International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Issue: 12 | Dec 2023 www.irjet.net p-ISSN: 2395-0072

Campus Placement Hub using K-Means Clustering Algorithm

P. Rajesh [1], P. Devi [2], B. Vijay[3], K. Kavya [4], M. Santhosh[5], M. Yesu Sekharam[6]

[1]P. Rajesh, B. Tech Student, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

[2]P. Devi, B. Tech Student, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

[3]B. Vijay, B. Tech Student, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

[4]K. Kavya, B. Tech Student, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

[5]M. Santhosh, B. Tech Student, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

[6] M. Yesu Sekharam, Assistant Professor, Department of CSE, Sri Vasavi Engineering College(A), Pedatadepalli, Tadepalligudem – 534101.

ABSTRACT:

The Placement Cell is an interactive web-based application. The main purpose of the application is to facilitate the process of placement for students. It is designed specifically for use in colleges. The web application is developed to offer three separate modules: the user module, the company module, and the admin module.

User modules are specially designed for interested stude nts in participating in the placement drives. The students can register on the platform and provide all their necessary details, such as personal information, academic records, and other relevant details that are required by the placement cell. The module is equipped with essential features to enable students to upload their resumes, browse through the available placement drives, apply for them, and track their application status. In the company module, various companies visiting the college can view a list of students and their respective resumes. The company module has ability to add job titles, job descriptions, drive dates, etc. The admin module is designed for the college administration and staff who are responsible for managing the placement cell. The admin module allows them to upload details about upcoming and ongoing placements, manage student applications, and generate reports. One of the core features of the admin module is the ability to view the details of students applying for placement drives. The Placement Cell is a valuable tool for both students and college administration. The platform offers an effective way of managing and tracking the placement process, thus ensuring that students get maximum benefit from the available placement opportunities. The development of the Placement Cell aligns with our commitment to provide innovative solutions that enhance the learning experience of students.

Keywords: Placement Cell, Interactive web-based application, College Administration, Upcoming and Ongoing Placements.

1. INTRODUCTION:

The Campus Recruitment System is a comprehensive software solution designed to streamline the recruitment process within a college campus. It offers three distinct user roles: students, companies and administrators, each with specific functionalities and benefits.

For students, the system provides a user-friendly login interface where each student can create and manage their profiles. Students can input their academic details, including marks and other related information. This centralized repository simplifies the application process for various job opportunities.

Admins play a vital role in maintaining the system's integrity. They have the authority to review and approve student profiles while also removing any inaccurate or faulty accounts. Admins also oversee the entire system, ensuring that it complies with college placement rules. The company login feature allows visiting companies to access a list of students attending the college also view their resumes. This functionality streamlines the recruitment process for companies, making easier for them to identify potential candidates.

Furthermore, students can explore a bunch of companies that have posted job vacancies through the system. This feature empowers students by enabling them with insights into available job opportunities and the

companies recruiting on campus. The system also includes email and for faculty members and students. Admin members are informed about job postings relevant to their department, ensuring that students receive timely updates on job profiles.

Ultimately, the Campus Recruitment System is a web-based software solution that enhances placement activities within the college. It facilitates communication among admins, faculty, and students. Key features include user management, job posting, tracking company data, and notifications. The system is customizable to meet the particular needs of each college, enhancing efficiency and overall placement performance.

2. LITERATURE SURVEY:

The primary and crucial phase within the software development process involves conducting a comprehensive literature review. During this phase, we delve into the preliminary research conducted by various authors in the relevant field. By carefully analysing and considering significant articles, we aim to build upon the existing body of knowledge and expand our work further.

