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# Simulating an Automated Staff Recruitment Management System

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**ABSTRACT-** Recruitment is the process of actively seeking out, finding and hiring candidates for a specific position or job. The recruitment definition includes the entire hiring process, from inception to the individual recruiter's integration into the company. Due to the rapid development of job market, traditional recruitment methods are becoming insufficient. This is because employers often receive an enormous number of applications (usually unstructured resumes) that are difficult to process and analyze manually. In this research work, an automated recruitment system is designed to provide tools for effective processing of candidates resumes and matching them to their relevant jobs posts. The methodology used for this research is the structured systems analysis and design method (SSADM). The result of this research work is an automated recruitment system which performs the entire recruitment process and allows the recruiter to only take the final decision thereby giving him time to perform his other functions.

**Keywords**: Recruitment, Employers, Job seekers, Automated Recruitment System, Resume

## I. INTRODUCTION

Recruiting the right candidate with the required skill is an uphill task faced by many companies. This is due to the high volume of applications always received by a single job advertisement. This can be attributed to the high rate of unemployment found in many countries.

For the past few years, Information Technology (IT) services including consulting, software development and technical support have witnessed tremendous growth and according to a NASSCOM (National Association of Software and Services Companies of India) study, IT enabled services professionals in India has grown from 284000 in 1999 – 2000 to over 1 million in 2004 – 2005. Recent estimates show that the IT industry employs more people than other industries. This growth cuts across all countries.

So hiring many employees amidst so many applications poses a lot of trouble and in the end, the best of the candidates are not hired because the best may not be given opportunity to attend the interviews since all applications are not even considered because of the enormous number of applications received for a single job listing.

The manual system of recruitment is achieved by having designated staff process the applications manually and then select the qualified candidates. Because of the enormous amount of applications received for each job listing, the personnel do not even get to process half of the applications submitted thereby missing out on some of the right candidates for the job.The manual process of recruitment is also affected by tribalism and nepotism because the personnel may tend to make sure they shortlist the applicants known to them in preference to the other applicants who do not have "godfathers"

The automated system of recruitment involves the candidates putting their applications online and the system which is already predesigned uses the laid down criteria for the shortlisting of the candidates and makes sure that the right candidates are shortlisted. The criteria are ranked and given grades. The grades can take the form of excellent, very good, average, poor and very poor. The system is also able to go through all the applications thereby giving every candidate equal opportunity of being shortlisted for interview and further scrutiny by the organization.

Recruiting automation is a category of technology that allows companies to automate recruiting tasks and workflows so they can increase recruiter productivity, accelerate time to fill, reduce cost per hire and improve the overall talent profile of their organization. Recruiting automation is a subset of Human Capital Management (HCM), a category of enterprise Software as a Service (SaaS)

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used by companies to manage all aspects of their workforce.

Recruiting automation enables talent acquisition teams to automate processes that were previously performed manually. These technologies leverage artificial intelligence (AI), machine learning and predictive analytics and can be found at all stages of the hiring process.

Recruiting automation technologies are used by companies looking to increase their competitive advantage in hiring. These companies recognize that the "status quo" way of hiring simply doesn't work as well as it used to in an age of hyper-competition for top talent. These companies are looking to achieve better results in a shorter amount of time and often with fewer resources relative to the goals they are trying to achieve.

Many factors have led to the rise in the usage of recruiting automation. Competitions for talent have made many organizations to opt for automated recruitment rather than relying on the manual method which is prone to many errors. There is also the problem of information overload; thousands of applications are always received for a single job listing and this is more than what the manual process can handle. Recruiting automation also excel at eliminating inefficiencies seen in the manual process and also helps ensure that the best-fit candidates are identified and engaged in the recruiting process resulting in better quality hires and a higher performing organization.

Automated recruitment management systems are set of tools designed to manage the recruiting process. It may be the most important core human resources (HR) system. Recruiting is competitive, especially for those with high demanding skills, and it's driving interest in sophisticated recruiting systems. These systems are being designed to improve the efficiency of recruiters as well as job seekers.

Automated recruitment systems have a range of components and functions. They include Applicant Tracking Systems (ATS) for managing job postings and applications, and customer relationship management-type functions to keep applicants connected and engaged. Many of these tasks are automated. Routine tasks, such as scheduling phone calls and in person interviews, comprise part of the work performed by these systems.

