

DEVELOPMENT OF DECISION SUPPORT SYSTEM FOR USING ADAPTIVE NEURO FUZZY INFERENCE SYSTEM

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Abstract: The data mining is used with employee selection for the algorithm of Fuzzy c-means, Support vector machine. As the great growth of industrial side, many company are seeking for more and more employee, not only an ordinary and less-skilled employee, but to get well trained and fit best at their work easier without missing an opportunity to get a best employee. Also the objective of this study is to develop a decision making and evaluating system for employee recruitment using fuzzy analytic. The system will firstly, calculate the weight of pair wise comparison generated by administrator. Then, system will retrieve all data about the applicant. Every person has its own record in respective curriculum vitae. The system will retrieve only important data such as age, gender, education, work, experience, and desired salary. Then system will retrieve the condition of desired employee from human resource development department. Every single data on all participant is calculated as a number and the system will compare it with fuzzy analytical process (later on will abbreviated as APH) weight calculated from pair matrix and show a result. The result shows a form of rank, which shows the fittest applicant to the available job vacancy.

Keywords: Fuzzy C-Means Algorithm, Neuro-Fuzzy Classifier, Support Vector Machines, Classifications

I. INTRODUCTION

Data mining software is an analytical tool for gathering the information. Data mining is the process of step by step analyzing of data perspectives and summarizing that information which can be used to increase revenue, cuts cost, or both. It is called as historical data. It allows users to analyze the data from many different dimensions, categorize it, and summarize the relationships identified. Data mining is the process of finding correlations or discovering interesting patterns among data from various applications. Data mining (the analysis step of the "Knowledge Discovery in Databases" process or KDD) is an interdisciplinary subfield of computer science and the computational process of discovering patterns in huge data sets involving methods at the intersection of using data mining, artificial intelligence, machine learning statistics, and database systems.

The overall goal of the data mining process is to extract data from a data set and transform it into an understandable structure for use. The term is a misnomer, because the aim is the extraction of patterns and knowledge from large amount of data, not the extraction of data itself. It also is a buzzword, and is uniquely also applied to any form of huge scale data or information processing (collection, extraction, warehousing, analysis, and statistics) as well as any application of computer decision making support system also including artificial intelligence, machine learning, and business intelligence. The famous book "Data mining: machine learning tools and techniques with java" (which covers mostly machine learning material) was originally to be named just practical, and the term "data mining" was only added for marketing reasons [1]. Since the 1960's database and information technology has evolved systematically from primitive file processing systems to

sophisticated and powerful database system. The research and development in database system since the 1970's progressed from early hierarchical and network database system to relational database systems data modeling tools, data and indexing and accessing methods. In addition, users gained convenient and flexible data access

II. LITERATURE REVIEW

Yousuf Amre (2018) [1] The initial step requires segregation of the submitted resumes. Short listing resumes requires a panel of HR managers and field experts of the particular job field which check for the particular skills of individuals to select or score them by collective decision of group. Abdullah (2018) [2] The role in educating children is not performed as well as possible. V. D. Samaila (2018) [3] Employing the right person for the right job is very important in any organization. H Irmayanti (2018) [4] The research is intended to determine employees who suitable with company criteria. Waiel F. Abd El-Wahed (2018) [5] The implementation of artificial intelligence techniques to solve different problems of fuzzy multi-criteria decision making. The reasons behind this implementation are clarified. R. Dhanalakshmi (2018) [6] The traditional healthcare involves clinical diagnosis using doctor's expertise and knowledge. S. M. Akash (2018) [7] the proposed model was quite capable to solve decision problems associated with product selection in starting up business. Nguyen Anh Tuan (2017) [8] Proposes an extension of fuzzy multi criteria decision making (MCDM) method for supposing the personnel selection and evaluation process. Mikhail Leizerovich Krichesky (2017) [9] The importance of the characteristics of a candidate for the position was defined using the data mining technique. T. A. Thakre (2017) [10] Proposed fuzzy expert system on the basis of multi inputs as required by the institution.

III. CLUSTERING BASED ON EMPLOYEE SELECTION

3.1 Fuzzy C-Means Algorithm: Performance appraisal system is used by the most of the institutions and organizations to evaluate the employer performance. The performance is very important to the job as well as management, which usually involves crisp and uncertain values to evaluate performance. Evaluate seeker performance on the basis of different factors. Evaluation of the overall performance of an employee is very necessary for hardwork, development of institution and betterment of the society.

3.2 Support Vector Machines Algorithm: This set of notes presents the Support Vector Machine (SVM) learning algorithm. SVMs are among the best (and many believe are indeed the best) “off-the-shelf” supervised learning algorithms. To tell the SVM story, we’ll need to first talk about margins and the idea of separating data with a large “gap.” Next, it talk about the optimal margin classifier, which will lead us into a digression on Lagrange duality.

