Application of an Algorithm in a Job Application Portal to Improve the Recruitment Process

Student ID:102042

Group A

An information system project 2 documentation submitted to the Faculty of Information Technology in partial fulfilment of the requirements for the award of the bachelor's degree in Business Information Technology of Strathmore University

Faculty of Information Technology

Strathmore University

Nairobi, Kenya

January 2021

Declaration and Approval

I declare that this work has not been previously submitted and approved for the award of a bachelor's degree by this or any other University. To the best of my knowledge and belief, the work contains no material previously published or written by another person except where due reference is made in the work itself.

Student's signature:

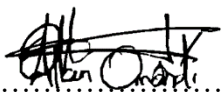
…….…….. [*Signature*]

…….…….. [*Date*]

Approval

The work of 102042 was reviewed and approved *(for examination)* by:

Supervisor's signature:



…….…….. [*Signature*]

27-JAN-2021

…….…….. [*Date*]

Abstract

Talent sourcing and recruitment of new employees to an organization is a critical task and should be carried out with precision and good judgement. Employees contribute to the growth and success of an organization. Recruitment officers are faced with a task to get the right people for the job. The current economic status of the country has rendered many people jobless and as result there is a high application rate to few vacant slots. Most of the organizations are not able to offer jobs to the increasing number of unemployed persons. This makes the recruitment process harder since most of the applicants who apply lack the needed skill set to perform and the recruitment officers must go through several resumes before the shortlisting of candidates. A delay in the recruitment process leads to delay or no feedback to the applicants.

The system was developed to include a shortlisting algorithm in the application process. The recruitment process is seen as a tedious task due to the high number of job applicants who apply for a job. During job application the system limits the number of applicants by selecting few who meet the category in terms of expertise. The system applies an algorithm in an online job application portal to improve the recruitment process. This way the recruitment process will be easier and faster, thus ensuring efficient communication to the applicants on their success or failure. The system uses Rapid Application Development methodology which ensures that the final product fits the user requirements.

Acknowledgements

The success of this project was a result of many individuals. I owe gratitude to God for giving me the strength and zeal to work on this project. My supervisor Mr Allan Omondi who has supported me throughout the project by his advice and persistence he made this happen. I would like to thank my parents for their support and continuous concern they have shown towards me and the success of this project. Lastly I want to thank my all my friends and colleagues who stood by me throughout the project.

Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction

1.1 Background

Recruitment according to (Arthi, 2018) is the process whereby an organization or team attracts potential applicants , shortlists the promising candidates based on a criteria , followed by selection from the shortlisted applicants and finally a job offer to a department in which they qualify. Talent sourcing is a critical step in the recruitment process since getting the right people for a job improves the working of an organization, in other words employees are responsible for the success of an organization. (Kawgira, Namusonge & Karanja, 2017) Recruitment practises vary in various organizations; this can be due to diversity, culture, and ethics of the organizations. (Abdi, 2018). This also depends on the sector or business the organization is involved in.

Recruitment agencies or applications tend to act as intermediaries between the employers and potential candidates, by having a platform whereby applicants get to view employer profiles and make an application that matches their skill set, examples are Brighter Monday and Fuzu. The employment sector in our country is unable to cater for all the applicants this is due to minimum number of slots in the job market and the lack of skilled candidates, as a result many applicants are left jobless.

1.1.1 Social Media Influence on Recruitment Process

Social media has become an essential part in the recruitment process and a s a result it has overtaken the traditional method of advertising and creating awareness on the vacant slots in the job market. This way many applicants get to know about the job opportunity leading to a disadvantage since some applicants prefer to make applications to jobs that they do not qualify.

1.1.2 Recruitment and Selection.

Recruitment is used to get qualified candidates this is done through an evaluation of received applications. The evaluation is done based on requirements set by the organization. Some companies carry out evaluation through amplitude tests done before an application to test the basic knowledge of the applicant. Selection of the most suitable candidate is done from the list of the evaluated candidates before a job offer is given. Recruitment officers oversee getting the right candidates for the job

through the stated processes (Abdi, 2018). Application of an algorithm to an online job application portal, will improve the recruitment process and as a result feedback to the applicants will also be done in good time.

1.2 Problem Statement

The high unemployment rate in the country brought about by the low economy and the ever-increasing population leads to competition for the few slots in the job market. Employers tend to be afraid of hiring graduates due to lack of experience, this increases the number of unemployment cases in the country (Kuso and Kahunga, 2021).

. Recruiters fail to manage the high number of applicants which makes the recruitment process tedious and longer, leading to delay of communication to the applicants. The Human Resource Management team, in charge of the recruitment find it hard to get the skilled candidates for the job. Transition of the application process to an online platform does not make it any easier since more applicants get to receive the information of vacancies through social media platforms.

1.3 Aim

This project aims to simplify the recruitment process by an application of an algorithm into the system. The algorithm ensures shortlisting of the applicants is done on time hence efficient communication to those who applied.

Algorithms have been used in the past to create intelligent systems. An example of such is EXPERT which is used in screening of candidates based on a criterion of a CV(curriculum vitae) format given by the recruiters (Chen, 2018).

1.4 Specific Objectives

1. To identify the challenges faced by recruitment officers during the job recruitment process.
2. To review recruitment algorithms used for screening candidates.
3. To develop a system that applies the algorithm which shortlists the candidates during the recruitment process.
4. To test the system and ensure it works as expected.

1.5 Justification

The developed system improves the recruitment process by reducing the recruitment officer's workload during the shortlisting and selection process. The developed system shortlists candidates during the application process by using a category specified by the employer. It makes talent sourcing easier and in return improves the functionality and growth of an organization.

1.6 Scope and Limitations

The developed system is used by both the applicant and the employers. Both parties create profiles which will ensure adequate information. An algorithm is applied to make the recruitment process easier by reducing the workload of the recruitment officers. The developed system aids interaction between the employer and the potential employee.

Adaptation to the new system will be a challenge since most users prefer the current online job application websites in use, making it hard for them to test the new system. Algorithms can create bias in employee selection. Being a web-based application system, it limits the users to those who have internet access.

Chapter 2: Literature Review

2.1 Introduction

The purpose of this chapter is to give a review of the current job application and recruitment trends in the country and how to improve the current system to increase efficiency and accuracy. The tools and techniques to be used in the system are also explained here.

2.2 Current Systems

The recruitment process begins when an applicant spots a vacant position, sends an application based on the requirements of the position, to candidate screening and employee selection. In the current systems the candidate screening is done by reviewing several CV's to spot talent or skills necessary for a specific job post.

The use of recruitment agencies and websites such as Brighter Monday (https://www.brightermonday.co.ke/) and Fuzu (https://www.fuzu.com/) increase the applicant's awareness of the job openings and posts. After an open job matches the applicant's profile, the applicant is advised to apply for the position. The current recruitment system depends majorly on the decision making of the human resource management to get the right talent for the organization. Being a critical step in most organizations, many organizations prefer introduction of outside personnel to reduce employment bias.

Several organizations fail to entrust their own personnel to oversee the recruitment and selection processes hence third parties are elected from other companies to take part in the recruitment and selection of new candidates. Social media has contributed majorly to the job market through the advertisements of job vacancies, with various applicants able to get first-hand information on new vacant posts and as a result are able to apply on time. The current systems lack a limit when it comes to the job applications. This means the vacant posts get more than the required number of applicants. Deadlines set for both job application and recruitment fail to be realistic, leading to unreliable and inadequate results.

2.3 Challenges faced by Recruitment officers during the recruitment process

The recruiting and selecting process is an important step in any organization since the success of an organization is influenced greatly by employee performance. Hence spotting and recruiting talent and skill become even harder. Due to the economic crisis the number of organizations seeking to employ new personnel to add to their team keeps decreasing, as a result the slots become fewer and attract several applicants.

The HRM oversee the recruitment process. One of the challenges is attracting the right candidates for the job. The many applicants are from different backgrounds and cultures which mean that they have different skills and behaviours. Shortlisting and increasing the diversity becomes an uphill task since some of the applicants tend to use the same skills set in all their job applications. Candidate screening becomes a long and tiring process due to the large number of applications turned in. The recruitment officers must also go through every resume spotting the best applicants. This procedure is long and time consuming.

Lack of enough resources is also a challenge of the current system. Some organizations lack the right resources to attract potential candidates. An example of resources is the HRM, who act as recruitment officers in other organizations. Resources have always been an issue in African countries, and as a result it leads to delay in the recruitment process.

