A COMPARATIVE STUDY ON EFFICIENCY OF E-RECRUITMENT USING DATA MINING TECHNIQUES

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ABSTRACT
Internet has proved as the most powerful social network that has deep impact on our society and has become catalyst in the process of globalization. Recent trends and data reveal that internet is being used in employment sector globally. This paper presents a systematic review of e-Recruiting literature. It is also concluded that Performance, Reliability, Security, and Cost-effectiveness could be utilized as criteria in evaluating online recruitment.[1][5]

Keywords: Data mining, Classification, E-Recruitment

I. INTRODUCTION

In recent years, there has been continuing trend among youths to pursue higher education in their quest to become better qualified and better skilled. New technologies, especially, the internet have made a huge impact on knowledge management and information dissemination in education. The web portal as a knowledge management system is very popular topics in many organizations including universities. Job Portals have different applications or services to solve various problems.

One of the main purposes of web portals is to allow information sharing over the Internet. For example, in a university, the new students in the faculty need access to information resources to select courses and to decide on the different majors available, in the faculty. This need can be addressed through a knowledge portal which must contain sufficient data and information about the requirements of the students. The number of jobless graduates has become one of the serious problems existing both in the developing and developed countries, today. The Internet has changed the way of looking for jobs, through the development of job portals. A job portal is a kind of web portal that provides an efficient ways for searching the Internet or the web for vacant job positions available. [2]

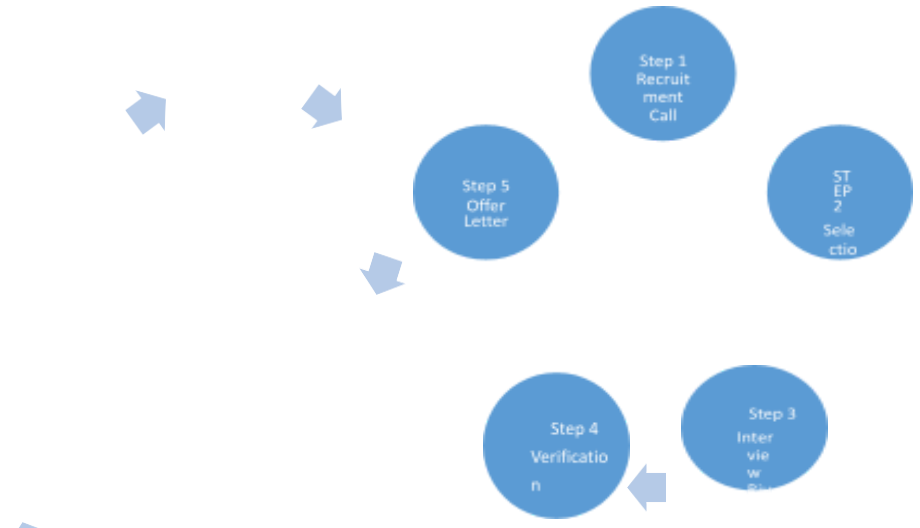

Figure 1: Recruitment Process

II. METHODS

The Existence of Multiple Independent Technologies is developed in past that serves the different facilities but all Technologies were different independent and Separate. Like Here we integrate different technologies together:

- Dynamic website creation
- Group SMS
- Apply online

There was no co-relation between these all technologies. These all Technologies are separated due to the separation; there is lack of access over multiple technologies within the same Application.

To overcome this problem, we have new Application “Job Portal” is going to be developed, which provides the facility to gain the access the multiple technologies within one single application. Job portal that provides the different services that are grouping SMS, dynamic website creation, apply online, all are available in same application. The outcome of this website is that can efficiency access the multiple services.