Recruitment software also deploys anti-bias technology to analyze job postings to flag words and phrases signaling gender preference, for example, which can discourage some applicants. The anti-bias technology is also applied to hiring. A hiring manager, for instance, may favor graduates of certain universities. The technology can exclude this limitation and help keep the focus on identifying applicants who best meet the job requirements.Ease of use for candidates is also a goal. The Recruitment Management Systems (RMS) may be able to parse a candidate's resume and pull out relevant information, such as work history and education, instead of the candidates having to manually enter information about themselves. Once the system learns a little about an applicant, it can suggest other jobs that may fit their skill set. The intent is to engage the applicant and keep them interested.The advantage of an RMS over an ATS is that it automates many manual tasks, allowing the hiring team to focus on tasks that add value. An RMS also serves as a one-stop location for the hiring team to view all data related to the hiring process, including the job requisition, assessments, comments, candidate details and more.The recruitment management software has the capability to integrate applicant tracking system functionality, automate matching of candidates to open requisitions, automate interview scheduling and integration with calendar software such as Microsoft Office 365 amongst others.

## II RELATED WORK

Kulkarni(2012) described the recruitment management system as a web solution that takes the advantageof the latest web application technology to deliver an online real time human resource management solution. In other words, an automated recruitment system can be considered as a way to implement HR strategies, policies and practices in organization through the use ofweb technology. The typical and traditional paper based recruitment is no longer present in its original form in many firms, as many firms now use a combination of online recruitment and traditional paper recruitment process Cappelli (2001).

Automated recruitment system techniques and related technology are observed to be used by firms in the three major tasks attracting job seekers, sorting applications, and communicating with candidates. All these three tasks are fully automated inmany organizations. Automated recruitment system allow technology aided resume scanning, which is advantageous to hiring managers and job seekers, as it allows application from various locations worldwide to submit consistent information to HR managers and permit easy storage of the information

Many researchers have implemented different approaches in the automated recruitment

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process. These include Kessler (2009), who dwelt on the relevance feedback. In Kessler's system, relevance feedback takes into account the recruiting consultant choice during a first evaluation of few CVs. Their goal was a system capable of reproducing the judgment of the recruitment consultant. Kessler (2009), stated that it is critical for recruiters not to miss a good candidate that they may have unfortunately rejected. The essence of the relevance feedback was to avoid this kind of error.

Relevance feedback was proposed by Smyth (2003) to help the user to find a job with server logs from the site jobfinder (Roche, 2008).

Mochol et al., (2007) introduced a prototype job portal that used semantically annotated job offers and applicants. They stated that using the semantic web technologies increased market transparency, lower transaction costs and speed up the procurement process.

De Meo et al (2007) proposed an Extensible Markup Language (XML) – based multiagent recommender system which supports online recruitment services. Their system handled user profiles for personalizing job search over the internet, uses intelligent agent technology and XML for guaranteeing representation, storing and exchange.

Evanthia et al (2012) proposed a novel approach for automated applicant ranking and personality mining, which is implemented in the form of a company-oriented e-recruitment system. Their objective was to limit interviewing and background investigation of applicants solely to the top candidates identified by the system. This can have a positive impact on the efficiency of the recruitment process and lead to significant cost savings. To showcase the effectiveness of the proposed schemes, they implemented and tested an integrated company-oriented e-recruitment system that automates the candidate evaluation and pre-screening process. The system wasdesigned with the aim of being integrated with the companies' HR management infrastructure, assisting and not replacing the recruiters in their decision-making process.

## III MATERIALS AND METHODS

### A. SYSTEM OVERVIEW

In this paper, an automated staff recruitment management system is proposed. The model is aimed atproviding an automated means of recruiting staff for organizations. This automation starts with collating staff application and resume after advertisement. Ranking the resume according to laid down criteria down to grading the staff application according to the qualification and level of experience to assigning designated scores to candidates, collating these scores and producing the results of the candidates who applied and attended the interviews. This is done by the application using the assigned marks for each of the questions to assess the candidates and afterwards is able to project the possible successful candidates according to their total scores. The results of these candidates are finally reviewed by the recruiter who evaluates the top candidates and takes the final decision.

