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Universitas Bandar Lampung
20 - 21, June 2012
Lampung, Indonesia

PREFACE

The activities of the International Conference is in line and very appropriate with the vision and mission of the UBL to promote training and education as well as research in these areas.

On behave of the First International Conference of Engineering and Technology Development (ICETD 2012) organizing committee; we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 45 technical papers were received for this conference

The participants of conference come from many well known universities, among others: Universitas Bandar Lampung, International Islamic University Malaysia, University Malaysia Trengganu, Nanyang Technological University, Curtin University of Technology Australia, University Putra Malaysia, Jamal Mohamed College India, ITB, Mercu Buana University, National University Malaysia, Surya Institute Jakarta, Diponogoro University, Unila, Universitas Malahayati, University Pelita Harapan, STIMIK Kristen Newmann, BPPT Lampung, Nurtanio University Bandung, STIMIK Tarakanita, University Sultan Ageng Tirtayasa, and Pelita Bangsa.

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also welcome to all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers which contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector which give us endless support to these activities, such that the conference can be administrated on time.

Bandar Lampung, 20 Juni 2012

Mustofa Usman, Ph.D
ICETD Chairman

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UNIVERSITAS BANDAR LAMPUNG
Bandar Lampung,Indonesia
June, 20-21 2012

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Decision Support System for Determination of Employees Using Fuzzy Decision Tree

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Abstract— **Employees as a source of performance measures of a company, become an important component for well-managed existence. Employees with good title, it should get an award from the company. Companies also need to properly oversee the performance of employees, to be known and chosen, a good employee for later promoted to a higher level and supervisory employees who need to get the job to be improved or even employees who can no longer to be retained to work in a company.**

DecisionTreemethodinthis studyare integratedwith thefuzzyalgorithmtobe able tochoose theemployee at a time. Many companies areimplementingthe determination ofemployee at a time in every monthoreven in every week, tobe able tolift theperformance ofthe employeetocontinue the better work orat leasttobe able tocontinue to defend his performance.

Fuzzyalgorithmwill laterperform a discretecalculationson the valuesthat appearvagueonthatassessmentappearson theemployeeside. DecisionTreemethodwillprovidea solutionthatdecisionsabout employeescan be expressedasemployee at a time based on data obtainedat one time.

The nextdecisionis still heldby the companytobe able todetermine thedecisionsofsome of the solutionsproducedby themethod oftheDecisionTree

Keywords— **decision support systems, determination of employees, decision tree, fuzzy algorithm**

I. INTRODUCTION

Today the development of information technology has grown so rapidly. The rapid development of technology not only hardware and software, but also developing computational methods. One of the computational methods developed enough at this time is the method of Decision Systems (Decision Support System). In information technology, decision support system is an interactive computer information system that can be used by decision makers to get the best of several alternative decision-making.

Decision support system is an interactive computer information system that can be used by decision makers to get the best of several alternative decision-making and this system gives the end result is precise and accurate because it is based on qualitative data that have been processed using quantitative methods. Currently the use of decision support systems is very important is the STMIK PPKIA TarakanitaRahmawatiTarakan, which is to determine the Employee example where employees have a very large role in supporting the success and improvement of the quality of Higher Education in STMIK PPKIA TarakanRahmawatiTarakan.

The reason triggering this study in STMIK PPKIA TarakanitaRahmawati, as an educational institution, sometimes complain about the work ethic of employees after seeing the extent to which they do not have the basic skills and behaviors necessary for success for their work. Employees absent from work without explanation, the clock was always in the presence of neglect, unwilling or lazy to do the tasks assigned to them, and do not take the initiative to look around and see what needs to be done without waiting for instructions from the leadership.

Scott Morton (Turban, 1998) in 1971 defines a Decision Support System (DSS) as an interactive computer-based system that helps, decision makers utilize data and models to solve unstructured problems. DSS sense proposed by Gory and Scott Morton, who is supported by Little in 1970 (Turban 1998) defines the DSS is a collection of models and procedures based on the procedures for processing data and judgments to assist a manager in decision making.

With this background the authors are keen to build a decision support system of determining employee of the month at STMIK PPKIA Tarakanita Rahmawati which later can lead and manage education in schools in an effort to improve the quality of education.

Other conditions that trigger the authors decided to build in this Decision Support System which will assist the leadership in terms of consideration of the objectivity of the selection of employees by an example, so that decision-making process could be done better, to be considered leaders to provide better confidence to the employees who have sufficient good performance and if there is a new promotion that the employee will likely be promoted because of the performance and competence held by the employee with respect to the sub criteria to be met by an employee so as to obtain quality human resources, and appropriate.