1. Job Procurement: Old and New Ways

Job seeking usually involves different ways to look for jobs such as through personal contacts, direct telephone calls to employers, job agency office, scanning online job listings, etc. Before the Internet, became widely uses as a method of seeking jobs, jobseekers spent a lots of time using various methods to look for job openings. Today, jobseekers use online methods which are very convenient and save a lot of time. Galanaki lists the following methods to be the traditional (old) ways for recruitment:

- Employment recruitment agencies
- Job fairs
- Advertising in the mass media such as newspapers
- Advertisement in television and radio
- Management Consultants
- Existing employee contacts
- Schools colleges or universities students services department
- Workers or professional referrals

These old job seeking methods are too slow, stressful, challenging and also lack quality. In addition, the applicants have to consider the cost and the amount of time to get the information they need, and other preparations they have to make. Finding all available job vacancies is a main step at in the job-seeking process.[3]

2. Knowledge Management System (KMS)

Alavi and Leidner gave KMS must have the capability of responding to changing situation fast and must be able to assist in inventing, decision-making and productivity. KMS is multi-functions system. KMS needs the technology tools in three aspects: database and database management; communication and messaging; and browsing and retrieval. The tools in these three domains may be integrated to control the Internet-based KMS framework.[4]

3. Decision support systems (DSS)

Decision support systems (DSS) join data, sophisticated analytical models and tools, and user-friendly software into a single powerful system that can support semi-structured and unstructured decision making. The main elements of the DSS are the DSS database, the user interface, and the DSS software system.[4]

4. Using Corporate or Commercial Websites

Parry and Tyson conducted a study on the recruitment activities of corporations for a period of six years with the use of survey and interview methods, questions were asked as to why the respondents utilized or did notemploy online recruitment, whether they predicted their use of the Internet for recruitment to change, and what impact they expected Internet recruitment to have on the use of other recruitment methods. Human Resource directors and managers, finance directors, managing directors and recruitment specialists from a sample of UK organizations with over 25 employees were the respondents of the study. There were 25,524 responses in the survey and twenty (20) HR or resourcing managers were interviewed.

The results of the survey showed that the most common reasons of using corporate or commercial websites in their recruitment were cost-effectiveness.[5]

Kar and Bhattacharya conducted a similar study. They determined the factors that could contribute to the effectiveness of the job portals and the elements of the job portal that could help increase the users' satisfaction onthe use of the portal. Survey method and personal interviews were conducted to meet these objectives.[5]

Haroon and Zia-ur-Rehman also investigated online recruitment in Pakistan. A total of sixty-five (65) respondents from small and large firms of the different sectors of the industries in Pakistan participated in the study. Data were collected through telephone interviews. Haroon and Zia-ur-Rehman showed that preference was given to small firms as compared to large firms in terms of using internet recruitment. They also showed that large firms had their own websites and use them for recruitment as compared to small firms. They also revealed that online recruitment became a new medium that was going to replace the other traditional sources of recruitment because online recruitment offered reduced recruitment costs, time-saving capability, quick response features in checking application status, and online resume development.

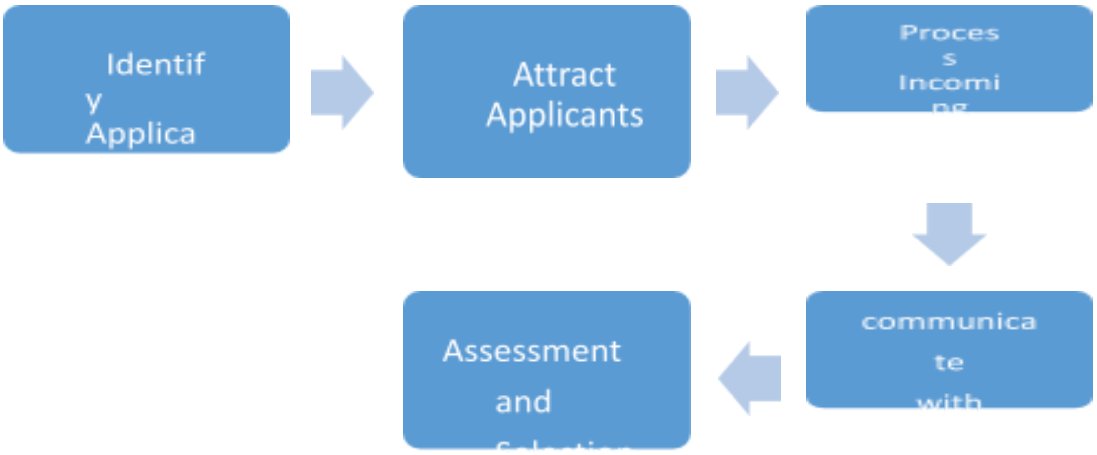

Figure 2: Traditional Recruitment Process Using Advertising [16]