### B. SYSTEM ARCHITECTURE

Fig. 1: Stages of Online Recruitment

Fig. 1 above shows the stages of the online recruitment. The candidates upload their CVs and other documents through the internet to the recruiters website. The recruitment software performs activities on these credentials. These CVs must be structured in such a way that it can be assessed by the software. It ranks the CVs and assesses the credentials while assigning grades to the different credentials submitted by the candidates and also assigning grades to the level of experience garnered by the candidates. When the recruitment software is done with the ranking and assigning of grades, it performs activity screening by selecting only the candidates who met the required criteria and who are able to get the minimum pass mark. The recruitment software then filters these results and ranks them according to the highest score and stores the result in the database. The recruiter then looks at the scores in the database and selects the number of candidates needed for each post.

The automated staff recruitment software eases the lot of the recruiter by first making sure all applications and credentials are attended to irrespective of the number of applications, assessing the candidates based on their credentials and the online examinations written, collating and filtering the results of the candidates.

### C. WEB SERVICE

Web of service refers to message based design frequently found on the web and in enterprise software. The web of services is based on technologies such as HTTP, XML, SOAP and others.

Web service is defined as a means to connect services together (Barry and Dick, 2013). A service is a software that performs some

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computing functions and has some type of underlying computer system.
Web services allow various applications built with different technologies or platform to communicate and share data with each other through an acceptable standard.
The automated staff recruitment software was designed and developed using the following development tools for the different aspects of the program:
They are front end, back end and the database.

1. **FRONT END**: The front end of the website is the visible part where the user can interact with. The front end was designed using programming languages like HTML, CSS, and JAVASCRIPT.
- HTML: (Hypertext mark- up language) is a programming language used to create web document. It defines the syntax and placement of special instruction(tags) that are not displayed, but tell the browser to display document contents. It was also used to create links to other documents either locally or over a network such as internet.
- CSS: (cascading style sheet) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML.
- JavaScript**:** JavaScript is among the most powerful and flexible programming languages of the web. It powers the dynamic behavior on most website. It is used for interaction between the front end and the back end.

2. **BACK END**: The back end of a website is the aspect of the website that can't be seen by the user. The back end communicates with the front end on what to be displayed as a web page. The python language was used for the back end.
- PYTHON: Is an interpreted high level functional programming language. It has its uses in web development, software development, and system scripting.

3. **DATABASE**: Is an organized collection of data, generally stored and accessed electronically from a computer system.The database was designed using MYSQL.
- MYSQL: Is a relational database management system (RDMS) that runs a server providing multi- user access to a number of databases.

## IV. RESULTS AND DISCUSSION

### A. SYSTEM IMPLEMENTATION

The proposed model was developed as a web service that can be consumed by any application. The service model was developed using python for the automated recruitment and My SQL for the database.
The mobile app was developed using HTML, CSS, javascript and django framework to activate and maintain the database.

### B. SYSTEM INTERFACES

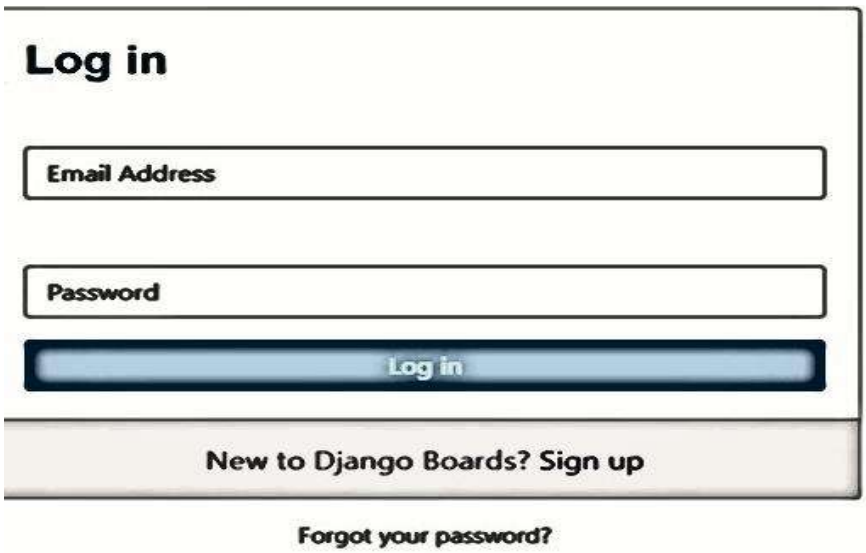


Fig. 2 The login page

Fig. 2 above depicts the login page. The login page also serves as a registration page for new applicants. A new applicant clicks on sign up where he can register before he can access the

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application and an old user simply enters his email address and password to login.