The need for online job boards for universities, along with their usefulness in bridging the gap between college students and employment chances. Employment websites have historically been utilized in HR administration for recruiting and finding candidates. This work is mostly based on a job portal created for Pulchowk Campus, one of Nepal's top engineering colleges. It is a special version of a job board created for the campus's students. The system is supposed to be useful for both students looking for jobs and businesses looking for possible candidates suited for the position. Services like job recommendations to students based on their talents and applicant filtering to assist employers in candidate matching.[1]

A website that offers online information to recruiters and job searchers is known as a job portal. By taking into account their tastes, education, and experience, it aids job searchers in finding the best organizations. A list of businesses that meet the job seeker's requirements is displayed on the portal.[2] Similar to that, it offers recruiters a pool of qualified individuals to pick from. The main purpose of this application is building a platform that facilitates efficient communication between potential candidates and companies.

In order to enhance the efficacy of campus recruitment fairs, a quantitative evaluation system has been proposed that analyses the big data statistics of such fairs.[3] By combining an effective statistical analysis model with a sample regression analysis method, the system evaluates the data gathered from campus recruitment meetings and formulates a decision objective function to assess the impact of the campus recruitment fair. The system also employs a convergence rule evaluation method for quantitative regression analysis of the fair's effectiveness. The outcomes of this analysis are derived by mining descriptive statistical data and relevant descriptions from the big data collected.

This article delves into the traditional way of recruitment by reviewing its background. It further highlights the emergence of new recruitment methods, such as e-recruiting, and evaluates their effectiveness. The advantages of e-recruiting, including its accessibility, are discussed with its disadvantages, such as the violation of some legislation.[4] Moreover, the article explores the impact of e-recruiting on management. The study conducted face-to-face interviews with 102 companies from the population.

This project aims to implement a Desktop Based System for Campus Recruitment using Mahout. It can help college placement offices to match the company's criteria with students' eligibility. Th e system automates the activities of placement cells in colleges, reducing the dependence of human intervention. Our main focus is on profile matching, where eligible candidates all will be matched with the company's criteria. To achieve this, we will use Mahout's Naïve Bayes Classification algorithm. Based upon profile similarity degree, the preference lists of companies and students are calculated, which serve as the input of two-sided matching.[5] With the new system embedding SMS-based interaction, it can raise the matching degree, shorten the recruiting period, and reduce costs. Furthermore, this recommendation service is not only applicable in the region of campus recruitment but also provides a frame work for the mobile business field with the extension to other domains such as hospital-intern and college-student matching and recommendation.

The study's goal was to create online hiring tools that would make it easier to fastly and approximately choose qualified candidates. The software was developed using the Modified Waterfall Model.[6] System efficiency in terms of performance, dependability, security, and cost-effectiveness was then assessed using the generated software by six sets of respondents. Descriptive statistics demonstrated the utility of the software.

Lack of user management data across distinct application systems causes users to maintain multiple sets of accounts and passwords, despite the fact that each system must provide the user interface in order to function; absence of unified authentication users are unable to use different apps and information resources in the campus network via a unified entrance due to lack of services and adequate management. In order to close the "gap" in the application system, integrate different

types of data and workflow, and ultimately provide a personalized platform to obtain and disseminate information uniformly, campus portal, a unified public network application platform, is required.[7]

Using an applied web concept, this project seeks to improve the design and development of HR apps by providing a productive and innovative communication platform. Application design follows two basic principles of responsive and dynamic web architecture.[8] The portal provides candidates with an easy-to-understand application process and career information with an optimal reading experience on all devices thanks to a responsive web interface. The dynamic communication-path structure of the backend system allows seasonal employees to develop business skills that efficiently use project information and common operating procedures

An ontology model of job description is presented in this paper. This approach helps employers create better job descriptions and provides a structured, computer-understood framework for job descriptions.[9] The most important advantage is that it provides a workflow for editing job descriptions and cross-posting them in a common conceptual framework.

This project proposes development of an automated multi-levelled online recruitment system that first uses techniques to analyse and extract lists of candidate concepts from the job postings and user resumes the next step is semantic search existing resources (also called ontologies) must be incorporated in the workflow and then computationally based conceptual-relational techniques are used for dealing with the situation when the logical resources used do not recognize a concept.[10]

All college student's data can be gathered, and we can retrieve them in accordance based on company's criteria. The three modules we have Student, Company, Administrative/Training and Placement Officer (TPO). It also ensures that admin with full access. Students will mostly move their CVs, while administrators, TPOs, and companies may also transfer resources. The company will register and disclose their placement criteria.[11] Our suggested system must be implemented in colleges to improve placement services.