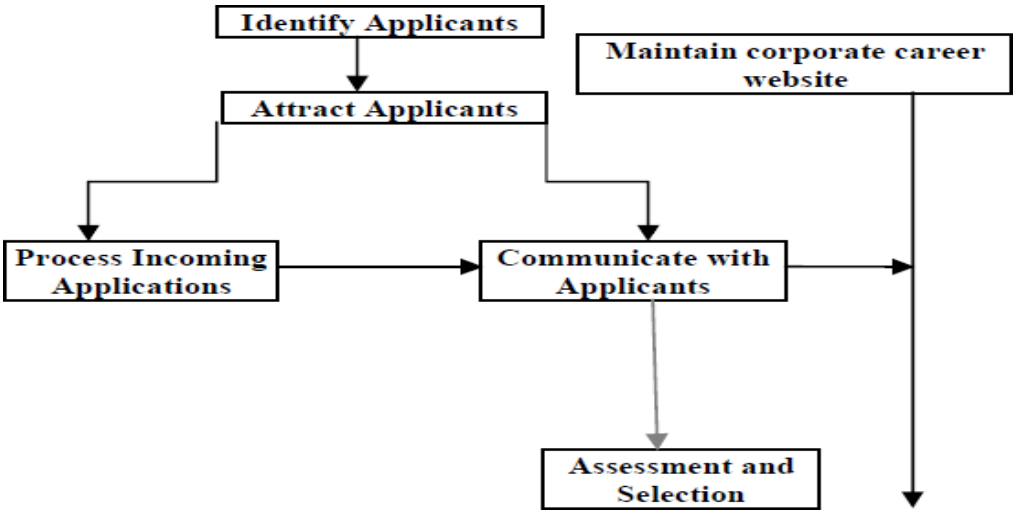

Figure 3: E-Recruitment Process [16]

Comparison of methods for different types of e-recruitment

Name of paper	Publication	Methods	Merits	Demerits
Recruitment Process Outsourcing: A new type of service provider by Amita Betgerikar	Dublin Business School in partial for the degree of Masters of Business Administration	Human resource outsourcing (HRO) discussed by Sheehan, Holland and Nelson in 2002 And Recruitment process outsourcing (RPO) by Whelan and Carcary in 2011	Save costs, Looking for better services, Strategic concerns	Pitfalls are – Validity , Practicality, Cost, Acceptability And Legality.
Development of a Job Web Portal to Improve Education Quality by Marjan Mansourvar and Norizan Binti Mohd Yasin	International Journal of Computer Theory and Engineering, Vol. 6, No. 1, February 2014	Job Procurement: Old and New Ways By Galanaki	It provides ways to look for jobs through personal contacts, direct calls to employers, job agency office.	These methods are tooslow, stressful, Challenging and also lack quality.
Development of web portal to capture industry needs By Marjan Mansourvar	Faculty of computer science and IT university of Malaya kualalumpur march 2011	Knowledge Management System (KMS) and Decision Support Systems (DSS)	Sophisticated analytical tools, user-friendly that support semi structured and unstructured decision making	Limited services Seems complicated for first-time login users , Cluttered information
Job Search study by Anne E. Green, Maria de Hoyos, Yuxin Li and David Owen	Department for Work and Pensions, Commercial Support and Knowledge Management Team	Economic job-search it addresses a selective aspect of the job-search process.	Searching, screening, extracting and reporting.	Time pressures, targets and other work constraints

