newspaper based hiring is the most traditional recruitment process. Some organizations practice this as a legal obligation, where they have dotted this in company constitution as a basic step of hiring a newbie. This allows anyone to apply and targets mass public who refer newspapers or other medias today. Applicants can submit via post or email as provided or at times walk in directly to interviews as instructed.

2.2.2 Getting help from employment service

Employment services have a massive candidate base in diversified areas. The more the company is recognized or known, the higher the number of candidates. Generally, operating a substantial candidate base are mostly computerized. They provide services based on financial

hiring support programs and secondary training for difficult applicants. A placement center is an effective place to inexpensively find various types of skilled individuals.

2.2.3 Online Job Portals

Ever since a decade, the internet has grown rapidly. There are numerous career sites launched, featuring paid job postings online. Initially, it had started with a basic job description page and then gradually started to adapt new growing trends in the world of information technology. Also, before interaction was limited to submit an application and now has changed into a real-time communication level. E.g. remote interviews (interviewer in one country and candidate in another). Job search engines are helping now to find latest jobs in diversified fields and has become a very easy-to-do task. At the same time, job posting has become a matter of just a few clicks away, instantly notifying millions of job seekers.

2.2.4 Social media based hiring

Social media websites are now governing the internet and millions of users are actively interacting, e.g. Facebook. These platforms allow advertisements based on pay per clicks and they are very cost effective. Also, some platforms have free services inbuilt to support advertisements and apply for jobs where they gain the active user counts in returns, e.g. LinkedIn.

2.3 Review of present well-known hiring systems

There are plenty of online job portals and hiring system which are receiving numerous visitors around the world and earning massive revenue annually. Hiring industry is enhancing daily and can forecast well expansion way beyond the borders. Few of them are,

- **LinkedIn** [01]
  This is a business-oriented social networking service. Founded on December 14, 2002 and launched on May 5, 2003 it is mainly used for professional networking. As of 2015, most of the site's revenue came from selling access to information about its users to recruiters and sales professionals. As of March 2016, LinkedIn has more than 433 million accounts, out of which more than 106 million are active. LinkedIn allows users (workers and employers) to create profiles and "connections" to each other in an online social network which may represent real-world professional relationships.

- **Monster** [02]

  Monster.com is one of the most visited employment websites in the United States and one of the largest in the world. It is owned and operated by Monster Worldwide, Inc. It was created in 1999 by the merger of TMB and OCC, which were two of the first and most popular career web sites on the Internet. Monster is primarily used to help those seeking work to find job openings, for lower to mid-level employment, that match their skills and location.

- **Naukri** [03]

  Naukri.com is an Indian job portal operating in India founded in March 1997.

  Naukri.com is owned by Info Edge which is a listed company on the Bombay Stock Exchange and National Stock Exchange of India. It went public in November 2006.

- **SEEK** [04]

  SEEK is a diverse group of companies that have a unified purpose to help people live more fulfilling and productive working lives and help organization succeed. The Group encompasses a strong portfolio of employment, education and volunteer businesses which span across Australia, New Zealand, China, India, Brazil, Mexico, Indonesia, Nigeria, Bangladesh, Philippines, Vietnam, Thailand, South Africa, Kenya, Malaysia, Hong Kong and Singapore.

- **Top Jobs** [05]

  Top Jobs is a local recruitment job site in Sri Lanka and has captured a half of the local market when it's come to advertisement. Main benefit to the employees from the site is advertisement cost. But in comparison it has major draw backs contrast of e-recruitment. The site act only as an advertisement dashboard and it process nothing more but just posting vacancies. Interested candidates simply use direct contact to the client. The next most barrier is its too much localized and can find only local jobs. Also, it does not allow any further interaction on Candidate – Client relationship to enhance the whole process.

2.4 Summary

E-Recruitment is one of the effective method for any level of organizations in a country. Online Job Portal is a viable product of e-recruitment for this need. It reduces the overhead cost &human efforts while increasing the usability & quality. Also, it can trigger a target set from the industry by profession or location. It automates the whole hiring process by a few clicks and sustains the availability throughout.

Chapter 3: Analysis and Design

3.1 Introduction

Analysis is primarily aimed at requirement gathering, fact finding and identifying the functional and non-functional requirements in the system. In addition, rapid analysis of available job portal systems is discussed. Upon completion of the analysis phase, the system can proceed to the design phase. It will consider the software architecture design and primary diagram designs like ER and UML.

3.2 Requirements Gathering

Requirements gathering is a crucial task in any sort of system development as it is the most challenging task. A significant amount of time and energy must be involving in here. It is very important to take sensible judgements to make the analysis phase successful. Most often, discovering the problem precisely, is what a potential client required. It will not be much clear in the beginning. However, while moving forward it is clearer with much sense.

If failed to analyze the requirements carefully, the entire project will end up in failure, in theory it will contradict to the real requirements. Therefore, understanding what is absolute requirement is vital. Following strategies had been used to gather requirements.

3.2.1 Fact Finding Techniques

- **Research and professional visits**

  By visiting the few professionals (Example: Hot Jobs Asia's work flow), studied the current process and received sample documents of exiting traditional recruitment process. Such as paper/form base information and note down information about their current online systems which are applied in system requirement analysis. Research is by far the most used facts finding means in the project and used to learn the best efficient online recruitment process from research articles.

- **Observation and follow similar systems**

  There are plenty of web based hiring systems in the market. For this project, it has cross reviewed many functionalities and behavior of exiting systems and actively participated and observed as Employer and Candidate behaviors in few commercial systems on demonstration moods.

- **Interviews**

  Interview is one of the best source to find out the flow of a hiring process. Each professional prefers customize flow where they can adapt. Choosing a best flow for the process is a challenge based on different interest but associating few in a list can come to a stage where we can decide an optimal flow.

  - **Unstructured Interviews**

    A general objective or business domain in mind. Questions can differ from one individual to the other.

  - **Structured Interviews**

    Pre-defined certain list of questions maintained to inquire from the interviewee.

- **Review of available documents and manuals**

  Review the available company documentations and charts, recruitment analysis stats and analyze the past hiring pattern.

3.3 Requirement analysis and Management

The acquired requirements need to be analyzed and validated for ambiguities. Requirements needs to be obvious unless it can create chaos later. Requirement management is the procedure of managing the change scope of the project base on an estimation which include efforts and time costs with budget. Receiving new requirements from the client unconditionally will impact the project quality or it can result in over budget of initial estimation for the project. Hence requirement management is a critical task in any project.

3.4 Analysis of the ongoing systems

Current work process need to be evaluated prior to any system design drafting. It can be the best place to start with requirement analysis. When the ongoing steps and process are clear it very easy to extract the change requirement and then new addition that needs to be implemented.

3.5 Requirements for the new system

3.5.1 Functional Requirements

- Build customized online portfolios for job seeker and job provider
  - Maintain Candidate account profile
  - Maintain Client account
- To act as a middle man connecting job seeker and provider
  - Enable Job posting for Client
  - Enable profile submission for candidate's interest jobs
- Job search engine
  - This supports quick search and sorting method to identify suitable jobs.
- Enable High level of interaction between job seeker and job provider
  - Email communication
  - SMS Alerts
  - Skype communication
- Facilitate real time job search and potential candidates search
- Enable mass online recruitment.
  - Email Campaigned
- General evaluation process to find best match
  - Initial screening using questioners.
- Stats report engine for all levels.

3.5.2 Non-Functional Requirements

- **Performance**

  Page loading time is obviously an important part of any website's user experience. And many times, we'll let it slide to accommodate better aesthetic design, new nifty functionality or to add more content to web pages.

- **Reliability**

  Information that contains within the system needs to be accurate and consistence. Acknowledgments or emails should be real time to overcome any gaps in the system down time and all errors in the system or process need to be well advised dynamically to the user. Should loads in common computer devices regards of Operating systems and display sizes.