Web pages are made more machine-understandable by semantic web, making them readable by both human and artificial agents. Software agents have the capability to browse and process Web pages.[12] The motto of web-based educational systems is improved by semantic web, which also raises the standard of learning. According to Mizoguchi, "it can give students personalized learning materials, gather data about how students interact with the web environment, and discover services."

One of these services with a potential market in China is the SMS-based mobile recommendation system for college recruitment. Our survey and interviews with college placement offices revealed that the relatively lower matching degree (such as information overload or ambiguity), longer recruitment period, and greater expense of the present campus recruiting systems have been frequently criticized. In a nutshell, there are four causes of those issues. First, the HR released vague and unclear requirement descriptions, which caused a larger variety of requirements and miscommunication among job candidates. Second, candidates who lack crucial career planning or are unable to fully comprehend the job description might submit their applications for the wrong roles. [13] Thirdly, the phenomena where job searchers who are under more pressure to find work apply for numerous openings in a mass and random manner would raise cost of applicant selection. Additionally, the China's university hiring events take place in October and November, which overworks the employees. The candidates may be chosen at random in this scenario, which results in poorer matching.

3. PROPOSED WORK:

3.1. Problem Statement:

All Processes in the previous existing system are handled manually, resulting in a heavy workload for the placement Officer and increasing the risk of errors. Due to the sharp increase in the number of users, the process has become more difficult. Some of the problems/obstacles faced in the existing system are

- Searching for eligible students is done manually by the TPO based upon company criteria.
- The records are stored in modified Excel sheets, resulting in sorting problems. Data redundancy due to duplication of records.
- TPOs have to collect and organize information and resumes of students according to various streams, which is a time-consuming task.
- Managing, updating, and informing specific students for specific company criteria takes too much time.

3.2. Proposed System

The planned Web-based Training and Placement portal's major goal is to make it easier for TPOs, placement coordinators, and students to access and edit information. The technology offers a better approach to maintaining student data in the database, maintains data integrity and accuracy, and shortens the time required for paperwork. There will be no need of putting up notice or emailing every student about the companies visiting the college. The students can keep updated themselves through this software. The company can

view all students data and it can shortlist students based on their criteria instead of doing manually. Student can register online instead of going to placement department for registration. The three main elements of our web portal are student login, admin login, and company login.

Student Module:

A crucial element of a campus recruitment system that assist students with their job search and the hiring process is a student module. This module often forms a portion of a broader platform or piece of software for campus recruitment that universities, colleges, or other organizations use to run their career services and assist students in finding potential employers. The following are some essential characteristics and features frequently present in a student module within a campus recruitment system.

Profile Creation: Student profiles can be created and updated with personal information, academic accomplishments, talents, and by uploading resumes.

Job Search and Apply: Employers or organizations taking role in the campus recruitment program may post job openings, internships, or co-op opportunities that students can view for and apply for those jobs.

Student Application Submission: Students can submit their cover letters and resumes for employment applications through the website. They might be able to follow the progress of their applications as well.

Communication: The career services office or partnering employers may send relevant alerts, messages, or announcements to students. If students have any doubts, they can easily contact the admins through emails.

Preparation Material: Access to tools including interview guidance, job search recommendations, career guides, and company profiles to aid students in their job search preparation**.**

Admin Module:

The administrator's role is essential for a campus recruitment system to function effectively and efficiently.

Managing users: Administrators have the ability to create, alter, or deactivate user accounts for students, faculty, and other administrators. They can also assign roles and permissions.

Job Posting Review: Before making job posts or internship possibilities available to students, administrators can examine, approve, or reject job postings or internship submissions from companies.