Talent and skills set being critical elements that all employees need for the benefit of their organization is even harder to get since most applicants applying for the post lack the skill set required for the job post. Competition between organizations to attract skilled personnel is a challenge. Normally every organization wants the best person to do the job, and as a result getting an expert to fit the job description is hard since some of them are already taken by other organizations.

Selection of the right candidate from a list of candidates with the same characteristics and skills becomes a task. Decision making at this point becomes a burden to the recruitment officer to the right skill set required by the organization. The human mind can also be a subject to bias at this stage due to the reasoning and attitude towards the applicants. An example can be a case whereby the IT department has a vacant post and ten applicants apply for the job having the same skill set. In this case, the decision to get the best candidate from the group will not only be based on the skills but also contributions made by the candidates preferably in their previous jobs.

As a result, candidates with bigger contributions or projects get to be selected (Koivunen, 2019).

2.3.1 Communication to the Applicants

A delay in the recruitment process leads to a delay in offering feedback to the applicants. This is one of the challenges I faced as an applicant during my search for an internship position since some organizations prefer to give the feedback after two months. Other organizations give no feedback at all which leaves the applicants unaware of the process that goes on after the application.

2.4 Techniques to be used in the system

Data analytics and mining has been consistently used to simplify data selection from bulk data in each criterion. Algorithms can be used for this since they make the work easier. Brighter Monday and Fuzu websites apply the job matching algorithm that selects a registered users CV and compares it with the vacant slots of various organizations after which the user is advised to apply for a specific post. This algorithm links employers to promising candidates. Introduction of an algorithm to a system improves its efficiency and accuracy. The proposed system will include an algorithm to screen the CV's for a format and predict the future success of one as an employee.

This will make the shortlisting process shorter and as a result make the recruitment process shorter. The proposed system offers a solution to the recruitment process other than offering a platform for both employers and applicants to interact. The proposed system is expected to alert the employers on promising candidates for the job post the company is offering. After the recruitment process the successful applicants will receive a feedback regarding their application and whether they were successful or not.

2.5 Algorithms Used in Recruitment Processes.

Algorithms are perceived to make systems intelligent hence the application of an algorithm into a system will ensure that the system runs efficiently.

The following flowcharts represent simple recruitment processes with an application of an algorithm.

1. **Semantic Algorithm**

This algorithm works based on filtering and sourcing data to match a criterion specified by the hiring organization. It can also be called a job matching algorithm since it goes through applications and shortlists the candidates according to the specified requirements.

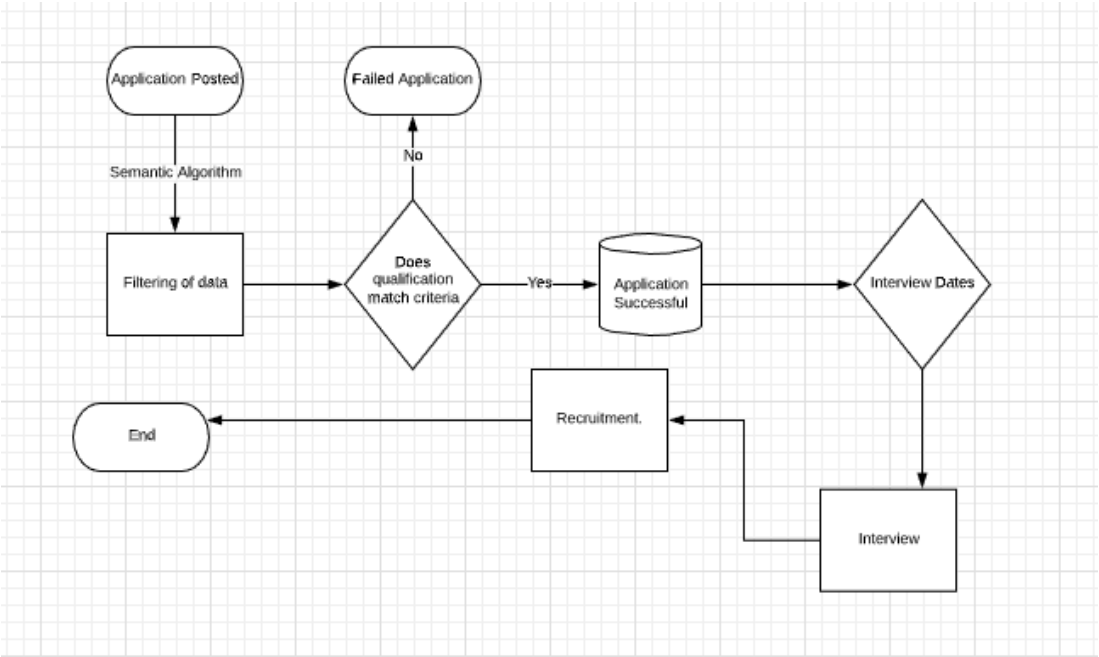


Figure 2-1: Semantic Flowchart

2. CV Screening Software

This intelligent software is used by organizations to shortlist candidates by using their CV format. Each applicant is required to upload a CV based having the same format as that required by the recruiting organization, failure to which the application is cancelled.

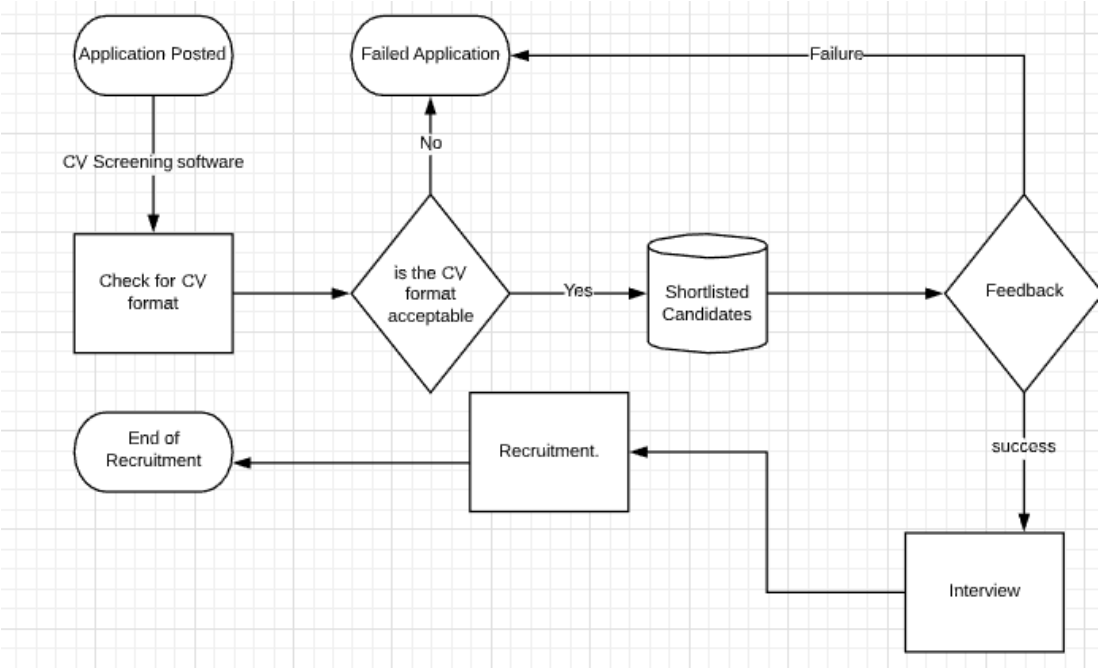


Figure 2-2:CV Screening software

3. Prediction Algorithm

A prediction algorithm is used to alert the recruitment officers of a job seeker's likelihood to succeed in the workplace after recruitment. This can be done by an integration of an assessment tool to gauge an applicant's basic knowledge before prediction of success or failure is done.