- **User Friendliness**

  Employers and candidates should be quickly need to get the hang of the system flow.

- **Flexibility**

  Employers and candidates should be able to customize their user profile and system should stand in common devices without any hassle.

- **Availability**

  Web site should be available whenever the user need.

- **Security and safety**

  System should be secure enough to handled *job applicant's* profiles and their personal information. As well as have to provide secure access to the admin users because they have the ability to control all activities so admin users must have authorized by company or who is responsible for job portal. Initiate regular back up and required infrastructure measurement could erase the server down times.

- **Privacy**

  Maintain security measurements for user personal information's is a must. Alone with that assign user privileges and obtain user likeness to expose selected personal detail could be a important activity to focus.

- **Mobility**

  Make available of mobile browsing could be vital with increasing mobile smart phone users.

3.5.3 Hardware and Software requirements

Hardware Module	Requirement
Processor	Intel 2Ghz or higher
RAM	512MB/1GB or higher
Hard Disk	20GB or More Disk space
Internet Connection	Broadband Connection
Resolution	Minimum 1024 x 768

Table 01: Hardware requirements

Software Module	Requirement
Operating System	Windows XP or Later
Web Server	Apache 2.x for Windows
PHP	PHP 5.x version
Database	My SQL 5.x version
Web Browsers	IE6 +, Mozilla Firefox 3 +, Google Chrome(recommended)

Table 02: Software requirements

3.6 Design of system

3.6.1 Introduction

The design and implementation phase on this system development will concern about the design of suggested program using unified modeling language (UML) plus the interpretation of the design to the desired design specifications and source code. The main objective of the implementation is to generate the source code and that adheres to the specifications. Simply in this exploration PHP, MySQL used back-end and JavaScript, JQUERY, CSS, HTML have been used to design a user-friendly interface. The designed ER diagrams, UMLs are listed as Figures in next chapter.

3.6.2 ER Diagram

An entity–relationship model is usually the result of systematic analysis to define and describe what is important to process in an area of a business. It does not define the business processes; it only presents a business data schema in graphical form. It is usually drawn in a graphical form as boxes (entities) that are connected by lines (relationships) which express the associations and dependencies between entities.
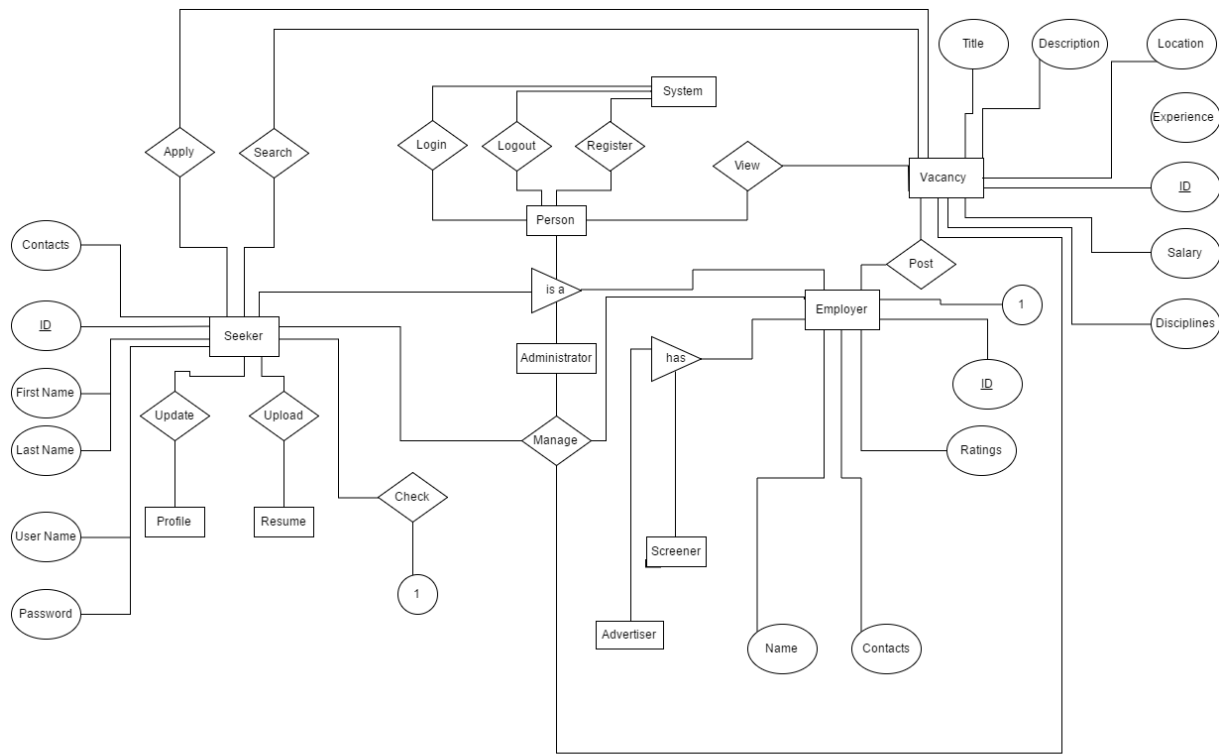
Figure 01Detailed ER Diagram for the System
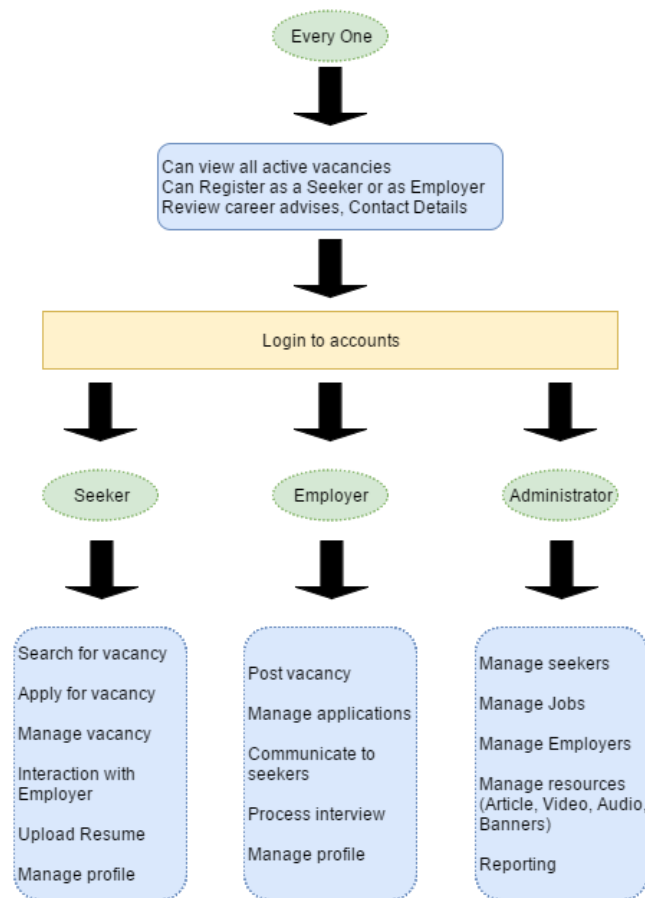
Figure 02: High level architecture for the System

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3.6.3 UML Diagram

A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. Use case diagrams are employed in UML (Unified Modeling Language), a standard notation for the modeling of real-world objects and systems. UML shows the various activities users can perform in the system and represent the dynamic aspects of system also provides user's perspective of the system. In user case diagram an actor are users of the system and playing a role.

Use Case	Users level registration
Actors	All users
Overview	Provide all the require personal information and contact details.
Preconditions	
1. Required to have email address	
Post conditions	
1. Once user registered user belongs to one category it may be jobseeker/job poster/admin.	
Flow of events	
1. Users must provide initial details to register with the system. 2. Users must provide password and confirm password and set the access level. 3. Once user registered user will get email notification to confirm his registration with the system.	