Decision tree is a classification and prediction methods are very powerful and famous. Decision tree method to change the fact that a very large decision tree is presented to the rule. Because the decision tree is also useful to explore data, find hidden relationships between a number of candidate criteria input by the target criteria, objective criteria are usually grouped with definite targets and decision tree models aim at

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calculating the probability of each record of these categories or to classify record with breaks in the one class.

Decision tree can also be used for various shooting needs keptusan including in this case is the determination of employee of the month at the College of Informatics and Computer Management (STMIK) PPKIA Tarakanita Rahmawati by looking at the behavior and performance are shared by all employees.

Data are expressed in the form of decision tree with the attribute tables and records, the attributes expressed in a parameter that is created as a criterion in the establishment of a tree in this example for the determination of employee or not examples of criteria to consider is the absence of attendance, cooperation with fellow employees, absent from work without a statement, have the initiative in the work without waiting for instructions from the head first, always keep track of work space, following the policy of the office, courtesy of all civitas School of Information Management and Computers (STMIK) PPKIA TarakanitaRahmawati, hardworking and always has an interest in diridan develop each of the attributes (criteria) has a value called the instance instanceinstance less absenteeism have good attendance, good and very good.

II. THE THEORY

2.1 Decision Tree

Known as decision tree or decision tree classification method is one that uses a representation of a tree structure that contains alternatives for solving a problem. The trees also show the criteria that affect the outcome of alternative decisions with estimates of the final results when making decisions tersebu. the role of decision tree is a decision support tool to assist in decision-making decion maker, as for the benefit of decion tree is to break down a complex decision-making process becomes more simple so that a decision maker decion would be to interpret the solution of the problem. concept of the decision tree is to change the data into a decision and the rules.

The concept of decision tree concept is to transform the data into a decision tree (decision tree) and decision rules.

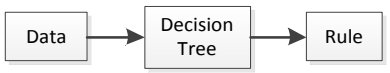

Fig 1. Decision Tree Structure

Decision tree is a tree-shaped structure flowchart (tree), where each internal node denotes a test attribute, each branch represents the test results, and leaf nodes represent classes or class distributions. line traced from the decision tree to the root node to a leaf node that holds the class prediction for example. decision tree classification rules (classification rule).

Decision tree using hierki structure for supervised learning. process of decion tree starting from root node to leaf node is done rekusif. where each branch represents a hastus conditions are met and at each end of the state tree of a class of data.

To obtain a rule (rules) on the decision tree can be created on each path from the root down to a leaf node. for each criterion separately on a path, then in logic and give the formula or rule conjungtion antecedet or in part if leaf node has a class prediction rule formulated for consequent on the then.

Iterative Dichotomicer Tree (ID3) is a decision tree learning algorithm (decision tree learning algorithm) is the most basic. algorithm performs a greedy search / comprehensive (greedy) at all possible decision trees.

One of the decision tree induction algorithm ID3 (Iterative Dichotomiser 3) which was developed by J. Ross Quinlan. Decision Tree consists of three parts, namely:

- **Root Node**, which is the topmost node of a tree
- **Internal Node**, is a form of bifurcation, there is only one input and at least two output
- **Leaf Node**, an end node, it only has one input and no output

Gain calculation process by using the following formula.

$$Gain\ (K, SB) = \text{Entropy(K)} - \sum_{\text{Value}\ (K)} \frac{|Sy|}{|S|}\ Entropy\ (Sy)$$

Description:
gain (K, SB) : atribut
S : Chamber or sample data for training
y : The possible values for attribute k
Value (k) : The set is likely to attribute k
Sy : The number of samples to the value of y
S : The whole number of data samples

Meanwhile, the calculation of entropy values can be seen there are similarities:

$$Entropi\ (S) = \sum_{i=j}^{n}\ pi * Log2\ pi$$

Description:
Entropy (S) : Space of datafor the training sample
Pi : The number of sample data for criteria

III. DESIGN APPROACH

The system development process begins by determining the domain for each attribute, the group data value of the new employee based on the average value of employee.