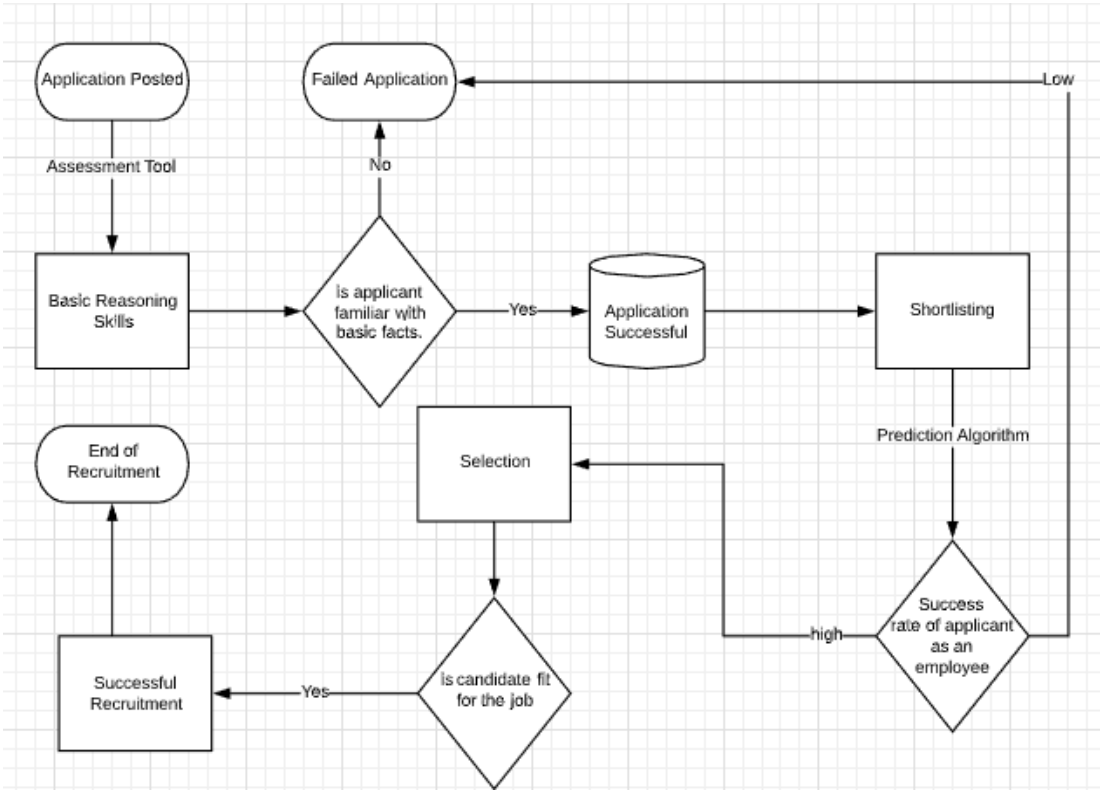


Figure 2-3: Prediction Algorithm

2.5.1 Advantages of Algorithm Integration

The ever-growing technology trend has led to the acceptance of online job recruitment sites, which ensures exposure and attraction of several potential candidates. (Grimaldo & Uy, n.d.). This way the companies and organizations get to attract the right people for the vacant job slots.

The new system saves on time since it shortlists the candidates according to a criterion set by the organization. Reduction in the time taken for recruitment increases the possibility of setting interview dates and appointment of new personnel into the organization. Notifications sent to the applicants concerning their success or failure in their application process improves the communication and interaction between the applicants and employers. This way the applicants who fail to meet the requirements can be aware of this and make another application to a new organization, instead of being kept in the dark for months. Improvement of the recruitment process ensures attraction of the right personnel for the job post.

2.6 Related Works

The current improvement and change in technology trends have ensured that most of the processes being done manually, be carried out online. Among these is job

application. Currently web applications have been created to aid the job application process. An example is brighter Monday and Fuzu which both use job matching algorithms, these algorithms go through employer profile and recommend the job postings to the registered applicant. Linked In is another online job recruitment system which offers a platform where both employers and applicants can communicate regarding job vacancies. A job matching algorithm is used in this case to alert the registered users of new job vacancies available based on their profile.

Some organizations have adapted CV screening software an example is IBM. The CV screening software works in phases the first being checking the format of the CV and the next phase shortlists the CV's according to the skill set required by the employer.

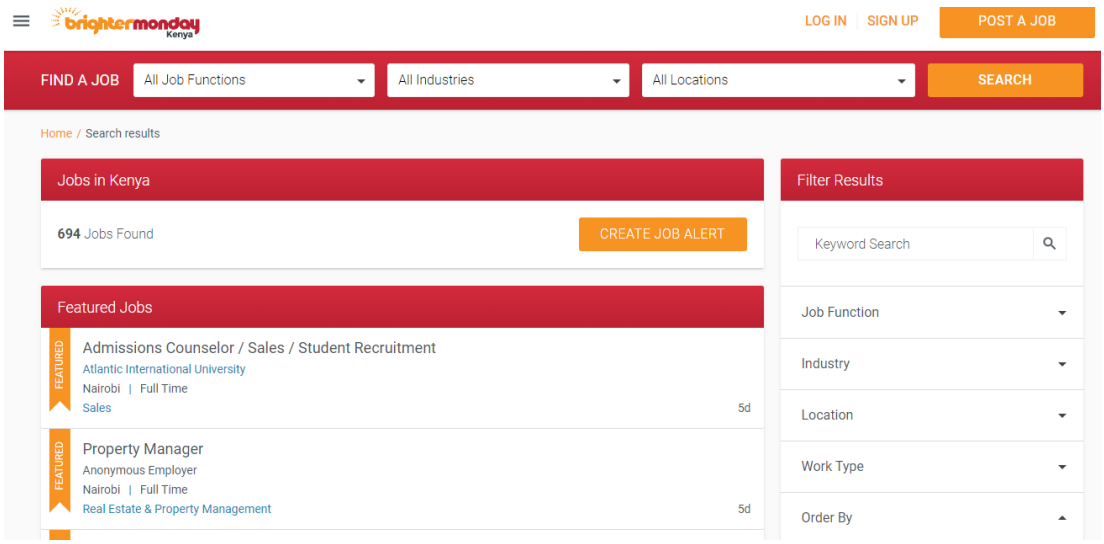


Figure 2-4: Brighter Monday Job Application Portal

2.7 Gaps in the systems

The systems mentioned above act as intermediaries between applicants and employers.

The only fall back of the systems is that they do not assist the recruitment officers in their recruitment process. The major focus of the online job portals is to get job vacancies, advice the applicant to apply and maybe at some point give the interview dates feedback. The systems should be able to offer more than interaction between user profiles.

2.8 Conceptual Framework

Application of an algorithm into the online job application portal will make the recruitment process faster and efficient. The system will be able to capture the data from the users, in this case the algorithm will capture the requirements needed for a specific job post and compare the same with the applicants application form before shortlisting the candidates .The diagram below is a representation of how the system is implemented so as to ensure an improvement in the recruitment system.