Table 1: Comparison

III. Observation and Discussion DATA MINING TECHNIQUES

I. EDUCATIONAL DATA MINING

Education is an essential element for the betterment andprogress of a country. It enables the people of a country civilized and well mannered. Educational Data Mining is an emerging discipline concerned with developing methods for exploring the unique types of data that come from educational database. Mining in educational environment is called Educational Data Mining, concern with developing new methods to discover knowledge from educational databases. Lack of deep and enough knowledge in higher educational system may prevent system management to achieve quality objectives, data mining methodology can help bridging this knowledge gaps in higher education system.[16]

II. DATA MINING DEFINITION & TECHNIQUES

Data mining, also popularly known as Knowledge Discovery in Database, refers to extracting or “mining" knowledge from large amounts of data. Data mining techniques are used to operate on large volumes of data to discover hidden patterns and relationships helpful in decision making.

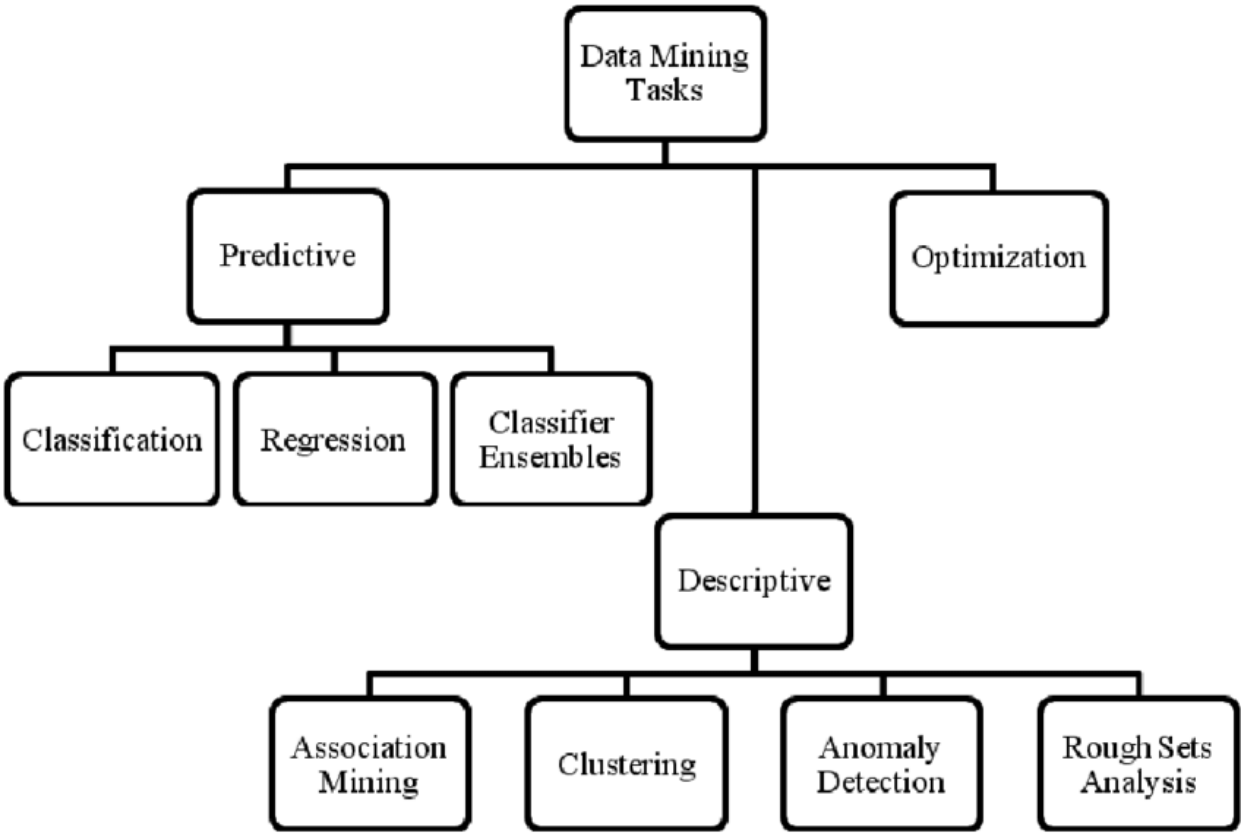

Figure 4: Data mining Techquines [6]