TABLE I
ASSESSMENTOF HARD WORKTODEVELOPANDSELF-INTEREST (PKK)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLE II
ASSESSMENTFORFOLLOWINGOFFICE POLICY
(PK)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLE III
ASSESSMENT OF ATTENDANCE
(PA)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLE IV
ASSESSMENT FOR OPERATE IN THE TEAM CAPABILITY
(PKS)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLE V
ASSESSMENT OF THE INITIATIVE AND PARTICIPATION TO WORK
(PI)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLE VI
ASSESSMENT OF ATTITUDE
(PSS)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

TABLEVIV
ASSESSMENTOFROOMTOKEEPCLEAN
(PM)

Parameter Ukuran	Bobot Nilai
Sangat Baik	70-100
Baik	41-69
Kurang	0-40

In Table 8 below contains data that is used as a sample in the study.

TABLE VII
PENGELOMPOKAN NILAI HISTORI/TRAINING KARYAWAN

No	Kerja Keras	Absensi	Kebijakan	Sopan	Kerja sama	Inisiatif	Menjaga	Jawaban
1	B	SB	SB	B	B	K	SB	Layak
2	K	K	K	SB	B	K	K	Tidak Layak
3	SB	B	B	K	SB	SB	K	Layak
4	B	B	B	SB	SB	K	B	Layak
5	K	B	SB	SB	SB	B	SB	Layak
6	K	K	K	SB	K	K	B	Tidak Layak
7	B	K	K	K	SB	K	K	Tidak Layak
8	B	B	SB	B	B	K	K	Layak
9	B	SB	K	B	B	B	K	Layak
10	K	SB	B	K	K	K	SB	Tidak Layak
11	SB	K	SB	SB	K	B	SB	Layak
12	SB	K	B	SB	B	B	K	Layak
13	K	K	K	B	K	SB	K	Tidak Layak
14	B	SB	K	B	SB	SB	SB	Layak
15	B	SB	B	K	B	SB	K	Layak
16	K	K	K	K	SB	B	K	Tidak Layak
17	SB	SB	SB	K	B	B	B	Layak
18	B	SB	SB	B	K	SB	B	Layak
19	SB	B	SB	B	K	B	K	Layak
20	K	B	SB	K	K	B	SB	Tidak Layak
21	SB	B	K	B	K	K	K	Tidak Layak

Entropy calculations that occur are as follows

Layak	13
Tidak Layak	8
Total	**21**
Entropi	0,959

Kerja Keras	**Layak**	**Tidak Layak**	**Total**	**Entropi**
Sangat Baik	5	1	6	0,650
Baik	7	1	8	0,544
Kurang	1	6	7	0,592
Gain	**0,37**			

Kebijakan	**Layak**	**Tidak Layak**	**Total**	**Entropi**
Sangat Baik	7	1	8	0,544
Baik	4	1	5	0,722
Kurang	2	6	8	0,811
Gain	**0,27**			

Attendance	Feasible	Unfeasible	Total	Entropi
Very Good	6	1	7	0,592
Good	5	2	7	0,863
Less	2	5	7	0,863
Gain	**0,19**			
Relationship	**Feasible**	**Unfeasible**	**Total**	**Entropi**
Very Good	4	2	6	0,918
Good	6	1	7	0,592
Less	3	5	8	0,954
Gain	**0,14**			
Initiative	**Feasible**	**Unfeasible**	**Total**	**Entropi**
Very Good	4	1	5	0,722
Good	6	2	8	0,811
Less	3	5	8	0,954
Gain	**0,11**			
courteous	**Feasible**	**Unfeasible**	**Total**	**Entropi**
Very Good	4	2	6	0,918
Good	6	2	8	0,811
Less	3	4	7	0,958
Gain	**0,06**			
Guard	**Feasible**	**Unfeasible**	**Total**	**Entropi**
Very Good	4	2	6	0,918
Good	3	1	4	0,811
Less	6	5	11	0,994
Gain	**0,27**			

Employee of the selection procedure with a decision tree method is an employee of the selection process using a decision tree method, a system flowchart as shown in Fig. 2.

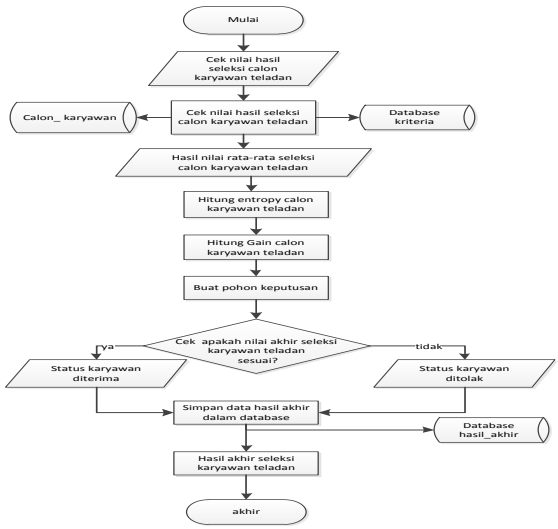

Fig 2. Flowchart of Application Design

Prospective employee of the table design is used to enter and store candidate data model, to more clearly the structure of this table is shown in Table IX.