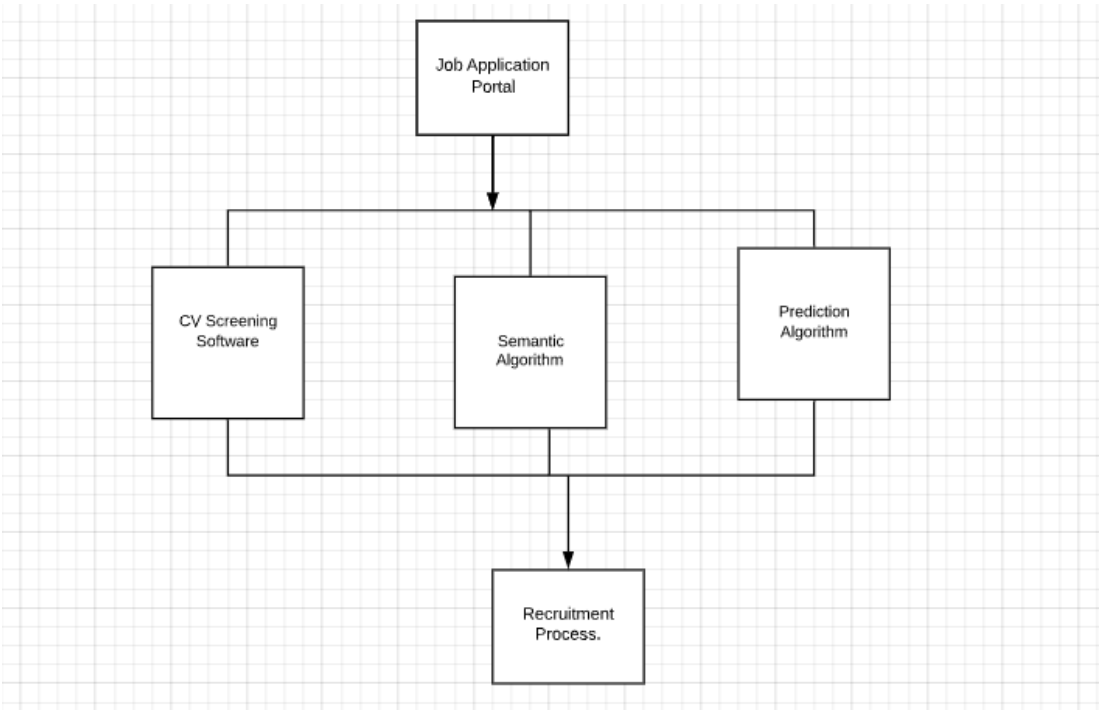


Figure 2-5: Conceptual Framework Diagram

Chapter 3: Research Methodology

3.1 Introduction

The project applies a Structured Systems Analysis and Design (SSAD) approach. This approach analyses the best strategy for the system development. Structure of the system is divided into the main subsystems, in this case application and recruitment. Focus is mostly on the procedures which play an important role in the success of the system functionality. Rapid Application Development (RAD) methodology to be used in the proposed system relies on customer feedback to make the final product efficient. It works in an iterative manner with each iteration seeking to make the system better.

3.2 Research Design

Research design is basically a plan that guides a researcher to answer his/ her research questions. It can be done for both qualitative and quantitative research. This project will cover quantitative research since it entails more details. Quantitative research is done based on the following criteria.

i. Number of contacts

Number of contacts refers to the access point a researcher has to a population. Cross-sectional study refers to the number of contacts made to a population sample. The population samples in this case are the recruitment officers who will be contacted to give information regarding the recruitment process.

ii. Reference Period

Prospective reference study aims to get the impact of a research or study in the future. In this case a prospective reference study is done to predict the impact that the proposed solution will have on the recruitment process in the future.

iii. Nature of the investigation

Comparative experimental designs states that several experiments are carried out to select the best experiment through its effectiveness, accuracy, and period of execution. Comparative experimental design is made for the algorithms to select the most efficient based on both time and accuracy (Kumar, 2011).

3.2.1 Experiment Procedure

Step I: Use of a job matching algorithm. Semantic Algorithm is used to match specific skills on a resume to a job post.

Step II: Use a prediction algorithm to predict the success of a candidate applying for a specific job post.

Step III: Use a CV screening algorithm to shortlist the resumes according to a format set by the organization.

Step IV: Compare and record the candidates that the algorithm chose alongside those chosen by the HR.

3.2.2 Rapid Application Development

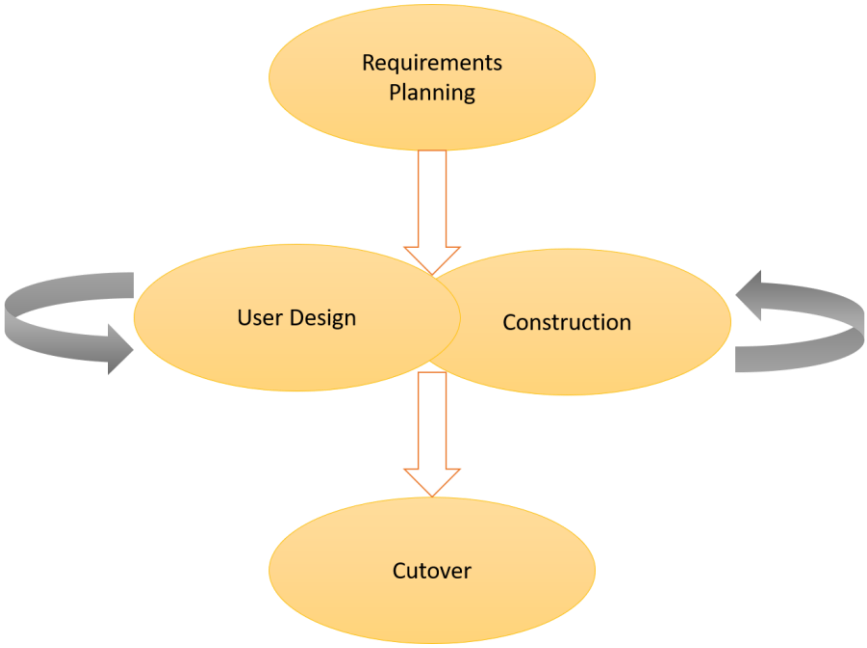


Figure 3-1: Rapid Development Cycle

3.2.2.1 Requirements Planning

This is the first phase of the System Development Methodology. This is the step where the scope of the system is defined. The client gives the expectations and goals on the workings of the product.

3.2.2.2 User Design

User design is built using prototypes which are then shown to the clients. Clients' feedback on the prototype is then taken and the prototype is redefined and improved

in an iterative design. Development and coding of the system also occurs on this stage. The system is debugged to ensure that it is error free.

3.2.2.3 Rapid Construction

Since the debugging and improvement has been done in the previous stages, at this point the prototype becomes a working model. At this phase system testing is done to ensure the system works as it should.

3.2.2.4 Cutover

This is the final phase of the methodology. The system is implemented at this stage once the system is judged to have the functional and non-functional requirements. This requires the client's approval. System changeover from the old system to the new system is then done.

3.3 List of Design Diagrams that will be drawn in Chapter 4

Since the system will apply the SSAD approach which majorly focuses on the processes and functionalities of the system the following design diagrams will be drawn.

1. **Use Case Diagram.**

   This diagram is based on the functional requirements of a system and the interaction between the users and the system, making it easy to understand.

2. **ERD Diagram**

   This will be used to visualize the database design. This is by showing the relationship between the entities of the system.

3. **Database Schema**

   This is used to show how data will be stored in the database.

4. **Data Flow Diagram**

   Level 0 diagrams is basically a context diagram that shows a system as a single process while level 1 DFD is a context diagram broken into multiple processes which highlight the main functions of a system.

3.4 Experiment Test Data

The proposed system is a system that aims to improve the recruitment process after a job application. The Test Data in this case will be the resumes uploaded by the applicants since the system seeks to improve the recruitment process.

3.5 Experiment Test Bed

The tools used to develop the system are as follows.

i. IDE – sublime text.
ii. DBMS – MySQL
iii. Programming language – PHP.
iv. Laravel framework.

3.6 Data Collection Methods

3.6.1 Population Description

The population being affected is a list of recruitment officers and job applicants who interact with the system. This system aims to improve the recruitment process to offer a better service to both the employers and applicants.

3.6.2 Sampling Distribution

According to the stated population above a sample of recruitment officers from a sector in the job market will be taken to act as a sample of the whole population. Random selection of the recruitment officers will be done due to the covid-19 pandemic. The proposed sample size to be interviewed is 20.

3.7 Method to be used to gather the Functional and Non-Functional Requirements

Questionnaires will be used to gather information from the recruitment officers who are the users of the system. This is due to the Covid-19 pandemic that limits interaction between people. This method of data collection will ensure that there is adequate feedback from the users of the system and hence the system will be developed in a way that meets all the user requirements. The interaction between the system analyst and the users of the system is a step in RAD cycle, the user design stage, which ensures that the product meets the standards set aside by the

stakeholders. Secondary data will act as a good source of information since some topics are being researched in an iterative manner.

3.8 Requirements

The system has the following functional and non-functional requirements that the system should meet.

3.8.1 Functional Requirements

i. The system should register new users.
ii. The system should enable registered users to create and view profiles.
iii. The system should enable applicants to apply for vacant jobs.
iv. The system should allow employers to update the status of the jobs.
v. The system should shortlist candidates based on a category from their applications.
vi. The system should be able to generate reports.

3.8.2 Non-Functional Requirements

i. Reliability once a user has an account; they can access it, by logging in.
ii. Security, access control and authentication are put so as minimize unauthorized access.
iii. Accessibility being a web-based platform, it can easily be accessed by users with internet connectivity.
iv. Usability, the developed system fits into the screen, with the colours and buttons in the right place.

3.9 Data Analysis Methods

The type of data collected greatly influences the type of statistical data analysis method to be used. In this case, the data collected will be discrete in relation to the respondents' feedback. Correlation analysis requires one to develop and deploy a system so that data can be collected for analysis. The correlation analysis can be related to how a certain factor adds or reduces the challenges that the recruitment officers face.