3.3 Neuro-Fuzzy Classifier Algorithm: Fuzzy classifier is the task of partitioning a feature space into fuzzy classes. A learn-by-example mechanism is desirable to automate the construction process of a fuzzy classifier. In this paper we introduce a method of employing adaptive networks to solve a fuzzy.

3.4 Neural Network Algorithm: The objective of this work is to develop RFMLP-NN scheduler (Peters et. al., 2000). To accomplish this, learning task for ANN needs to be identified. The central issue of this investigation is that optimal solutions to scheduling problem have common features which can be implicitly captured by Machine Learning tool like ANN.

The second issue is that learned function i.e., ANN can be utilized to generate good solutions to new problems. The third issue concentrates in handling inherent uncertainty and impreciseness involved in scheduling problems which is taken care of by Rough and Fuzzy Sets. To generate learning or knowledge base GA are chosen for producing optimal solutions as they have proved to be successful in empirical scheduling research. Scheduling can be understood as decision making process (Tuban et. al., 2001), where decision is selection of next operation to add to a partial schedule from among set of competing operations with objective of minimizing chosen performance measure.

A complete schedule is thus consequence of repeated decisions to select best operation. Thus, in an optimal solution every individually scheduled operation of job is treated as decision which contains knowledge. Each decision is modeled as function of set of job characteristics such as processing time, machine load, which are divided into classes using domain knowledge from common dispatching rules like shortest processing time. The job of RFMLP-NN is then to capture predictive knowledge regarding assignment of operation’s position in the sequence. A schematic illustration of entire

of comparison is using with clustering algorithm to compared to NFC, FCM NN, SVM.

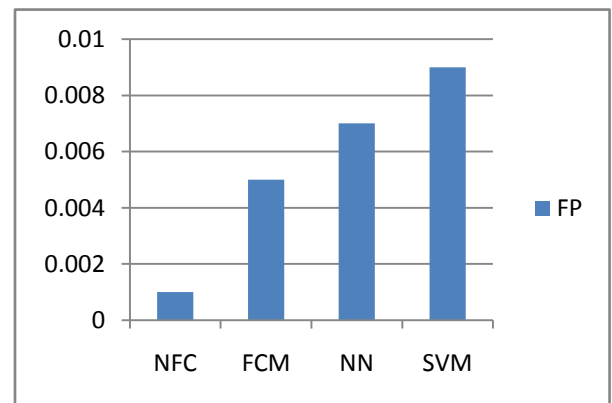


Fig.3.1. Average of comparison

Fig. 3.2 Accuracy of comparison is using with clustering algorithm in to given the overall percentage

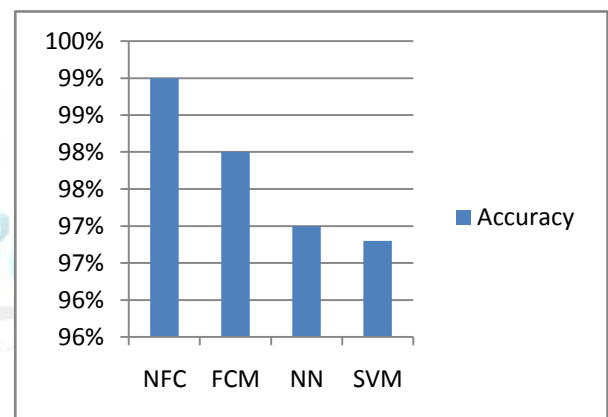


Fig. 3.2 Accuracy of comparison

IV. EXPERIMENTAL RESULT AND DISCUSSIONS

KNIME : An Analytics Platform is the open source software for creating data science. Intuitive, open, and continuously integrating new developments, KNIME makes understanding data and designing data science workflows and reusable components accessible to everyone.

This has already been done by universities, commercial vendors as well as by a growing user community2 contributing several plug- The official KNIME website also offers several plug-ins that enhance the standard KNIME distribution e.g. for statistical analysis with R3 or extended machine learning capabilities from Weka Table 4.1 categories of interviews in based on companies.