A. Classification

Classification is the most commonly applied data mining technique, which employs a set of pre-classified attributes to develop a model that can classify the population of records at large. The data classification process involves learning and classification .In learning the training data are analyzed by classification

algorithm. In classification test data are used to estimate the accuracy of the classification rules. The Classification methods used for the comparative study are discussed in brief.

1) Bayesian Network

Bayesian Classifiers are statistical classifiers which predict class membership probabilities. The probability that a given tuple belongs to a particular class is obtained using this. [7][8]. It is a graphical model that encodes probabilistic relationships among variables of interest.[9][10]

2) Navive Bayes

Naive Bayesian classifiers [11] can handle any number of variables, regardless of whether they are qualitative or quantitative. The algorithm works on the assumption, that variables provided to the classifier are independent. Instead of being presented with a multi-dimensional task, the algorithm has to compute only a set of one-dimensional tasks. Furthermore, the regions near decision boundaries do not seem to be greatly affected by doing this, thus leaving the classification task unaffected.

3) Multilayer Perceptron

Multilayer Perceptron (MLP) is a feed forward artificial neural network model that maps sets of input data onto a set of appropriate output. An MLP consists of multiple layers of nodes in a directed graph, with each layer fully connected to the next one. Their current output depends only on the current input instance. It trains using back propagation [8][9][12][13].

4) IB1

IB1 is nearest neighbour classifier. It uses normalized Euclidean distance to find the training instance closest to the given test instance, and predicts the same class as this training instance. If several instances have the smallest distance to the test instance, the first one obtained is used. Nearest neighbor method is one of the effortless and uncomplicated classification algorithms, and has been effectively applied to a broad range of problems [14].

5) Decision Table

Decision tables are classification models induced by machine learning algorithms and are used for making predictions. A decision table consists of a hierarchical table in which each entry in a higher level table gets broken down by the values of a pair of additional attributes to form another table. The structure is similar to dimensional stacking [8][15].

IV. RESULTS

Effectiveness of E-Recruitment

Parameters	E – Recruitment			Effectiveness (verbal Interpretation)
	Agree	Disagree	Mean	
Preference	32.50 %	17.50%	3.30	Moderately Effective
Use of Social Media	50%	22.50%	3.23	Moderately Effective
Quality of Resumes	47.50 %	15.00%	3.45	Moderately Effective
Speed of Recruitment	80.00 %	2.50%	4.38	Effective
Quantity of Resumes	72.50 %	12.50%	4.00	Effective
Reduction of Cost	67.50 %	12.50%	4.03	Effective
Organizational Success Rate	62.50 %	32.50%	3.90	Effective

Time Saving	85.00%	5.00%	4.33	Effective
Accessibility	82.50%	7.50%	4.28	Effective
Overall Effectiveness	57.50%	15.00%	3.60	Effective
Overall Mean			**3.85**	Effective

Table 2: Overall Effect [16]

Figure 5: Effectiveness of E-Recruitment [16]

V. FUTURE SCOPE

In terms of enhancement of the software, it is strongly recommended that an online exam be incorporated in the recruitment. Extra security features such as the level of access classified according to the position in the company also be incorporated in the software.[5]

VI. CONCLUSION

The developers challenged various issues to develop a system for responding some problems that job seekers and companies are facing today. The main aim of this work is to develop a web portal, which caters for various types of users and is easy to use. It would become a significant contributor to quality hire. It is also concluded that Performance, Reliability, Security, and Cost-effectiveness could be utilized as criteria in evaluating online recruitment software. It is concluded that the developed software was effective in selecting qualified applicants within a shorter period of [5].

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