3.10 Ethical Considerations

During research it is advisable for the researcher to have a code of conduct involving good morals as one carries out the research.

1. **Voluntary Participation.**

The researcher should not coerce or force participants of a population to take part in the study. The participants should be given the free will to decide if they will participate or not, research should not be imposed on people unwilling to take part in the study.

2. **Confidentiality.**

In the case of any research the researcher has no authority to reveal participants identity, for their safety and security. The information received should be confidential between parties, the researcher, and the participant.

3. **Convenience**

Sampling should be avoided since it is seen as the easiest way to collect data from a group. Information should be recorded based on data collected from a reliable source.

4. **Imposing ideas to participants**

During data collection the researcher should not let perceptions and bias define the data collected. The data should be reliable since it is from a credible source, primary or secondary data. At the same time, the researcher is not allowed to convince participants with their own knowledge of the topic being researched. This is data manipulation to get results.

Chapter 4: System Analysis and Design Description

4.1 Introduction

This chapter focuses on system analysis, design and description. Data gathering was done using a questionnaire filed by recruitment officers and analysis of the responses formed the foundation of the functional and non-functional requirements which basically explains how the system is supposed to function and if the features are user friendly. System design is a representation of the design diagrams mentioned in chapter 3.The diagrams are concept diagram, dataflow diagrams, ERD and a database schema.

4.2 Data Collection and Analysis

The questionnaire had 8 questions and below is a sample of some of the responses.

Figure 4-1: Question 1 and 2 responses

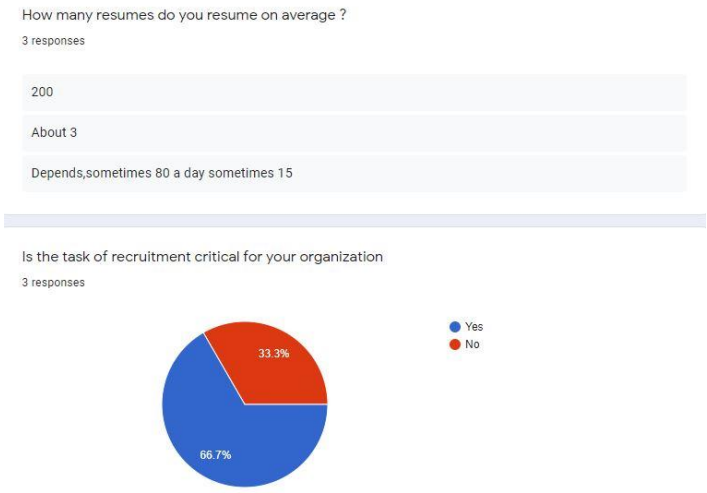


Figure 4-2: Question 3 and 4 responses

Figure 4-3: Question 5 and 6 responses

Figure 4-4: Question 6 and 7 responses

4.3 System Analysis

Requirement ID	Requirement Category	Requirement Description
FR1	Functional	The system should be able to register new users.
FR2	Functional	The system should enable registered users to create and view profiles.
FR3	Functional	The system should enable applicants to apply for vacant jobs.
FR4	Functional	The system should shortlist candidates based on a category from their applications.
FR5	Functional	The system should allow employers to update the status of the jobs.
FR6	Functional	The system should be able to generate reports.
NFR1	Reliability	Once a user has an account they can access it by logging in.
NFR2	Security	Access control and authentication to ensure the system is secure.
NFR3	Accessibility	To users with internet connectivity.
NFR4	Usability	The system should fit into

		the screen, with the colours and buttons in the right place.

Table 4.1: Requirements Table

4.4 System Design

4.4.1 Concept Diagram

.