Table 03: Use case description for users in the system

Use Case	Access the functions belongs to the seeker.
Actors	Job seeker
Overview	Job seeker able to apply for a job, check the status of job
Preconditions	
1. Job seeker must register with the system.	
Post conditions	
1. Job seeker can apply for a job 1time otherwise delete the applied job and reapply for it. 2. Contact with the employer	
Flow of events	
1. Job seeker apply for the available vacancy with the resume and cover letter. 2. Job seeker will get notify via email once invited for the interview if failed will notified with the reason. 3. Once interview success seeker will proceed to appointment.	

Table 04: Use case description for seekers

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Use Case	Access to the functions related to the Employer.
Actors	Advertiser
Overview	Advertiser able to post a job and process the applications
Preconditions	

2. Advertiser must register with the system.

Post conditions	

1. Advertiser post one or more jobs.
2. Update the job seeker about the application status

Flow of events	

1. Advertiser post one or more jobs.
2. Screener will get notify via email once seeker applied for a job.
3. Once interview success screener will notify job seeker to assume the job.

Table 05: Use case description for Employer

Use Case	Access the functions related to the admin.
Actors	Administrator
Overview	Control the Advertiser, seeker, jobs and manage the system.
Preconditions	

1. Admin must register with the system.

Post conditions	

1. Admin the users as immediately after the registration and trace events

Flow of events	

1. Admin control jobs, Advertiser/Screener and seeker.
2. Inform to all users if there is any fault or wrong activities.

Table 06: Use case description for administrator

3.6.4 High-level use case diagram for the system

High level use case diagram provides the brief description of three actors such as Employer, Seeker, administrator other than the simple mapping.
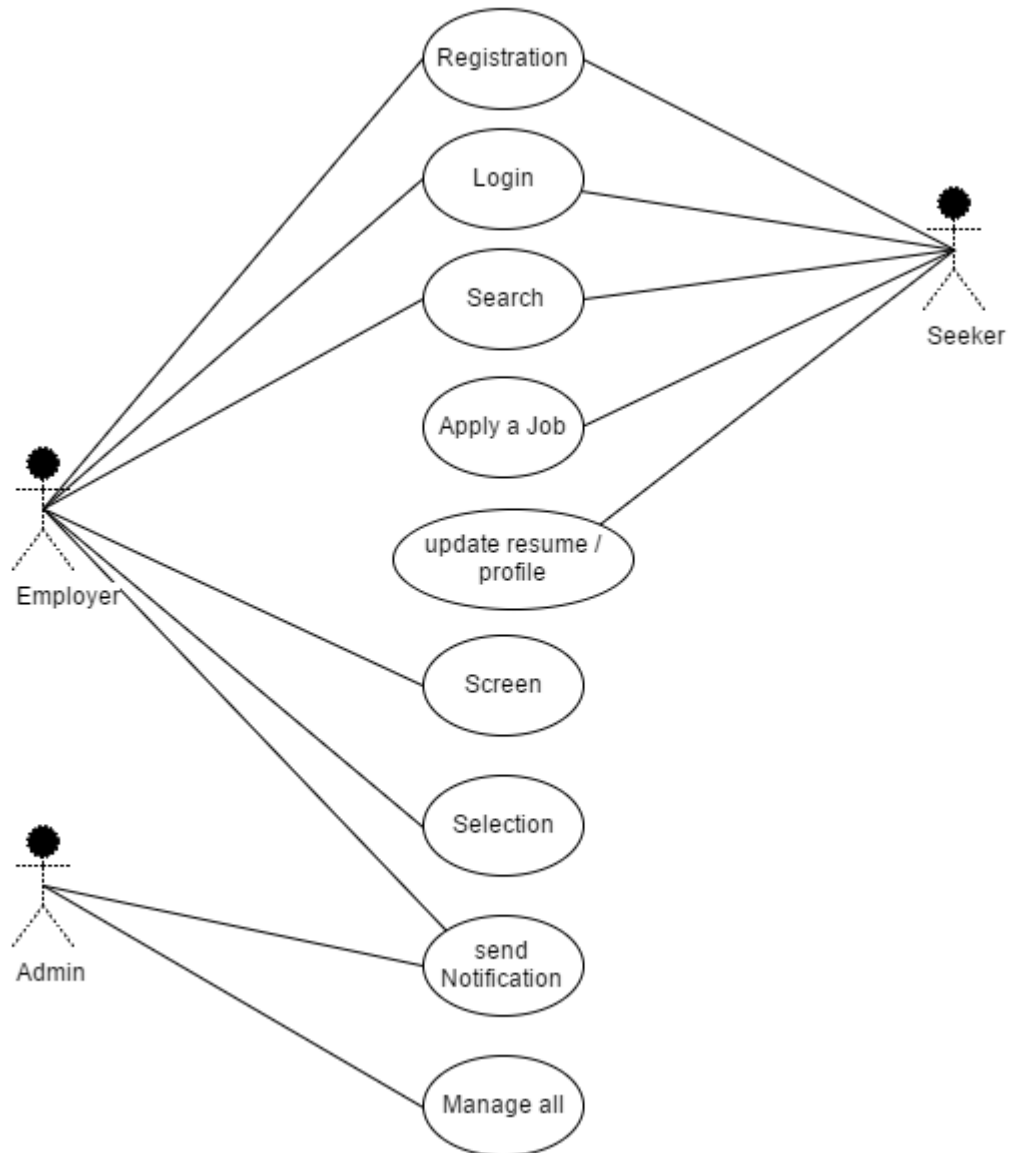
Figure 03: High-level use case diagram