Placement Reports: TPO can assess the ratio of students who were placed and make comparisons with comparable placements. The user performance statistics will be provided by this module.TPO can assist the students in improving their performance using this automatically generated information. To generate information on placements, this module will handle the data of job seekers and cut down on the paperwork required of TPOs.

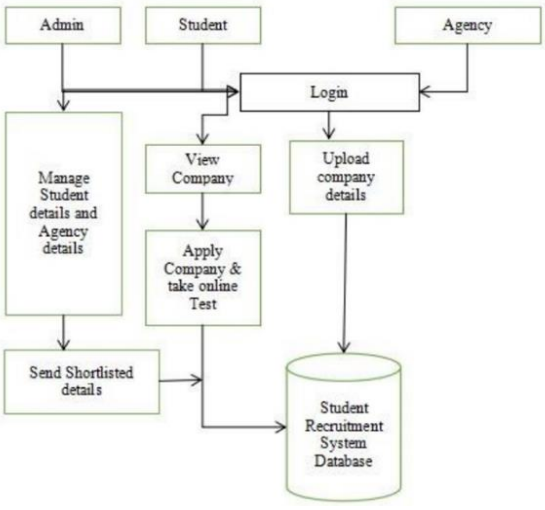
Detecting fake Accounts: TPO can evaluate performance using prior years or data to comprehend student needs. It will allow access to the system and has the ability to delete fake accounts.

Company Module:

The "Company" module, which contains all the features related to the organizations taking part in the selection process, is essential to a campus recruitment system. This module offers details about the numerous groups that are recruiting on campus and is primarily utilized by administrators, recruiters, and students.

Benefits and Outcomes:

There will be no need of putting up notice or emailing every student about which company will be coming to college. The students can keep updated themselves through the software. The company can see all student's data and system can select students according to their criteria instead of coding manually There is admin login that can view and manage both students and company's account and can put up notifications. Student can register online instead of going to placement department for registration. This system saves time and efforts.



Proposed flow diagram

3.3. Methodology

1.Data Collection:

Gather information about students and placement drives, including student details, academic records, placement drive details, and job requirements Collect data on students' academic performance, skills, and other relevant information.

2.Feature Engineering

Create features that represent student qualifications and suitability for placement drives. These features can include academic performance, skills, extracurricular activities, and other relevant attributes. Calculate distance-based features using K-Means Clustering to group students with similar profiles.

3.Labelling

Label students based on their suitability for specific placement drives. For instance, label students as "1" if they are well suitable for a particular job and "0" if not.

4.Naive Bayes Classification

Train a Naïve Bayes classifier using labelled data to predict student suitability for various placement drives and utilize the classifier's probability estimates to match students with job opportunities that suits with their qualifications and preferences.

$$P(y|x) = \frac{P(x|y)P(y)}{P(x)}$$

5.K-Means Clustering for Student Grouping

Apply K-Means Clustering to group students with similar academic and skill profiles and use the clusters to recommend placement drives to groups of students with similar qualifications or career goals.

$$\sqrt{(x1 - x2)^2 + (y1 - y2)^2 + \cdots + (z1 - z2)^2}$$

6. Placement Drive Prediction:

Based on Naïve Bayes and K-Means results, match students with suitable placement opportunities. Students within the same cluster can be offered similar placement opportunities based on their qualifications and interests.

7. Admin Interface:

Create an admin interface that allows placement coordinators to manage placement drives. Administrators can view available placement drives, student applications, and the recommended matches.

8. Student Application Management:

Implement a system for students to apply for placement drives. This can include uploading resumes, cover letters, and other relevant documents.

9. Placement Drive Management:

Admins can create and manage placement drives, setting criteria for student eligibility.

10. Validation and Reporting:

Develop validation rules based on Naïve Bayes and K-Means results to ensure that students are matched with suitable placement opportunities and generate reports on the success of placement drives and the suitability of students for different job profiles.

Benefits of Using Naïve Bayes and K-Means:

Naive Bayes: The classifier helps match students with suitable placement opportunities based on the probability of their qualifications aligning with job requirements.