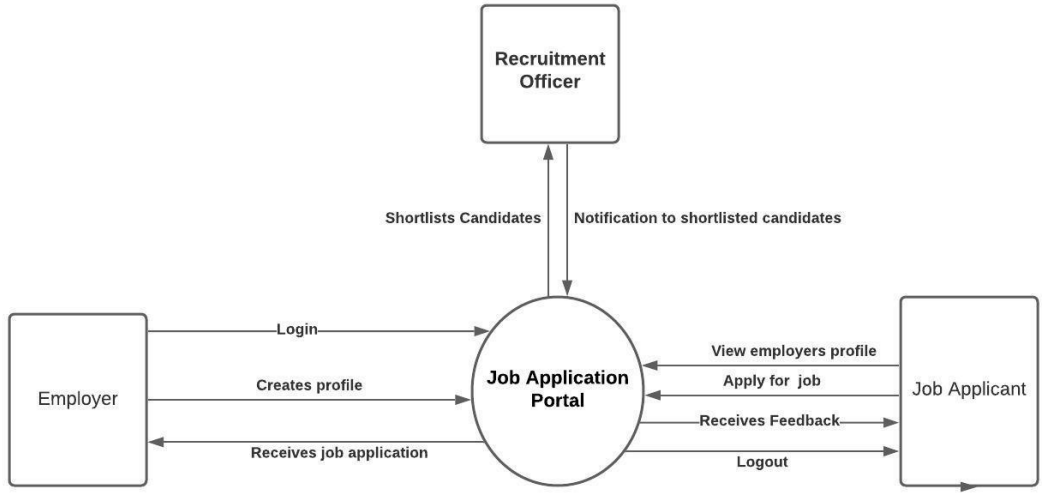


Figure 4-5: Concept Diagram

4.4.2 Level 1 DFD

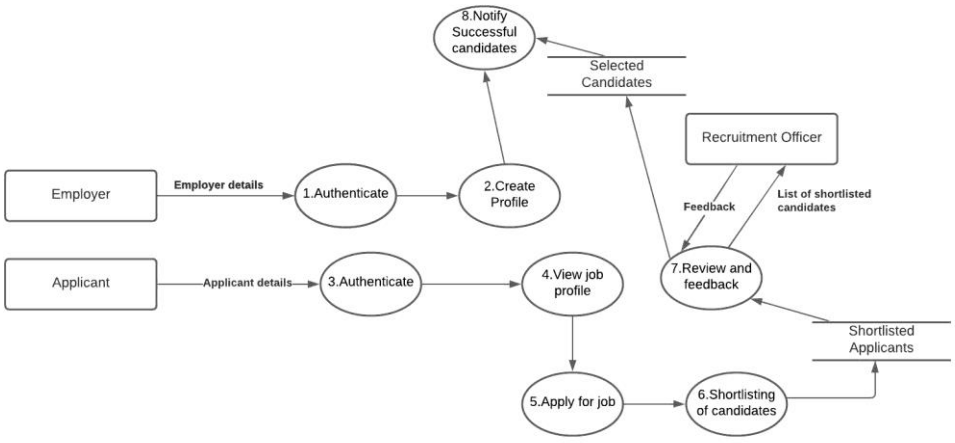


Figure 4-6: Level 1 DFD

4.4.3 Level 2 DFD

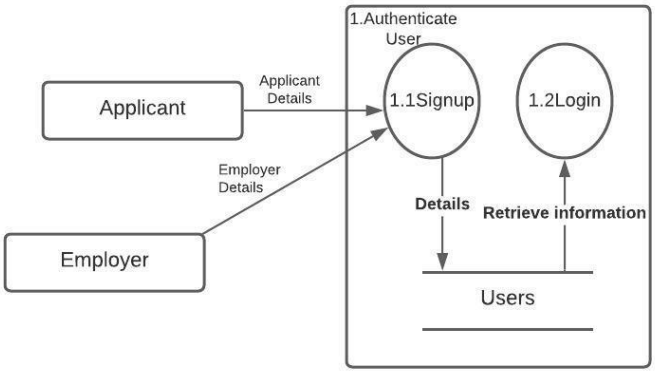


Figure 4-7:1st process of level 2 DFD

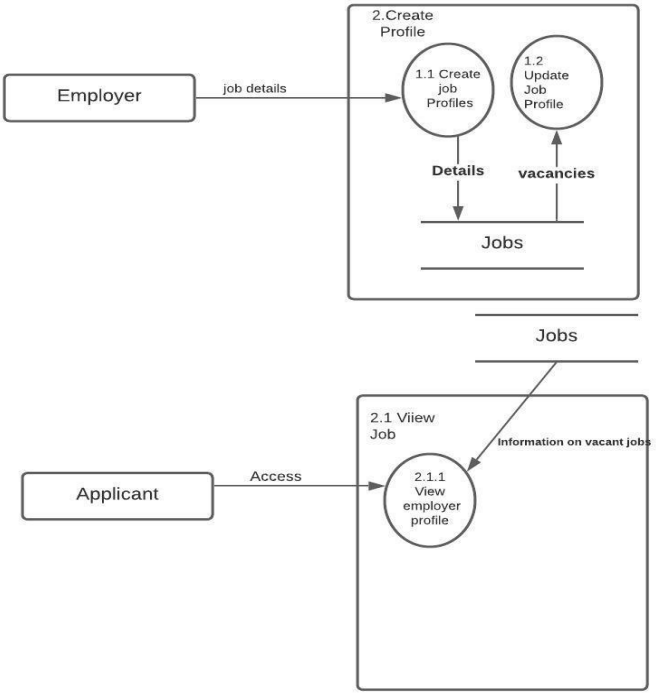


Figure 4-8:2nd Process of level 2 DFD

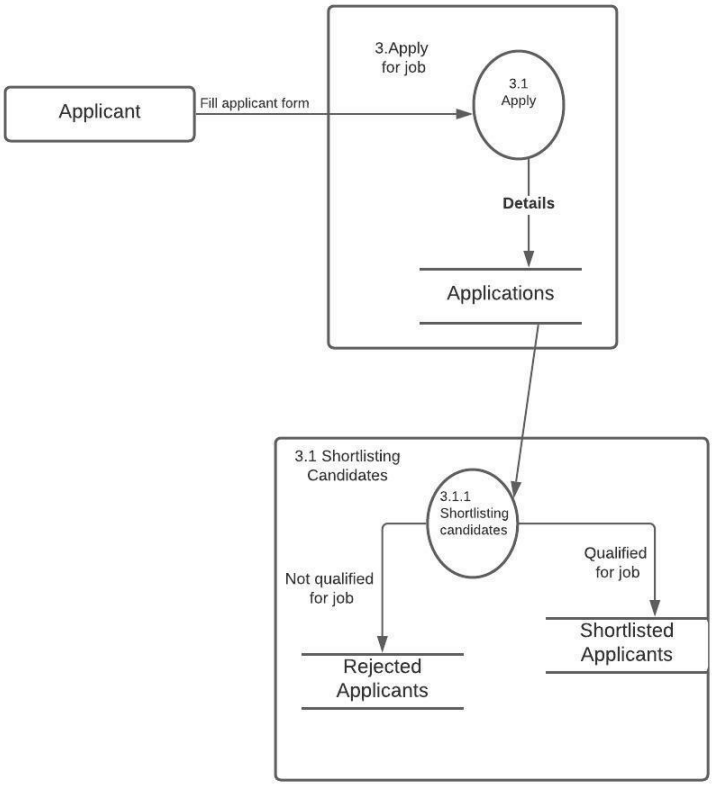


Figure 4-9:3rd process of Level 2 DFD

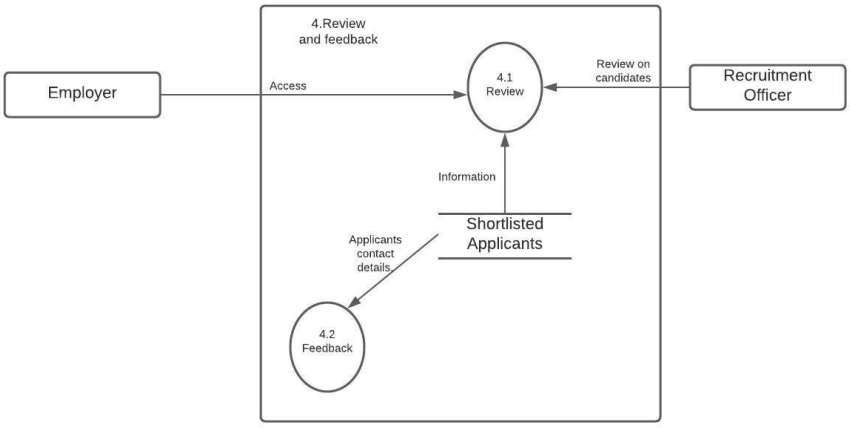


Figure 4-10:4th process of level 2 DFD

4.4.4 ERD

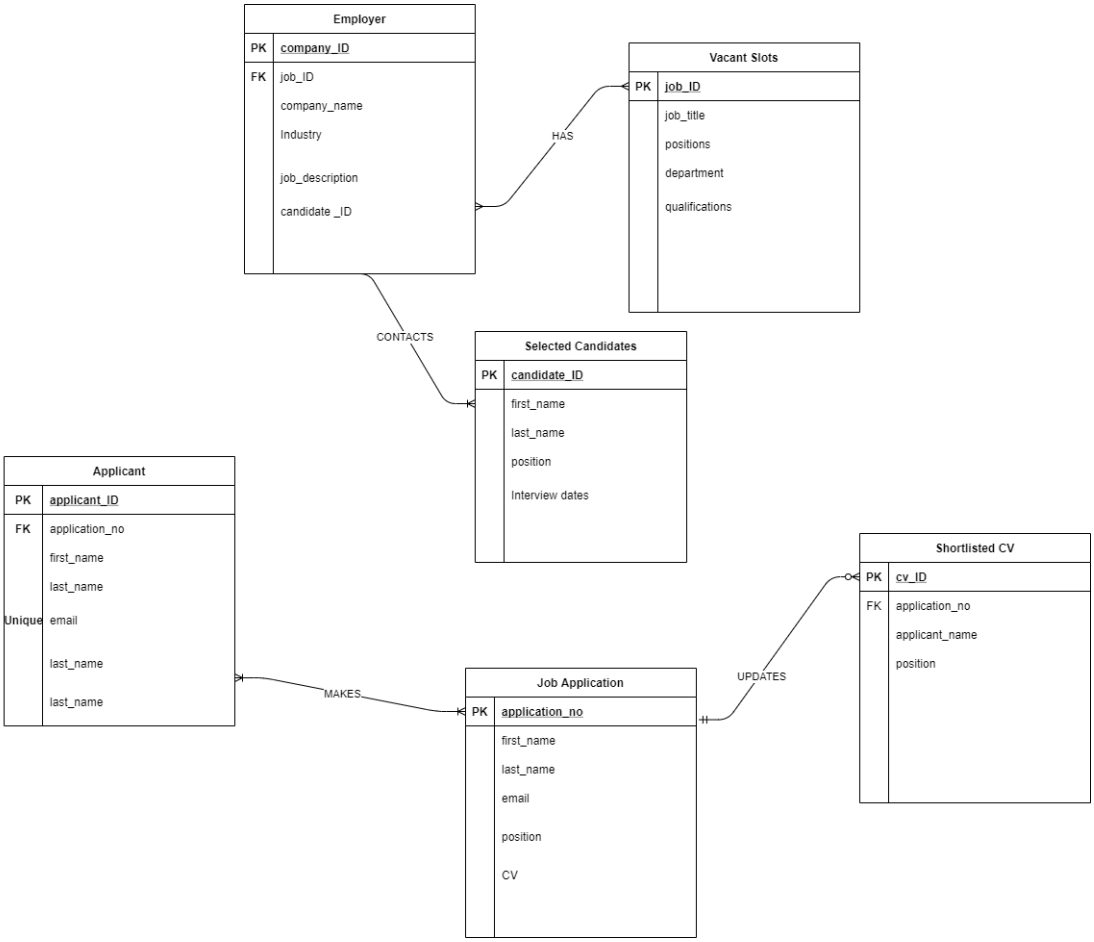


Figure 4-11: Entity Relationship Diagram

4.4.5 Database Schema

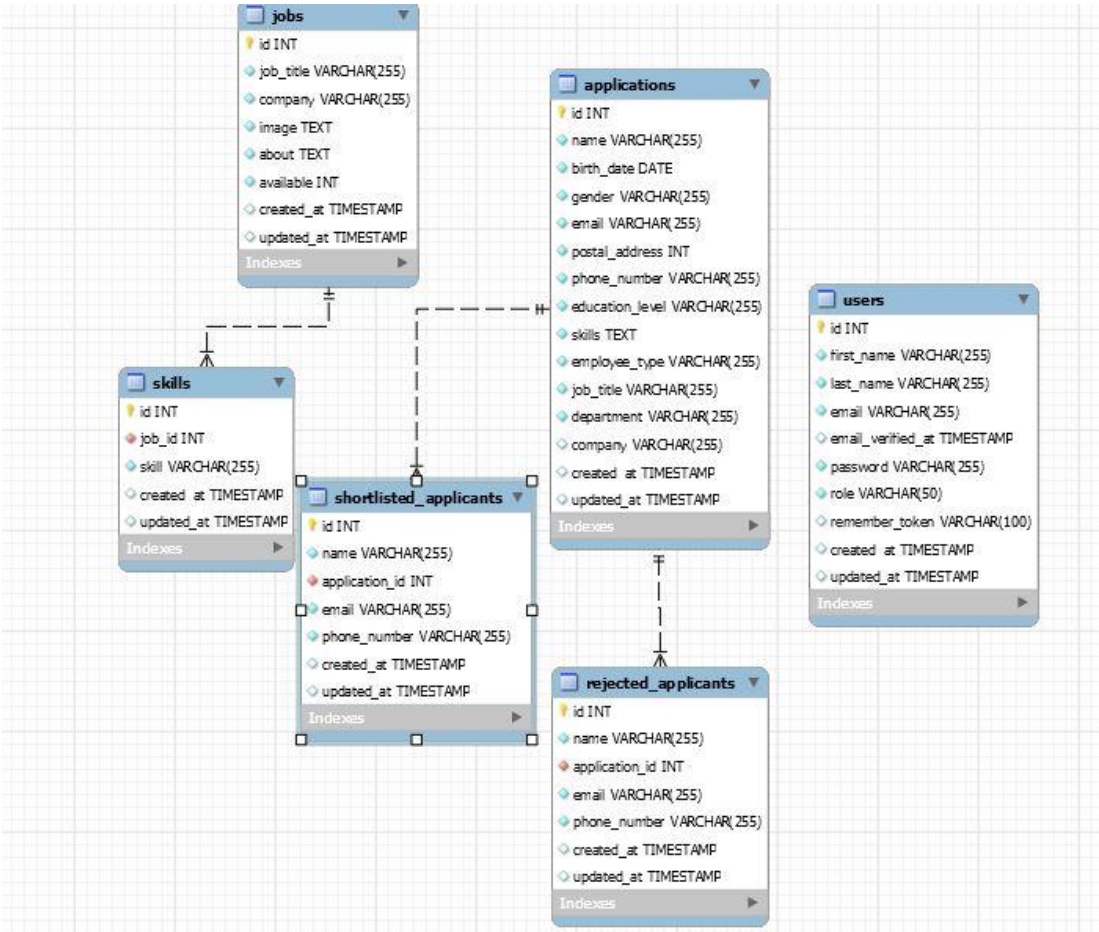


Figure 4-12: Final Database Schema

Chapter 5: System Implementation and Testing

5.1 Introduction

This chapter gives an overview of the functional and non-functional requirements that are mentioned in chapter 4, tested and documented so as to recognize defects or errors in the system. The tests cases done provide a guideline to see if the system has achieved the set requirements.

5.2 Test Environment

5.2.1 Hardware Specifications

Hardware	**Characteristics**
Machine	The machine that was used to run the developed system was HP ProBook 430.
Processor	The processor that was used in running the developed system was Intel® Core(TM) i5-6200U CPU@2.30GHz.
Primary Memory	8GB

Table 5.1: Hardware specifications table

5.2.2 Software Specifications

Software	**Characteristics**
Database management system	The DBMS used was phpmyAdmin and MySQL Workbench.
Internet Browser	Google chrome was used as the test environment for the web application.
Operating System	The operating system used to run the developed system was Windows 10 Pro. A 64-bit operating system.
IDE	Sublime TEXT environment was used to develop the system
Framework and Programming language used.	Laravel PHP framework was used for the development, Version 8 and PHP 7.

Table 5.2: Software specifications table

5.3 User Guide

The system has 3 main users the applicant, employer and the admin. Below is a representation of the admin dashboard.

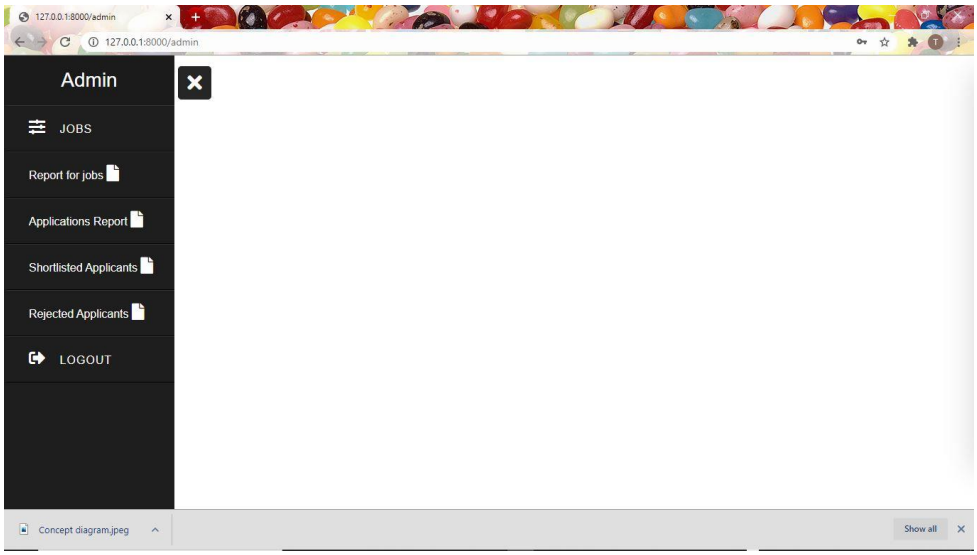


Figure 5-1: Admin dashboard

The system supports three users the admin, employer and applicant. All the users have to register an account before gaining access to the system. The employer then creates job profiles, for vacant slots. The applicant views the job profiles and makes a job application on the same, during the application process the applicant is either shortlisted or rejected after which the admin generates reports.

5.4 Test Cases

Test ID	Related Requirements	Inspection Check	Pre-Condition	Test Data	Priority Level
T1	FR1	Is the system able to register new users?	New users need to be registered to access the system.	The new users' details.	High
T2	FR2	Are applicants able to login and view vacant jobs?	The applicants should have access to employer's profiles.	Applicant's username and password.	High
T3	FR3	Are applicants	The	Applicant's	High