3.6.5 Sequence diagrams for entire process

Sequence diagram mainly used to identify the process in easily understandable way. Without high level software architecture or design knowledge can identify each event and its logic with the main key objects.
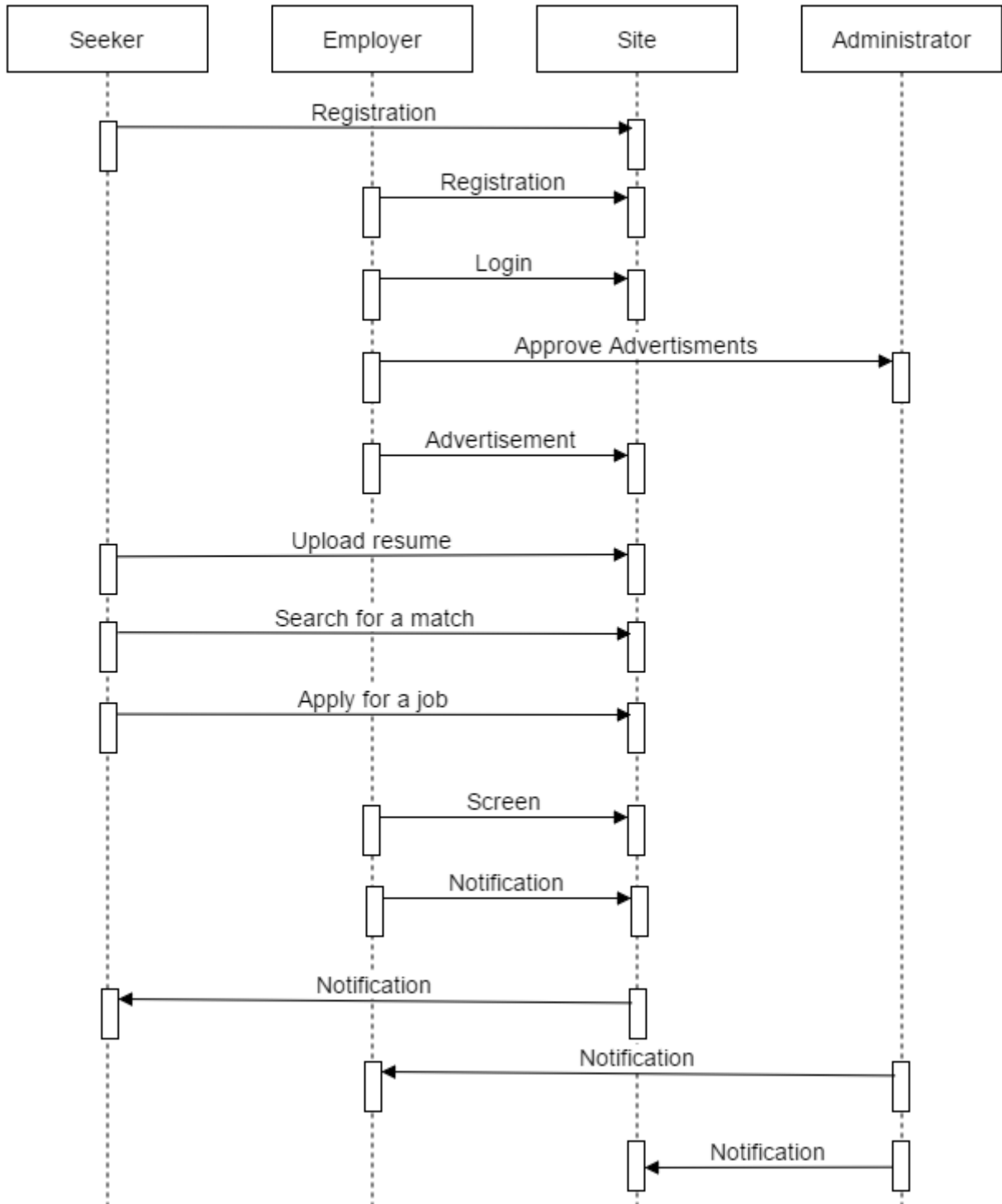
Figure 04: Sequence Diagram

3.6.6 Class diagram for the system

The class diagram describes the attributes and operations of a class and the constraints imposed on the system. The class diagrams are widely used in the modelling of object oriented systems because they are the only UML diagrams which can be mapped directly with object oriented languages.
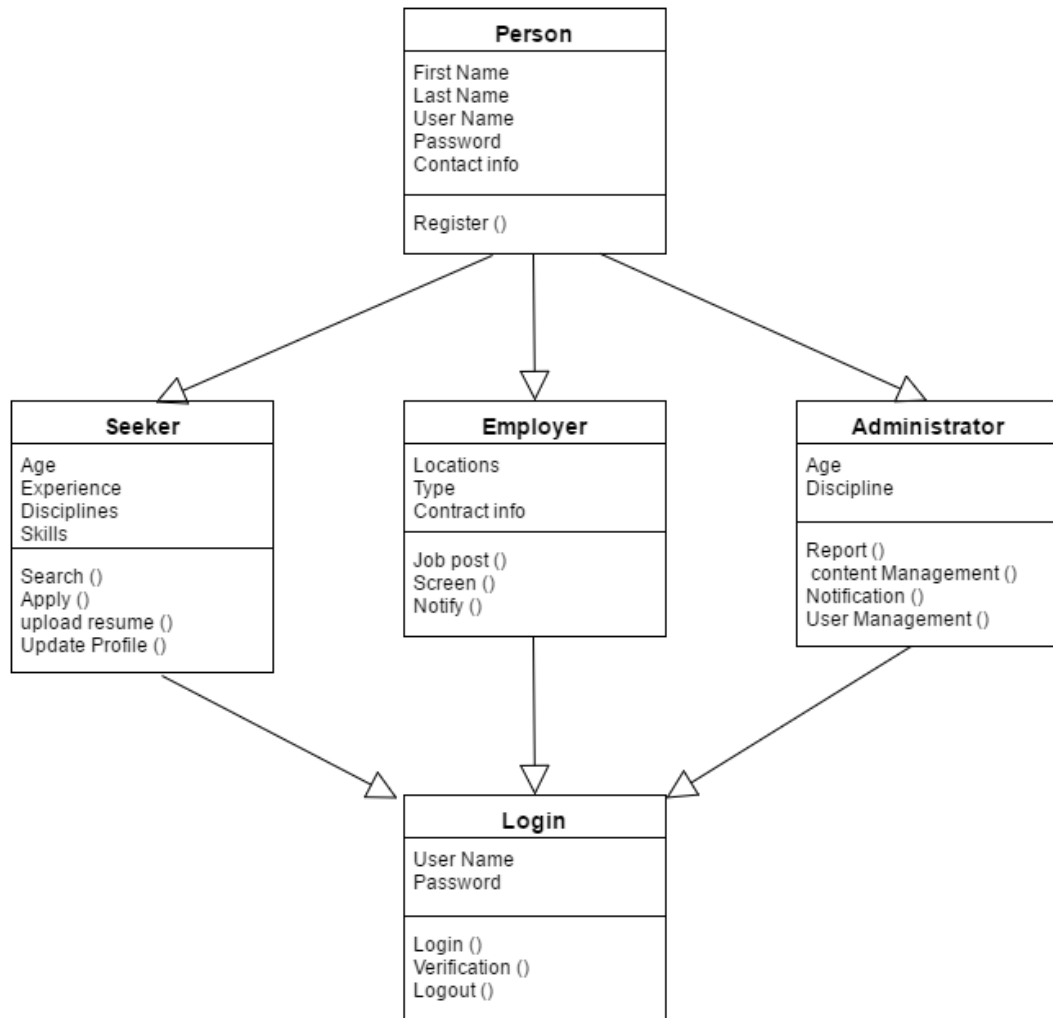
Figure 05: Class Diagram

3.7 Summary

This section mainly focused on system analysis and design of the HJA portal. It contains requirement gathering, fact finding and find the functional-nonfunctional requirements of the system at the same time brief analysis of planned system. Once analysis completed successfully can move to the design phase. It may focus on software architecture design and initial diagram designs such as ER diagram and UML diagrams. ER diagram, Class diagram, sequence diagram and use case diagrams which are discovered in the design section.

Chapter 4: Implementation

4.1 Introduction

The HJA Portal is implemented on open source Joomla platform and it takes the full pledge features from the platform to shorten the development time from the scratch. It utilizes Apache web server, MySQL database and PHP server side scripting language with many JavaScript libraries to enrich the development. With the open source utility, we can use any of Windows or Unix or XOS operating system to run and deploy the system. Users are the individuals who interact with the system. All user interaction is performed remotely through the web browser. Users are categorized into three domains: Administrator, Seekers and Employers.

A running version of the implemented HJA portal has only one administrator but it typically has multiple Employees and Seekers. Administrators have the authority to delete Seekers, Employers and posted jobs if there are any incorrect actions taken by users. Job seekers can apply/reapply for a job, manage their profile and resumes. Employers can post jobs, interview that which are from any backgrounds, check or evaluate the CV, call/schedule for interview, let Seekers know the status of their application.

The HJA portal is enriched with high end interview rooms where Seeker and Employer meet. It can be used to trigger a live session with Audio, Video and Screen sharing. This enables the opportunity for high transparency and instant live interview environment.

The Portal is also enriched with career advice and timely consultation over articles. It also enables to upload CVs and map content to a CV format which can be shared by Seeker to Employer.

4.2 System Overview

The HJA job portal (Figure 06) allows to login as (Seeker/Employer/Admin). Landing page provides functionalities such as list jobs by industry, by location, latest jobs, featured jobs, latest job advice/articles, search by job reference and menu based quick links to signup, about us and contact us pages.