K-Means Clustering: It enables grouping students with similar profiles and interests, improving the personalization of placement recommendations.

Optimization: Using both algorithms can optimize the matching process, ensuring that students are recommended for the most suitable placement drives based on both qualifications and preferences.

4. RESULTS & DISCUSSIONS:

From the below figures are the interfaces provided to the user to view and apply for the companies which matches his skill set.

LANDING PAGE

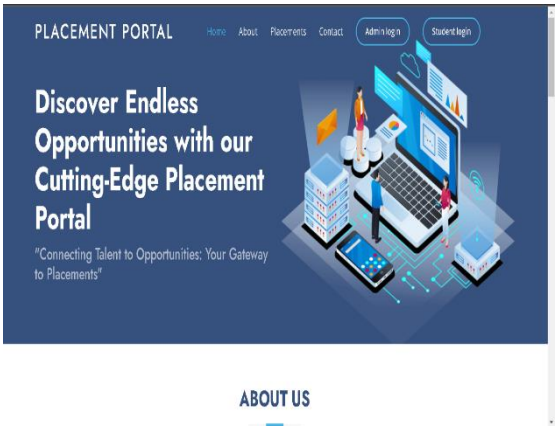


Fig-1: represents the Landing Page

Explanation: From the above window we can see the Landing page, where we can navigate to the student as well as to the admin pages respectively.

LOGIN PAGES

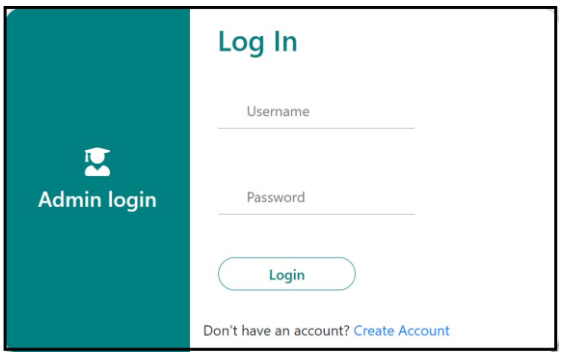


Fig-2: represents the Admin login

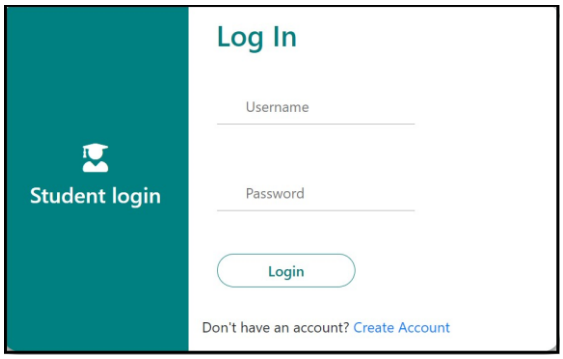


Fig-3: represents the Student Login

Explanation: This image showcases the Student Login page, which serves as the gateway for students to log in to their accounts explore job opportunities and submit applications. On the hand in this image, you'll come across the Admin Login page. This particular page is reserved for administrators who oversee the recruitment system