		able to apply for the vacant job slots?	applicants should be able to login before they apply for the job.	user name and password. Filled Application form by the applicant.	
T4	FR4	Was the developed system able to shortlist candidates from their application?	The applicants had to apply for the jobs before the shortlisting.	Applicants were shortlisted based on their skill rate from the application form.	High
T5	FR5	Was the employer able to update the job status?	The employer was responsible for updating the job status.	Job availability details.	High
T6	FR6	Does the system generate reports?	The admin was responsible for report generation.	Details from the database tables.	High
T7	NFR1	Can the users be able to access the system?	The users should have existing accounts.	Passwords and username provided at every login.	Medium
T8	NFR2	Is the system secure?	Providing a unique password every time a user logs in.	The passwords are hashed, user authentication and access control put in place to ensure security of the system.	High
T9	NFR3	Is the system accessible from anywhere?	Internet access.	WAMP server should be up and running.	High

Table 5.3: Test Cases table

5.5 Test Results

Test ID	Expected Results	Actual Results	Status	Remark
T1	New users are able to create accounts.	Registered users are able to be redirected to different we pages based on their roles.	Pass	Good performance.
T2	The applicants are able to login and view employer profiles.	The registered applicants are able to login and view vacant job slots.	Pass	Good performance.
T3	The applicants are able make job applications.	The applicants successfully apply for vacant slots using a job application form.	Pass	Good performance.
T4	The system should be able to shortlist candidates based on their application.	The system shortlists candidates based on the category of their expertise.	Pass	Good Performance.
T5	The employer should be able to update the job profiles.	The employer successfully updates the job profile in relation to the availability.	Pass	Good performance.
T6	The system should generate reports.	The admin is able to generate, view and download the reports in PDF format.	Pass	Good Performance.
T7	The users should be able to access the system.	Already registered users are able to gain access to the system freely.	Pass	Good Performance
T8	Unauthorized personnel should not gain access to the system.	The passwords are hashed and access control implemented to restrict access of unregistered users.	Pass	Good Performance
T9	The system should be accessible from anywhere.	The system is available and accessed on the internet freely.	Pass	Good Performance

Table 5.4:Test Results table

Chapter 6: Conclusion and Recommendations for Future Work

6.1 Conclusion

In conclusion the system ensured that there was interaction of the applicants with the employers' job profiles. The system was efficient since it limited the number of applicants by shortlisting them, using a category of their level of expertise present in their application forms. This aimed to enhance the recruitment process by making it shorter and less tedious for the recruitment officers.