Table 4.1 categories of interviews

Criteria	Criteria mean score	Sub-criteria	Sub-criteria mean score
Human skills and Qualifications	45	Communication skills	22
		Creativity and originality perspective	25
		Leadership skills and team spirit	23
		Motivational capability	30
		TOTAL	100
General skills	35	Qualification	28
		Work Experience	22
		Knowledge in technical and post related affair	25
		Organizational knowledge	25
		TOTAL	100
Personnel Information	20	Age	24
		Financial Background	26
		Intelligence and extroversion	23
		Learning ability	27
TOTAL	100	TOTAL	100

employees. The data set was composed of employee records of 250 staff members of the company extracted from the total number of staff records that was 3236. A period of 8 years extracts the records from 1st of September 2010 to 30th June 2018. The following variables (shown in table 2) were chosen from the employee records for building the required and targeted features.5.

Table 5.1 categories of skill

S.NO	ATTRIBUTES	DESCRIPTION
1	Background/ Demographic	Age, Name, Address, Gender, Year of service, Year of Promotion 1, Year of Promotion 2, Year of Promotion 3
2	Previous performance evaluation	Performance evaluation for 8 years
3	Knowledge and skill	Professional qualification (Teaching, supervising, research, publication and conferences)
4	Management skill	company obligation and administrative tasks
5	Individual Quality	Training, award and appreciation

4.1 FUZZY C MEANS USING KNIME TOOL

FCM_S, FCM_S1 and FCM_S2 Algorithms:

Step1: The number c of these prototypes or clusters ranges from 2 to c_{max} , fix a certain value c and then select initial class prototypes and set $\varepsilon > 0$ to a very small value.

Step2: For FCM_S1 and FCM_S2 only, compute the mean or median filtered image.

Step3: Update the partition matrix using (2) (FCM_S) or (5) (FCM_S1 and FCM_S2).

Step4: Update the prototypes using (3) (FCM_S) or (6) (FCM_S1 and FCM_S2).

Repeat Steps3–4 until the following termination criterion is satisfied

4.2 SUPPORT VECTOR MACHINES USING KNIME

Support vector machine is a validation combined with parameter optimization the data is split into five subset. The prediction of each subset is done by using an SVM model built on the other four. The sigma parameter for the SVM learner is varied and controlled by a flow variables the values of the flow variables for each iteration. The parameter optimization loop end node collect the result and output the values for the optimized parameter yielding maximization accuracy as an objective function.

V.RESULT AND ANALYSIS

There are a number challenges in employee selection are giving wonderful accurate result of the selection In the popular company Techno IT Solution, the data used for this research work was collected from the personnel records of

Table 5.1 Accuracy of Error

Strategy	Error (%)	# rules	Total Rule Length
All dataset for train/test	0	91	364
10-fold cross validation	36.848	83.8	335.2
5-fold cross validation	40.168	78	312

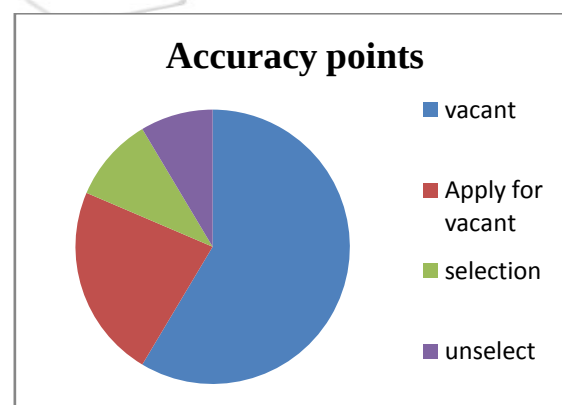


Fig. 4.3 Accuracy points

Table 5.2 Quality Range

Cluster	Range	Percentage (8 years)
Very Good	Quality $\geq$ 9.5	20.15%
Good	9.0 $\leq$ Quality $<$ 8.5	28.56%
Average	8.0 $\leq$ Quality $<$ 6.0	39.77%
Below Average	6.0 $\leq$ Quality $<$ 4.0	15.75%
Poor	Quality $<$ 2.0	9%

The initial values before clustering demonstrates figure 5.2 shows the 5 cluster like Very Good, Good, Average, Below Average and Poor based on their performance throughout 8 years.

VI. CONCLUSION

Today's highly competitive manufacturing organizations and IT companies; it is utmost necessary to have the right and appropriate person at every job position. The middle management level position of a many IT department, as considered for selection is far more critical and the incumbent is solely responsible for efficient functioning of the department. Therefore, it is necessary that the selection procedure for the said post is carried out by some competent authority while adopting a scientific and systematic procedure. The job nature of this post demands for techno-commercial and managerial competencies in the prospective candidate. Concomitantly, The personnel alternatives are evaluated with respect to a set of 18 different skills and attitudes by the selection committee. the development of selection and restructuring models presented in have applied competence management. The main idea of this approach is to obtain a perfect match between the employee and the job. human attributes, both objective and subjective, more extensive and complex. in decision-making process fully justifies the used fuzzy techniques.

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