Home page of the system gives a firsthand look in to all the newest jobs that has been posted by Employers and it is a dashboard of live jobs. The main menu lets users to access the main areas of the site and it also includes some marketing banners which try to grab user's attention.

The landing page is the most visited page by users and it needs regular changes to attract frequent visitors. So, some of polling and testimonial sections were introduced with dynamic contents and different type of quiz & feeds.

Also, some interesting HR related articles have been rostered to keep regular users interested in the site and to deliver vivid experience in the domain. Most articles are very useful for productive user interactions in the system.
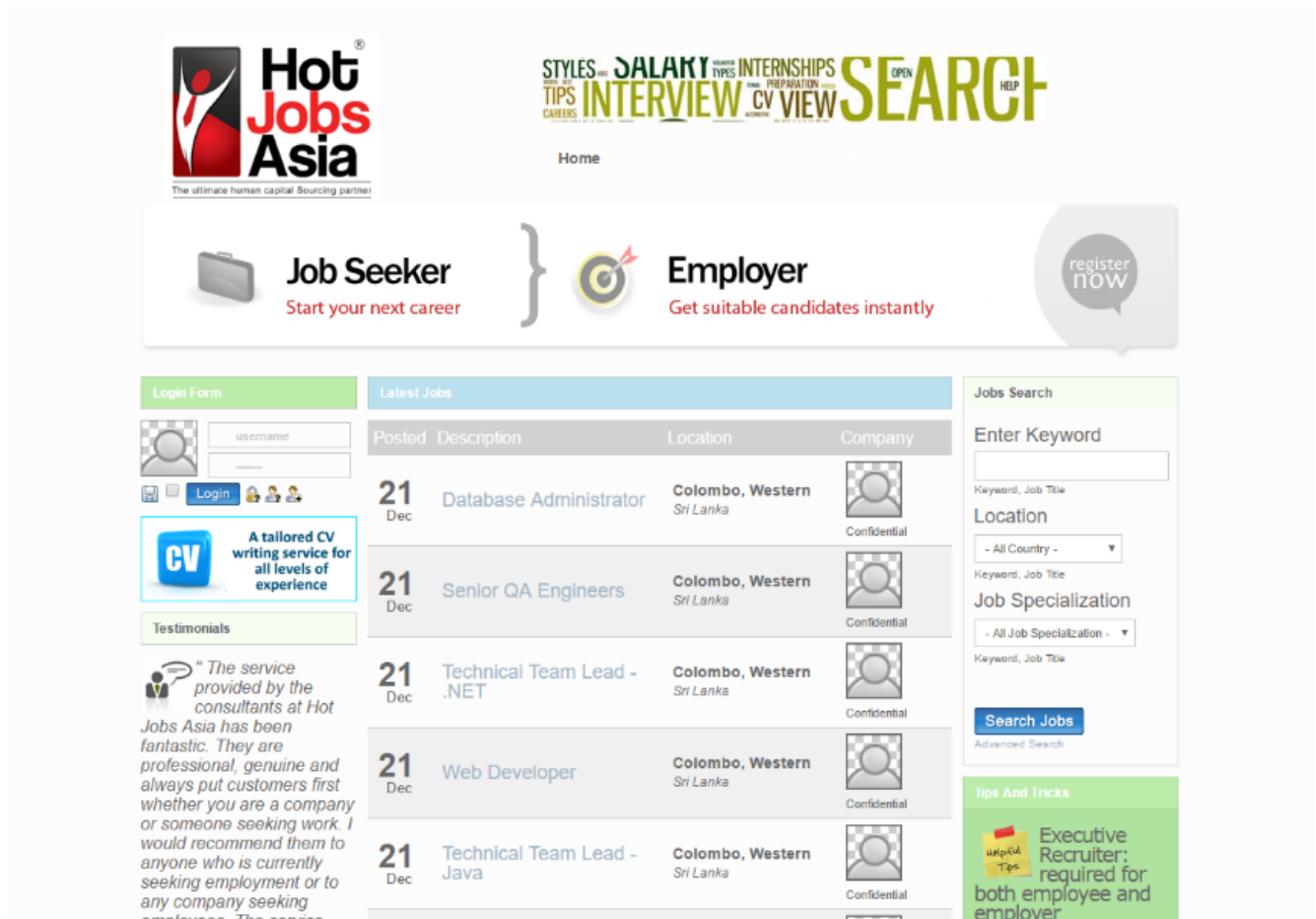
Figure 06: Landing page of the system

Seeker admin page provide the functionalities and quick links to view jobs, applied jobs, create CV, my CV, messages, update profile, upload latest CV/photos, view old CV/photos and apply to recommended jobs that are shown in detail.

It is necessary to grab almost all the most important contents of the Seeker and it is mandated to not waste their registration time. The system has introduced the quick and most essential content to grab from user as below (Figure 07).

Figure 07: Jobseeker Registration page

Job description page provide the job details such as title of job, company name, required skills, experience. JD helps job seekers to identify the actual requirement. Adding cover letter with application make sense to HR while checking the application. Figure 08 shows how a Job Description page will work like.

This page is most crucial and includes all important requirements related to the Job. The page gives a quick and detailed summary of the job and allows seekers to apply to a matching job.

Figure 08: Job description page

Company page provide the company details such as company name, address, contact number, company description, currently available jobs under this company and recently posted career advice or company promotion and introductory videos. Figure 09 shows the view of a company page.
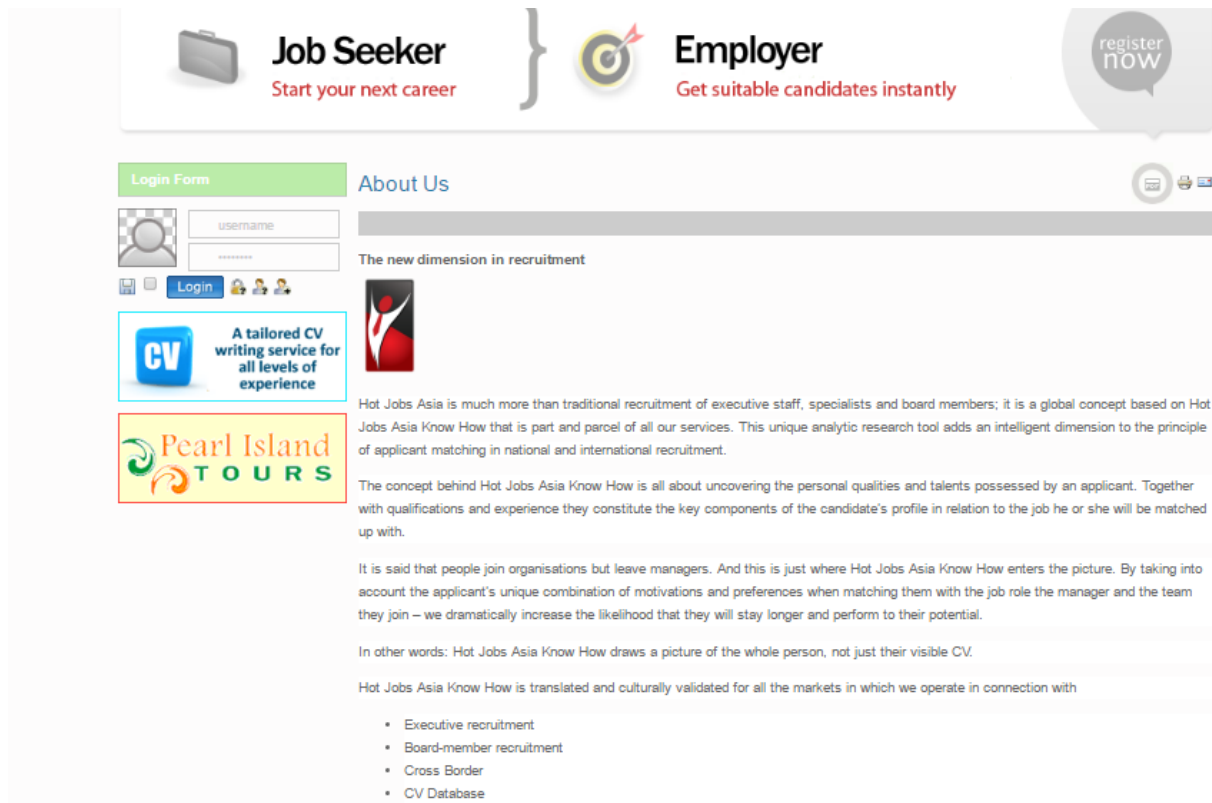
Figure 09: About us Page

4.2 Technology and Tools

- Apache Web Server [06]

  Apache HTTP Server is the web server technology used in this Web application. The Apache HTTP Server Project is an effort to develop and maintain an open-source HTTP server for modern operating systems including UNIX and Windows. The objective of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.