Fig. 3 Job creation page

Fig. 3 shows the job creation form where the applicant fills the form and uploads his credentials.

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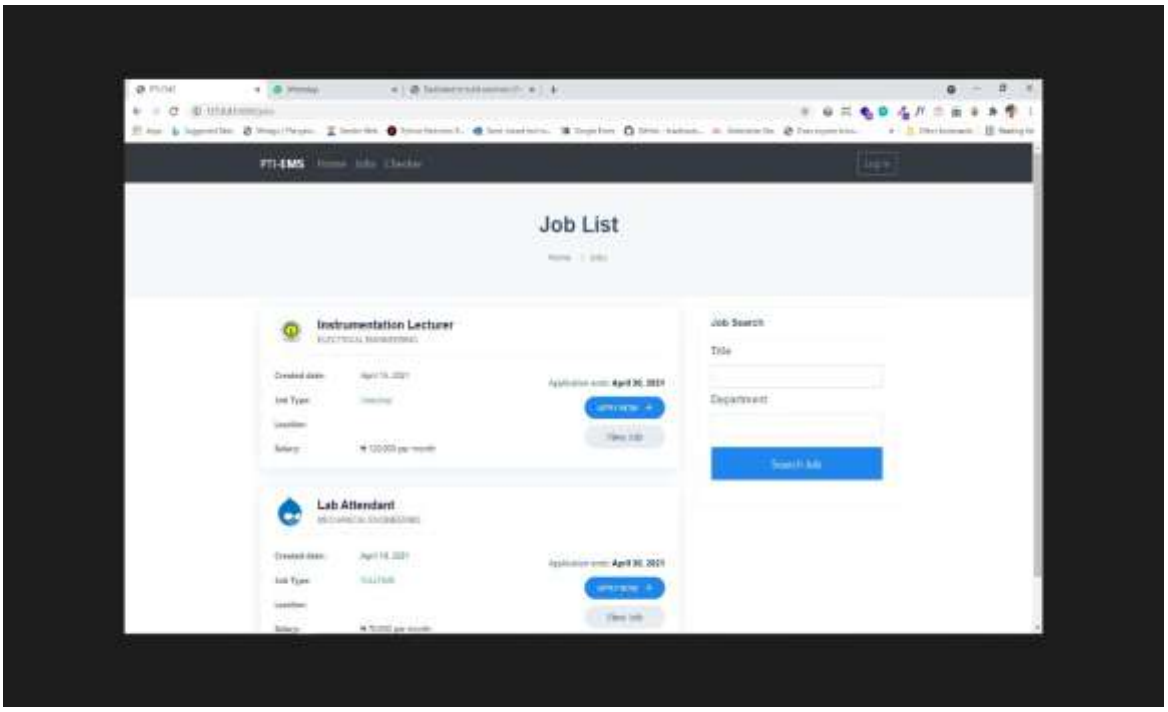


Fig. 4 Job listing page

Fig. 4 shows the job listing page where the different jobs are listed.Here the different positions to be filled in are listed where the candidate can select the position he is applying for.

## V. CONCLUSION AND FUTURE WORK

An Automated staff recruitment management system can be used by employers to recruit candidates and simplify the process of recruitment. Achieving this objective will be difficult using the manual system as the information is scattered, can be redundant and collecting relevant information may be very time consuming.This system will help in maintaining the information of potential candidates at one place, so it can be easily accessed by both applicant and employers.

The automated staff recruitment system will eliminate the problems inherent in the manual system by ensuring that all candidates who applied for jobs are screened and assessed and the best employed for the jobs.

Our future work is in integrating Artificial Intelligence and Machine Learning into the system so that the system can make decisions based on some trained data.

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