TABLE IX
EMPLOYEE DATA

NIK	Name	Address	Date of birth	Religion
080001	Nedya Lestari	Jl. Yos Sudarso No. 8	20/05/1975	Khatolik
080002	Ulva Yaomil	Kampung Bugis No. 5	11/03/1980	Islam
080003	Hendra M	Selumit Pantai No. 9	02/12/1985	Islam
080004	Ekawati	Mess PT. Intraca	30/07/1980	Budha

The design criteria table serves to enter and store data assessment criteria against prospective employee of the month, to more clearly competency table structure is shown in Table X.

TABLE X
DATA CRITERIA

Period	Hard Worker	Policy	Attendance	Relationship
10/05/2012	Good	Very Good	Very Good	Good
Initiative	**Courteous**	**Guard**	**Result**	
Less	Good	Very Good	Feasible	

Design of the prospective gain value table is used to enter and store data gain value of each prospective employee of the month which can be shown in Table XI.

TABLE XI
GAIN VALUE

Periode	NIK	Total Entropi	Kerja Keras	Kebijakan
10/05/2012	080001	0,9587	0,375	0,375
Absensi	**Kerjasama**	**Inisiatif**	**Sopan Santun**	**Menjaga**
0,401	0,424	0,424	0,50	0,918

Input page (input) data is used to insert candidate personal data of each prospective employee of the month. At this potential there is a blank form field that serves to fill the data prospective employee of the month.

Prospective employee of the input data is contained in the master data input, the input data of candidates. After the successful candidates in the data store to the database by pressing the save button the user can edit the data then the necessary data. After the change of data can be stored again by pressing the save data. As for the delete, the procedure is not much different to change the data as shown in Fig. 3.

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Fig 3. Form Input Data

Input page (input) value of the criteria for each employee used to perform data input into the terms of the assessment criteria in employee selection model must be owned by every employee who has been assigned by decision makers. Employee assessment criteria on the form blank, there are decision tree computation process of each prospective employee of the month.

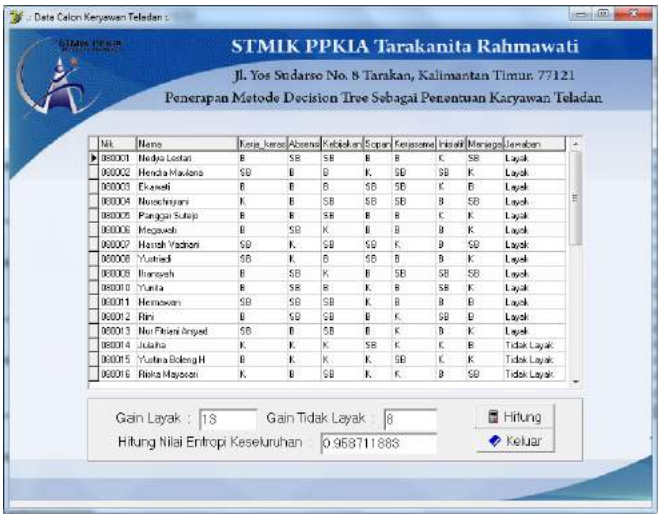

Fig 4. Form process entropy value

After each of the overall entropy value is unknown, it is the last step is to calculate the final value of employee selection selection model, where the final value is obtained from the total value of the overall entropy gain calculation is then performed for each employee to determine the value of the final determination or decision of employees in said to be feasible or employee of the bleak in Fig. 5.

Fig. 5. Form decision tree

Decision tree is one way that can be used to trace the main factors that most menonol is one way that can be used to trace the main factor of the most supportive of an activity. from the literature search and a simple test that we make to the algorithm are made using the election as an employee of the sample can be seen that this method of decision tree shows the most decisive factor.

IV. CONCLUSION

The benefits of tree decion method is effective in making decisions in determining the action to be taken by the decision maker. decision tree method can be used as a tool in the development of algorithms to solve the problem for decision tree model in determining the selection of employees, especially for input decisions can be relatively static.

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