  The Apache HTTP Server ("httpd") was launched in 1995 and it has been the most popular web server on the Internet since April 1996.

- PHP [07]

    PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. It is processed by PHP interpreter. Standard PHP interpreter is powered by the Zend Engine which is free software released under PHP license. PHP applications can deploy on most web servers on almost every operating systems and platforms.

- My SQL Server [08]

    MySQL Community Edition is a freely downloadable version of the world's most popular open source database that is supported by an active community of open source developers and enthusiasts. It is the most widely used open source RDBMS. It is the most popular choice of database management system for use in web applications. Many third-party GUI tools are available. MySQL work bench is one example of GUI tool.

- Adobe Photoshop, Adobe flash, Adobe premiere

    Adobe Photoshop CS6 tool is used for user interface designing. Adobe flash and Adobe premiere are used to create the multimedia contents of the system. These adobe tools support high-end graphics which can edit Photoshop images that can be used in premiere video creation and flash based content development.

- Sublime Text3 [09]

    Sublime Text is a sophisticated text editor for code and markup. Its user-friendly interface and short hand keys have helped in the efficient coding of the project.

- HTML5

    HTML is the mark-up language widely used for structuring content on a web browser. HTML 5 is the latest revision of HTML and it has many new features that support all modern browsers. HTML5 widely supports for multimedia and graphics.

- CSS3 [10]

    CSS3 is the latest evolution of the Cascading Style Sheets language and it aims at extending CSS2.1. It brings a lot of long-awaited novelties, like rounded corners, shadows, gradients, transitions or animations, as well as new layouts like multi-columns and flexible box or grid layouts.

4.4 Hardware and Software Requirements

4.4.1 Hardware configuration

- Intel Core i5 Processor
- 8 GB RAM
- 64-Bit Operating System
- 250 GB Hard Disk Drive
- Dual HD Monitors 1366 X 768

4.4.2 Software configuration

- Apache Web Server 2.2.6
- PHP 5.2.5
- My SQL server 5.0.45
- Adobe Photoshop, Adobe Dreamweaver
- Sublime Text3, Notepad ++ Text editor

4.5 Server Environment

4.5.1 Hardware Configuration

- 3.0Ghz Intel Processor
- 4 GB RAM
- 150 GB Free Hard Disk Drive

4.5.2 Software Configuration

- Apache Web Server 2.2.6
- PHP 5.2.5
- My SQL server 5.0.45
- Ubuntu Latest stable version

4.6 Client side Requirement

4.6.1 Hardware Configuration

- Any Internet connected PC (at least of 512 KB/s speed internet) and having processor power more than 2.0 GHz.
- Any Smart phone with internet connection. (3G/4G connection preferred)
- 4.6.2 Software/Application Configuration
- JavaScript enabled web browser

4.7 Summary

Implementation chapter focuses on the HJA portal user interfaces as well as justification of technology, tools used in the system. Configuration of server, configuration of development PC, client hardware and software are also mentioned briefly.

Chapter 5: Evaluation and Testing

5.1 Introduction

Testing is an investigation conducted to deliver stakeholders with information about the quality of the product or service. Software testing also provides an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.

5.2 Main objective of the Test process

1. To meet the client / user satisfaction
2. To conclude that the system is optimally bug free and in a stable condition.
3. To guarantee that the system is ready for production and live use.

5.3 Front End Testing

Web application mostly focuses on the web user interfaces (UI). Black box testing methodology is used to check the UI functions as per the test plan. The system was tested based on each module and the test cases were generated.

5.4 Cross Browser Testing

Browser testing was carried out for implemented HJA portal on all the latest browsers such as Firefox Chrome, IE 10 and Safari. Also mobile friendliness or responsiveness of the web pages were also tested in all browser level.

Tested pages	Chrome	IE	Firefox	Safari
Home Page	pass	pass	pass	pass
About Us page	pass	pass	pass	pass
Contact Us Page	pass	pass	pass	pass
Client/Candidate services Pages	pass	pass	pass	pass
Login Page	pass	pass	pass	pass
Job Seeker registration page	pass	pass	pass	pass
Job Seeker Profile Page	pass	pass	pass	pass
Employer Register page	pass	pass	pass	pass
Employer profile page	pass	pass	pass	pass
Job list Page	pass	pass	pass	pass
Search Page / Advance Search Page	pass	pass	pass	pass

Table 07: Cross browser Testing

5.5 Test Cases

5.5.1 User Registration and Login functions

User registration process is one of the major processes in the HJA portal system. All users should enter a valid email address and can register with the system. Administrators should activate the account using a token. Various test cases have been used to test the procedure and a generalized test plan is shown below.

Test	Test Case	Expected out comes	Success
1	New Candidate/ Client Registration with valid info	Adds user details to the database, Email notification and System Proceed	Yes
2	New Candidate/ Client Registration with invalid info	Error notifications in relevant fields. System rejects to proceed	Yes
3	New Candidate/ Client Registration with blank info	Error notifications in relevant fields. System rejects to proceed	Yes
4	User tries to register with an existing email address	Error notifications on Email address. System rejects to proceed	Yes
5	Un-matched password with confirm password	Error notifications when un-matched. System rejects to proceed	Yes
6	Matched password with confirm password	System proceed	Yes
7	Invalid username or password	Error notifications on username /password fields	Yes
8	Blank input and to login	Error notifications on username /password fields	Yes
9	Click forgets user name or password	Provided input field to enter the email address of the user	Yes

Table 08: Test Case - User Registration and Login functions

5.5.2 Job posting function

Job posting is one of the major processes in the HJA portal conducted by job posters and employers or HR of the company. Existing job posters must enter a valid email address and get registered with the system. Various test cases have been used to test the procedure and a generalized test plan is shown below.

Test	Test Case	Expected out comes	Success
1	Employee post a blank Job	Error notifications in relevant fields. System rejects to proceed	Yes
2	Invalid data In Job Title, Salary and required fields	Error notifications in relevant fields. System rejects to proceed	Yes
3	Content size on long description	Error notifications in relevant fields. System rejects to proceed	Yes
4	Edit and update Posted Job	When update button press, it displays in editable mode with existing data	Yes
5	Remove Jobs	Before remove a confirmation message	Yes
6	Notification for Successful job post	System will notify with the success message	Yes
7	Resume Search	List matched candidate's resumes	Yes
8	List application against each Job	List all application that has submit for each job	Yes

Table 09: Test Case - Job posting function

5.5.3 Job Seeker function

The Job Seeker is one of the key stakeholders in the HJA portal. All job seekers must enter a valid email address and required information to get registered in the system. The Seeker has several functions such as Job search, apply jobs, Upload CVs and Save interested jobs for future reference. Thus, various test cases were used and a generalized test plan is shown below.