REGISTRATION PAGE

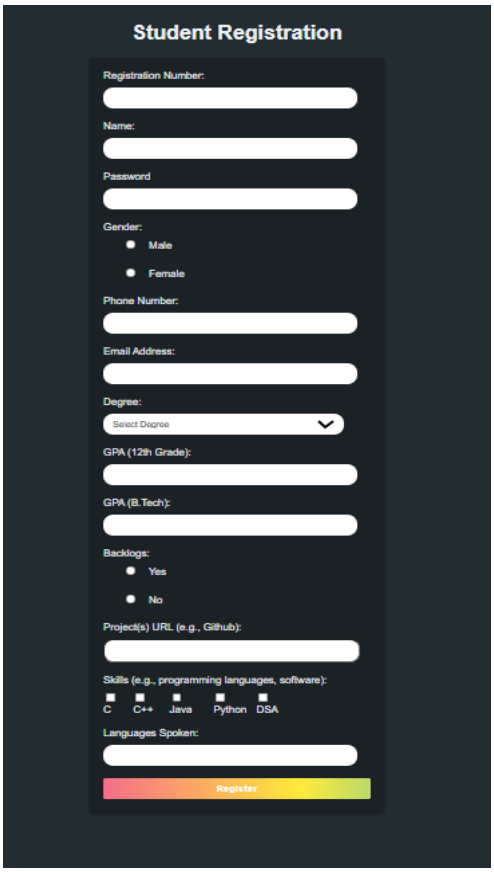


Fig-4: represents the Student Registration

ADDING DRIVES

Fig-5: represents the Admin adding the drives

Explanation: From the above window, we can see the admin of the cell is responsible for adding the new drives(companies) which should reflects in student home page of the student for applying.

APPLYING FOR COMPANIES

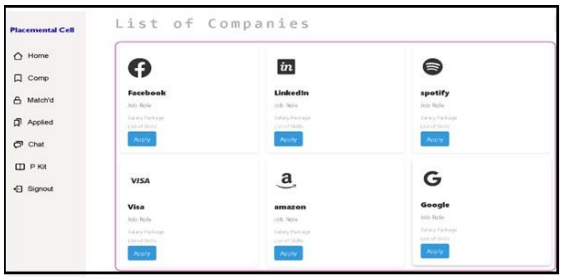


Fig-6: represents the Student applying the companies

Explanation: From the above window, we can see students are able to view the list of companies which

are about to conduct drive and the companies which should reflect in the student home page of the student for applying.

APPLIEDCOMPANIES:

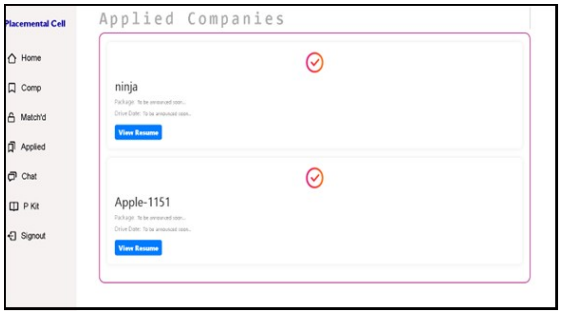


Fig-7: represents the student's applied companies

Explanation: From the above window, we can see the list of companies which are enrolled by the student are visible on the student dashboard.

STATISTICS

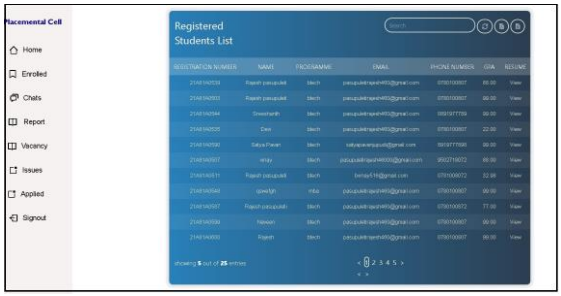
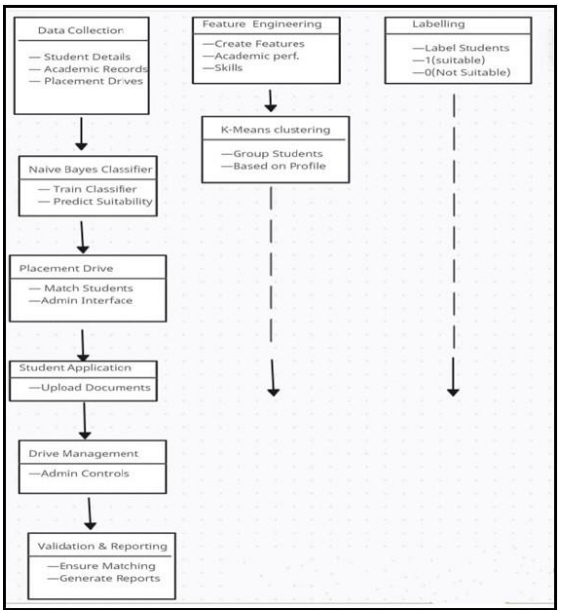


Fig-8: represents the registered students list

Explanation: From the above window, we can see admin is able to view all the list of students who are about to participate in the upcoming drives and perform the statistical analysis on the data.