6.2 Recommendations for Future Work

The system was not able to support multiple notifications sent via email to the applicants notifying them of the invitation dates. In future this step should be considered so as to improve the efficiency of the system. The system should be also expanded to ensure scalability whereby multiple users are able to use the same system. A selective algorithm is also to be considered in the future whereby the capacity of the expected number of applications is set by the employer, this will be efficient since the recruitment office will only be expected to handle a specific number of applicant requests.

References

Abdi, M. (2018). *Recruitment and Selection Practises among Telecommunication Engineering Firms in Nairobi County Kenya* (Masters). University of Nairobi.

Abdi, M. (2018). *Recruitment and Selection Practises among Telecommunication Engineering Firms in Nairobi County Kenya* (Masters). University of Nairobi.

Arthi, V. (2018). A Study on Effective Recruitment Process by a Recruitment \

Consultancy in India. *Indo-Iranian Journal of Scientific Research (IIJSR)*, *2*(3), 23.

Chen, J. (2018). A Two-Step Resume Information Extraction Algorithm. *Mathematical Problems in Engineering*, 3-4.

Grimaldo, J., & Uy, C. Factors Affecting Recruitment Officers' Intention to Use Online Tools. *Review of Integrative Business and Economics Research*, *9*, 204-205.

Kawgira, R., Namusonge, P., & Karanja, D. (2017). The effect of talent attraction on organizational performance of firms listed in the Nairobi Securities Exchange. *Journal of Human Resource and Leadership*, *1*(3), 18-23.

KOIVUNEN, S. (2019). Understanding Decision-Making in Recruitment: Opportunities and Challenges for Information Technology. *PACM On Human-Computer Interaction*, *Vol. 3*, 5-10. doi: 10.1145/3361123

Kumar, R. (2011). *Research Methodology A step by step guide for Beginners* (3rd ed., pp. 107-114). Los Angeles: Sage Publisher.

Lagat, S. (2018). *A JOB MATCHING SYSTEM TO TRANSFORM CASUAL JOB MARKET IN KENYA* (Postgraduate). KCA UNIVERSITY.

Kuso, Y. and Kahunga, M., 2021. An Analytical Study Of The Impact Of Unemployment On Economic Growth In Kenya. *International Journal of Business Marketing and Management (IJBMM)*, [online] 4(2456-4559),pp.52-53.Available at:
<https://www.researchgate.net/publication/333565722_An_Analytical_Study_Of_The_Impact_Of_Unemployment_On_Economic_Growth_In_Kenya/link/5cf4ce394585153c3daedc8f/download> [Accessed 11 January 2021].

Appendix A: Timeline of Activities

Task	Start Date	End Date	Duration
Idea Selection	15-04-20	21-04-20	6
Concept Document	22-04-20	28-04-20	6
Chapter 1	29-04-20	13-05-20	14
Chapter 2	14-05-20	25-05-20	12
Chapter 3	26-05-20	31-05-20	6
Proposal Review	01-06-20	02-06-20	2
Proposal Submission	03-06-20	04-06-20	1
System Analysis	05-06-20	09-06-20	4
Design diagrams	10-06-20	30-06-20	20
Progress Presentation	01-07-20	06-07-20	5
Data Collection	07-07-20	27-07-20	20
Analysis	28-07-20	12-08-20	15
System Development	13-08-20	07-11-20	84
Implementation	07-11-20	03-12-20	26
Documentation	03-12-20	15-12-20	12

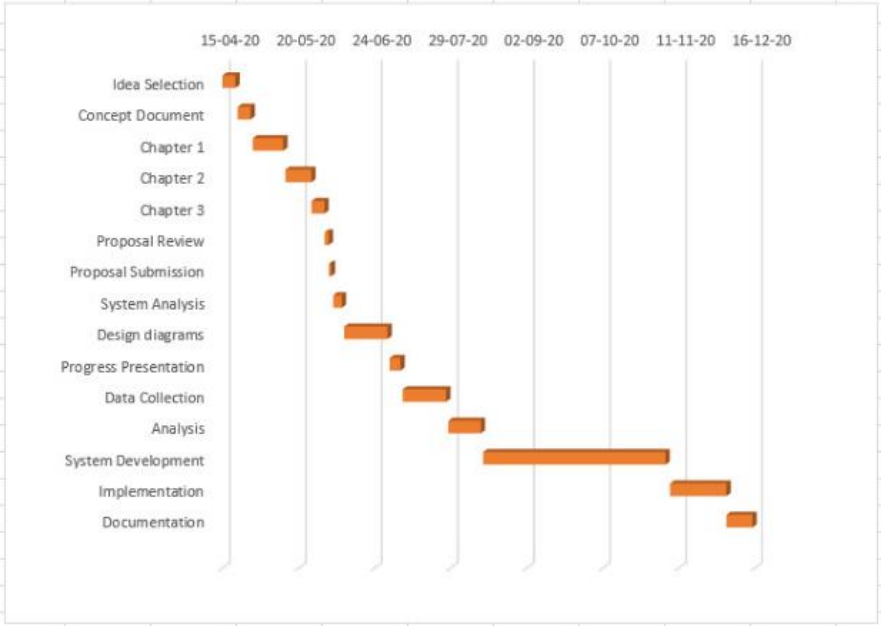


Figure 0-1: Gantt chart

Appendix B: Data Collection Tools

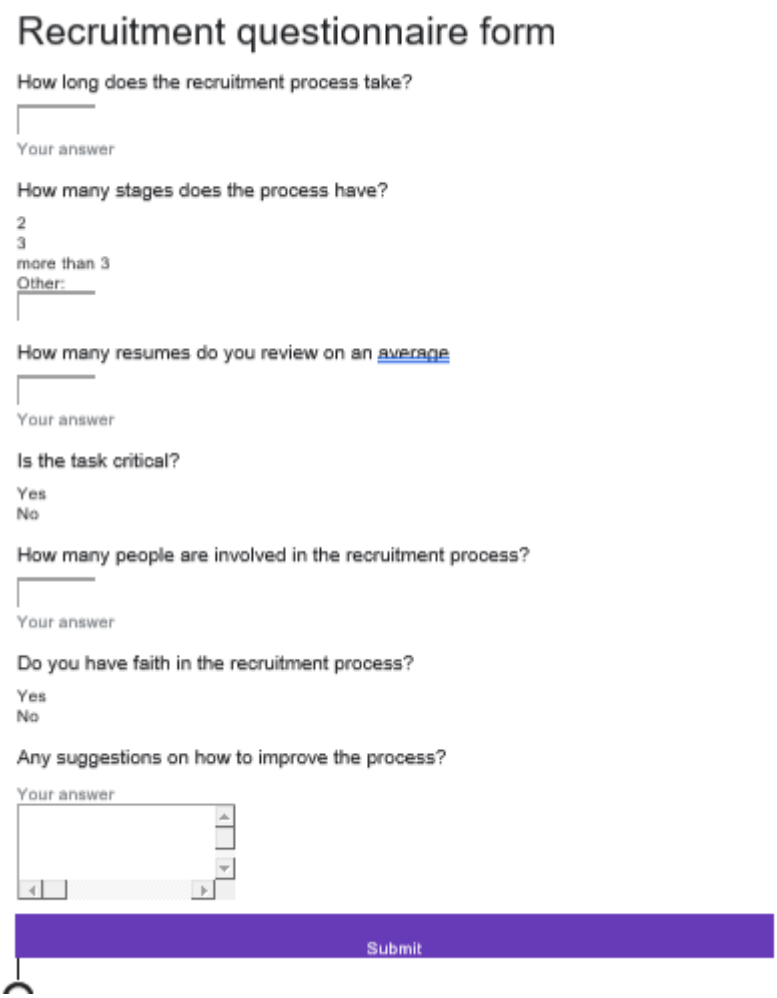


Figure 0-1: Sample Questionnaire

Appendix C: TurnItIn Similarity Index

Figure 0-1: Similarity Index