Test	Test Case	Expected out comes	Success
1	Job application	Only registered user as Candidate can apply	Yes
2	Profile management	Allow update profile and validate against changes	Yes
3	Candidate upload CV	Validate proper document type and size	Yes
4	Candidate phase CV content	Allow content mapping instead of a document	Yes
5	Search Jobs	Should list the matched job available	Yes
6	Saved jobs	Should list saved jobs as a list	Yes
7	Multiple application for a job	cannot apply twice for a same job	Yes

Table 10: Test Case - Job seeker function

5.5.4 Interview room function

Interview room is a new feature available in HJA portal system. It enables the high interaction with seeker and employer. The test cases used, confirm that the feature allows quick access to the user with minimal effort to connect with each other.

Test	Test Case	Expected out comes	Success
1	Initiate a session	Should be initiate a session with candidate and interviewer	Yes
2	Share the screen	Should be able to share candidate screen	Yes
3	Share the camera	Should be able to share each camera	Yes
4	Share the voice	Should be able to hear each other	Yes

Table 11: Test Case –Interview room function

5.6 User Acceptance form

User acceptance test (UAT) is the one of the main evaluation method before the software goes on live. UAT generate instant feedbacks from the end users and it is most effective way of collecting feed backs on the new system with real people interaction. If bugs are found, it will be sent across to be fixed immediately. The table below contains the questions used to evaluate the implemented HJA portal.

	Usability Test form - HJA Portal				
Your Name					
1	How is the overall the user interface designs and the recruitment system?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
2	How is the candidate profile and features in the system?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
3	How is the employee profile and features in the system?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
4	How is the interview room and its features?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
5	How you classify the open source Joomla platform?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
6	How far the system is user friendly and how is the performance?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
7	Interaction of the system and quality of content in home website?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
8	Understandability of the error messages and ease of using?				
	[ ] Very Poor	[ ] Poor	[ ] Good	[ ] Very Good	[ ] Excellent
9	Comments				

10	Signature	11 Date
	_____ _____	

Table 12: User Acceptance form

Usability test forms were distributed among friends, collages and HJA team. Twenty people participated and their feedback are listed below.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Very Poor	0	0	0	3	0	0	0	1
Poor	3	2	1	5	1	4	2	3
Good	9	11	12	5	7	4	4	9
Very Good	6	4	7	5	8	11	12	7
Excellent	2	3	0	2	4	1	2	0

Table 13: Feedback of user acceptance form
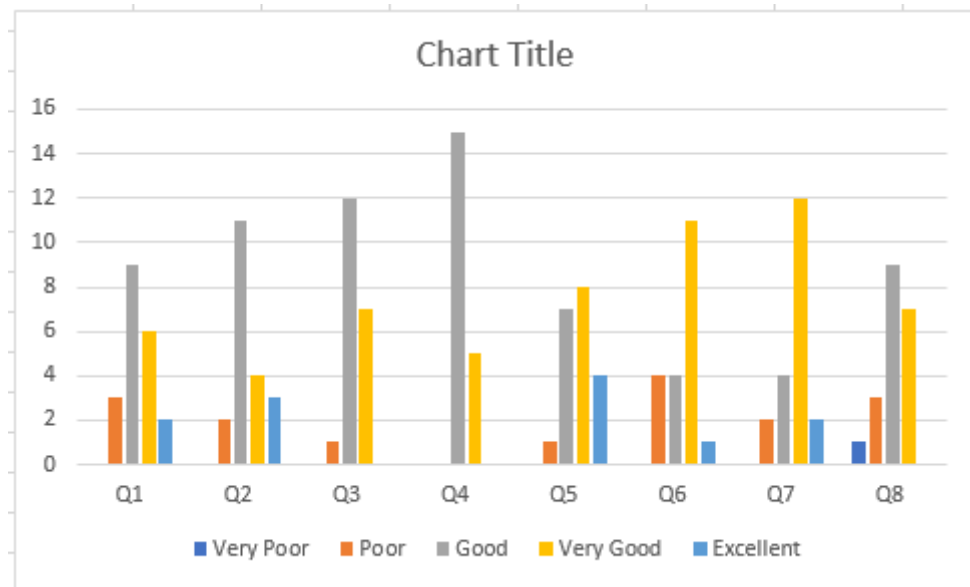
Figure 10: Results of UAT from

With the results of the user acceptance test, HJA portal mainly needs to focus on the enhancement of Interview room function of the system (Q4). In comparison, it has got a poor rating than others. (Q2, Q3, Q5, Q6, Q7, Q8) that turned out to be satisfactory.

5.10 Identified Strengths of the system

- Easy access and User-friendly environment.
- Interview room facilitate high end interaction within the system.
- Admin users need to provide a token to activate their registration and gain login access that is secured with a customized URL.
- Easy Job posting and Job apply process.
- Cross browser compatibility.
- Email notifications.
- Easy Job selection and filter applications.

5.11 Identified weakness of the system

- High end UX interface.
- Learning curve to develop on top of Joomla platform.
- Need more interactive and nice interfaces for the Interview room.
- Data backup functionality is not available.
- Social media sharing plugins need to be introduced to the system for SEO and marketing campaign.
- Lack of Banner management function.

Chapter 6: Conclusion and Future work

6.1 Introduction

This chapter focuses on the conclusion of the dissertation with a critical evaluation of the system and suggestions for any future work.

6.2 Lesson learned

In the process of implementing this system it was required to gain knowledge in several aspects. Such as requirement gathering, requirement analysis, planning, frontend and backend development, software testing, infrastructure setup and documentation. It was like an A to Z process which comprised of a System Analysit, Developer, Tester, Network Administrator, Content Writer and Project Manager. The determination to complete the project successfully on time has been a great challenge for the individual and it has been self-satisfactory goal for myself. It was mandated to learn the programming PHP, HTML, Java Script, MySQL and many other important new technologies to lead the way and it was a very dynamic learning curve.

6.3 Conclusion

Introduced HJA portal is stable system running on Joomla platform and its highly scalable time to come and very flexible to do changes with its MVC architecture. Any newbie can quickly learn the system with ease to manipulate features and it can be further enhanced with new user experience after a period in live environment.

The HJA portal has the scope all the main function required for a e-recruitment process, such as:

- User Register
- Job posting
- View applied application
- Job Application
- View applied job
- Email notifications
- CV Upload / Mapping
- Check the status of applied job
- Interview room

6.4 Future Works

Some functions need to be introduced to the system to enrich the portal. Further, they are less prominent ones they can still add more value to the users. Some features can develop as follows.

- Pre-test function to validate the application and shortlisting.
  - General IQ test
  - Job oriented test
- Integration of SKYPE + SMS in to the interview room function.
- e-Payment based professional CV writing function and job posting function.
- Responsive User Interface.
- Data backup function.
- Banner management function.
- Mobile native app for both Apple and Android devices.
- Candidate and Employer referral function.
- Freelance job management module.
- Video resume function.
- Integrated SEO module.
- Social media integration.

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Appendices

Appendices A: System Documentation

Title: HJA Portal

Date: 26th Dec 2016

Version: 1.1

System: Web application

This documentation provides system implantation information for the system administrators, developers, technical project managers who involve in further system encasement. Also, those who would like get the technical information to configure and use the system successfully.

Hardware requirements

- Intel Core i5 Processor
- 8 GB RAM
- 64-Bit Operating System
- 250 GB Hard Disk Drive
- Dual HD Monitors 1366 X 768

Software requirements

- Apache Web Server 2.2.6
- PHP 5.2.5
- My SQL server 5.0.45
- Ubuntu Latest stable version

Configuration of the pre-requisites

Information related to installation, compilation and execution details of the system are as below.