Work flow of Analysis of data:



5.CONCLUSION:

In conclusion, the majority portion of work is done manually in the current placement system, and system changes take time. The search, sorting, and updating of student data provide a significant challenge, and the only available notification method for students is the notice board. The suggested system automates online user registration for each user, user activation and deactivation, personalization for each user, online resource provision, user interaction, and online feedback. The administrator can view user information, verify it, and create a student list based on company criteria. The user can

FUTURE SCOPE

1. **Consideration of Current System and Acknowledgment of Improvements:** Recognition that there is room for improvement in certain areas, along with an acceptance of the system's drawbacks.
2. **Proposed System Enhancements and Expansion:** Suggestion to integrate the Exam cell of the college with the system to remove the need for two separate systems and facilitate double verification of marks and other important data.
3. **Incorporating Multimedia Elements:** Mention of the possibility to include videos of students or companies within the system, likely for educational or promotional purposes.
4. **Adaptability and Ongoing Development:** A commitment to align the software with changing

requirements to keep it relevant and effective in the future.

6.REFERENCES:

1. Vijay Yadav; Ujjwal Gewali; Suman Khatri; Shree Ram Rauniyar; Aman Shakya, "Smart Job Recruitment Automation: Bridging Industry and University", IEEE, 2019 Artificial Intelligence for Transforming Business and Society (AITB)

2. K. Kopuri, G.M.H. Aqueel, A.S. Jabeen, and T.K. Shaik Shavali, "An Online Job Portal Management System", International Journal of Innovative Research in Technology, vol. 3, no.9, February 2017.

3. Ying Zhang; Xuanping Luo; Chen Zhong; Xinghua Cai; Xiang Gao, "Research on the effectiveness of Campus Recruitment Based on Big Data", IEEE, 2019 International Conference on Smart Grid and Electrical Automation (ICSGEA).

4. H.H. Frederick and A.D. Plessis, "Effectiveness of E-Recruiting: Empirical Evidence from the Rosebank Business Cluster in Auckland New Zealand", Science Journal of Business Management, vol. 2012, pp. 1-19, August 2012.

5. Ronak V Patil, Sneha R Gadekar, Prashant P Chavan, Vikas G Aher," Desktop Based Recommendation System For Campus Recruitment Using Mahout", 2014.

6. M.G.G. Ventura and R.P. Bringula," Effectiveness of Online Job Recruitment System: Evidence from the University of the East", IJCSI International Journal of Computer Science Issues, vol. 10, no. 4, pp. 152-159, July2013.

7. HongpingChen, Jinhong Li, Qizhi Sun, "Campus Information Portal based on Portal Technology", 2010.

8. Jesada Kittivaraporn, Jirat Chokdeeanan, Teerapong Yaophrukchai, Thanwadee T. Sunetnanta, "HRM Portal Human Resource Management Portal",2014.

9. Nabeel Ahmed, Sharifullah Khan, Khalid Latif, "Job Description Ontology", 2016.

10. Aseel B. Kmail, Mohammed Maree, Mohammed Belkhatir, "Matching Sem: Online Recruitment System based on Multiple Semantic Resources"2015.

11. Mulla Kajal, Mahadik Awanti, Pandharpatte Sonali, Kalantre Rashmi, BansodeSwapnali, "Online Training and Placement System",2016.

12. Taras Lendyuk, Sergey Rippa,"Information Portal of E-Learning System in Semantic Web Environment", 2011.

13. Xiangpei Hu, Lirong Wu, Chao Li, Minfang Huang, "SMS-based Mobile Recommendation System for Campus Recruitment in China",2011