WAMP server

Using WAMP / LAMP can configure web application locally with webserver, database together with PHP language. WAMP bundle (Windows, Apache, MySQL, PHP) is simple and hassle free from any configurations. Also, it is open source and quickly downloadable for use. On server side implementation, a web server Apache should be installed firstly. If the user is using UNIX related environment, then LAMP can be used the same way as above software configuration.

Once WAMP/LAMP server is installed the project files can be used to store in the host and database file can be used restore in the MySQL database.

Follow below steps:

- Start the WAMP/LAMP server.
- Restore all project files in WAMP/LAMP server host folder (Ex: Windows-C:\wamp\www).
- Restore database file in MySQL, Hint: use phpmyadmin.
- Configure the environment in configuration.php in the web root.
  Hints:
  - $hostname="localhost";
  - $username="root";
  - $password="root";
- Hit URL : http://localhost/ on browser to load the home page.

Appendices B: User Documentation

User can get register to the system as Seeker or Employer
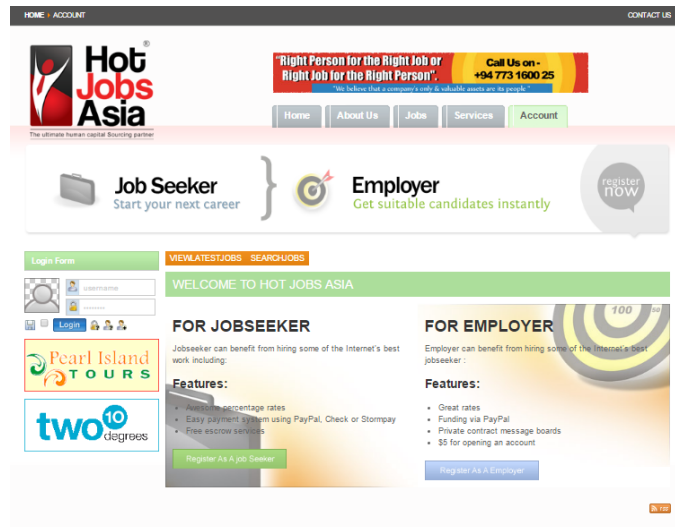
Figure 11: User Registration

Job seeker can update the personal details and get register.

Figure 12: Seeker Registration

Job listing is a dash board of live jobs and it lists the basic details upfront.

Figure 13: Job Listing

Any opening can apply for once for any registered seeker

Figure 14: Job Description

Employees need to register with their basic information

Figure 15: Employee registration

Any registered employee can post jobs
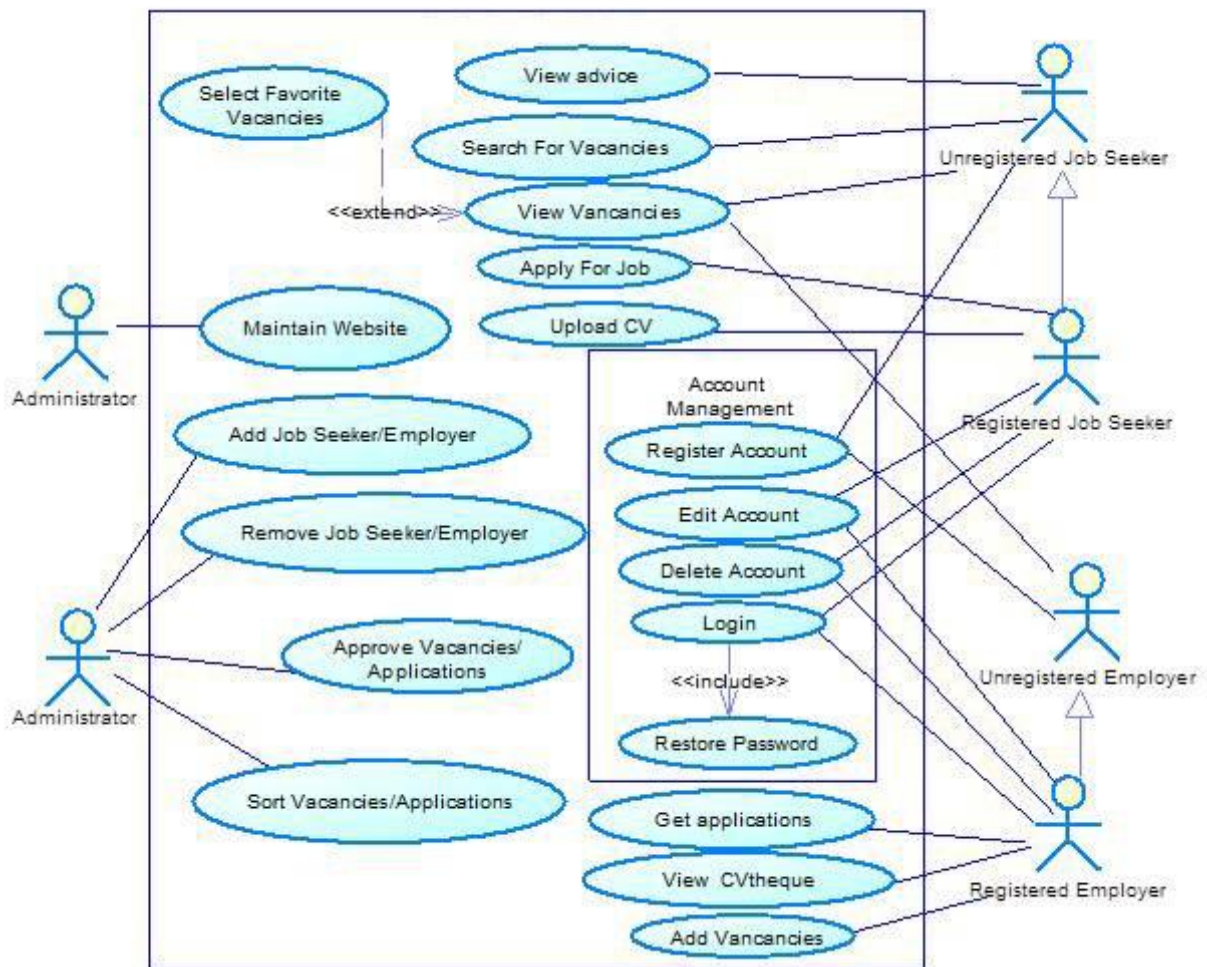

Figure 16: Job Posting

Appendices C:

Use Case Diagrams

Figure 17: Detail Use Case Diagrams

Appendices D:

Sample Usability Test From

Usability Test form - HJA Portal		
Your Name	Fazna tt	
1	How is the overall the user interface designs and the recruitment system?	
	[ ] Very Poor [ ] Poor [✓] Good [ ] Very Good [ ] Excellent	
2	How is the candidate profile and features in the system?	
	[ ] Very Poor [ ] Poor [✓] Good [ ] Very Good [ ] Excellent	
3	How is the employee profile and features in the system?	
	[ ] Very Poor [ ] Poor [✓] Good [ ] Very Good [ ] Excellent	
4	How is the interview room and its features?	
	[✓] Very Poor [ ] Poor [ ] Good [ ] Very Good [ ] Excellent	
5	How you classify the open source Joomla platform?	
	[ ] Very Poor [ ] Poor [ ] Good [✓] Very Good [ ] Excellent	
6	How far the system is user friendly and how is the performance?	
	[ ] Very Poor [ ] Poor [✓] Good [ ] Very Good [ ] Excellent	
7	Interaction of the system and quality of content in home website?	
	[ ] Very Poor [ ] Poor [ ] Good [✓] Very Good [ ] Excellent	
8	Understandability of the error messages and ease of using?	
	[ ] Very Poor [ ] Poor [ ] Good [ ] Very Good [✓] Excellent	
9	Comments	
	Please Enlarse the Interview Room Feature. It is Such a good Module	
10	Signature 11 Date	
	(signature) 10-01-2017	