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Multi User Feedback System Based On Performance and Appraisal Using Fuzzy Logic Base System- Design and Implementation

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ABSTRACT
        In Multi-user Feedback support system or 360^0 Feedback, data on the performance of an individual are collected systematically from a number of stakeholders and are used for improving performance. The 360^0Feedback approach provides a consistent management philosophy meeting the criterion outlined previously. The 360^0 feedback based appraisal is a comprehensive method where in the feedback about the employee comes from all the sources that come into contact with the employee on his/her job. The respondents for an employee can be her/his peers, managers, subordinates team members, customers, suppliers and vendors. Hence anyone who comes into contact with the employee, the 360^0 appraisal has four components that include self-appraisal, superior's appraisal, subordinate's appraisal student's appraisal and peer's appraisal.
        Keywords - Multi source feedback, 360^0 feedbacks, performance appraisal system, and fuzzy logic based decision support system for standards/rewards

I.INTRODUCTION

        In recent years multi-user feedback systems (MUFS) also known as **360^0 Appraisal** became very popular. When managing the human resources of an organization, appraising the performance of applicants for a particular position is central task it became popular as it has been felt for long years that one person's assessment of another individual cannot be free of biases. An operation in mobile robot is used. In this work, this approach is completed with more simulation and also theoretic results. Performance appraisal is a formal management system that provides for the evaluation of the quality of an individual's Performance in an organization [1]. Performance appraisals of Employees are necessary to understand each employee's abilities, competencies and relative merit and worth for the organization. Performance appraisal is a formal system to re-learn and evaluate the someone's performance. Educational assessment is the process of documenting, usually in measurable terms, knowledge, based on the criteria incorporated in the process of In view of this methodologies used are legion but lack of standardization Yields different outcomes assessment. Through student's assessment the institute can foresee the student progression and inform the students well in time in respect to areas that are not doing well and there is need to concentrate and workout the remedial coaching or training programmers.
        Various techniques or methods have been used by human resource management experts to evaluate the performance of an employee. Ranking Methods are the most popular type of performance appraisal. The ranking system refers to the performance appraisal model in which best-to-worst ranking methods are used to identify and separate the poor performers from the good performers. It continually motivates employees to better their performance since nobody would like to be included in the poor performance band. The purpose of assessment by allocating a score to employee's performance may be used for both development and salary or promotion purposes.

II. SIGNIFICANCE OF PERFORMANCE EVALUATION:

        Assessment helps in selection of future plan or course of action. At every juncture of completion of one course and going for higher course or thinking of going for Employment a student finds himself in the midst of dilemma, where he needs a kind of guidance or direction. Certification indicates the conforming that a student has reached a particular level of standard. This may be in the form of simple "pass" or "fail" (as the driving test) and if pass with what class or "competent" or „not yet competent" and if competent then to what degree of competency Assessment in these and similar circumstances certifies that a particular level of performance has been achieved. Assessment can be used for Learning that addresses to a very important purpose in early stage of career development in student's life. Assessment can stimulate learning in many different

ways-Prompting or otherwise motivating the students. Offering the students guidance so they can see how well they are achieving learning outcomes. Following the remedial practices based on the feedback to help students diagnose their strong areas for further enrichment and weak areas for improvement. Providing the information that helps student for future plan of action. Helping students and others concerned with their learning to track progress.

1.1 STUDENTS:

Student's perceptions about assessment and their approaches to learning are strongly interrelated. These Perception and Learning Approach can both be positive and/ or negative, however the study of Trigwell and Prosser [9] suggests that the deep approaches to learning are especially encouraged by assessment methods and teaching practices which aim at deep learning and conceptual understanding rather than by trying to discourage surface approaches to learning. Especially student's perceptions on the perceived difficulty, lower anxiety and complexity, and higher success expectancy have greater tendency towards the preference for objective type of Examination format. Students with both the good learning skills and with low test anxiety rates seem to favour the essay type Examinations, while students with poor learning skills and low test anxiety have unfavorable inclination towards long answer based assessment mode. From student's point of view, assessment has a positive effect on their learning and is 'fair' the assessment relates to authentic tasks, represents reasonable demands, encourages students to apply knowledge to realistic contexts, emphasizes the need to develop a range of skills, and perceived to have long- term benefits.

2.2. TEACHERS:

Performance evaluation of students can help a Teacher to review the effectiveness of all instructional and instrumental practices. If student regularly finds the assignments difficult, it might suggest to the Teacher that it is too much demanding and he needs to change the instructional methods, revise the competencies or help the student gains some relevant technical skills. Comments made by Examiners on various reports suggested that the candidate taking the examination needed to be exposed to the required content on the syllabus to prepare them for the examination. If this exposure was not provided to students, then it could be a contributory factor to the poor performance displayed by students. The students who are motivated can achieve higher mean scores than the students who left out unmotivated.

2.3. MANAGEMENT:

Management body and Students form the main pillars of Educational Institute while Teacher stands in between. Practicing performance evaluation time and again has two fold benefits. On one hand students will know their progress and on the other hand the Management can see as a whole the system doing well which definitely helps in pursuing the Institutional academic development and Teacher's contribution in the overall process of Education.

III. DIFFERENT WAYS OF PERFORMANCE EVALUATION

Different scaling patterns are adopted by Academic Institutes as a Performance-Average Percentage and 10 point GPA (Grade Point Average) system are the two patterns popularly employed in majority of Institutes In first case an average percentage of score of marks are Computed and reported as a Performance Index. The scaling pattern followed could be as shown in Table-1.

Table 1: Scaling Pattern of Average Percentage

Average Percentage (AP)	Performance Index (PI)
AP ≥ 80 %	Excellent
80 % > AP ≥ 60 %	First Division
60 % > AP ≥ 50 %	Second Division
50 % > AP ≥ 40 %	Third Division
AP < 40 %	Fail

3.1 EDUCATIONAL PERSPECTIVE

In today's competitive world, it is very important to select appropriate career in order to achieve success by utilizing ones' capabilities and intelligence. The originator of the theory of multiple intelligences, Howard Gardner, defines intelligence as potential ability to process certain sort of Information [6]. All types of intelligence play an important role in overall growth of human Capabilities. It has been proven that specific types of intelligence such as logical, verbal, Interpersonal, kinesthetic etc. are essential to have satisfactory level of success in the field of science and technology, management, sports, etc. [7].

The field of education and technology has contributed numerous research projects by implementing Theory of MI for the last few decades, some of them are as International educational online learning programs for students as well as teachers. Curriculum planning, parents' interaction, etc. Research based on school students of different ages with IQ tests to identify their skills. Adult developmental programs. Employees' developmental programs. New AI approach for students' academic performance using fuzzy rule generation.
The research project "EDUCE", implemented as a predictive system using MI. Application of the Theory of Multiple Intelligences to Digital Systems

Teaching. Learning style improvement using information technology, and many more.

IV. DESIGN METHODOLOGY

Performance appraisal helps measure the productivity of the employee and assesses the quality of work delivered by him. Performance appraisal also seeks to determine whether an employee is able to blend with the organizational culture while introducing values that would promote the cause of the company. It's evident that the results of a performance appraisal hinge on both qualitative and quantitative factors [8].Performance appraisal also seeks to determine whether an employee is able to blend with the organizational culture while introducing values that would promote the cause of the company. It's evident that the results of a performance appraisal hinge on both qualitative and quantitative factors [8].After reviewing evaluation criteria of various many companies and institute performance appraisal reports of different organizations evaluation parameters shown in Table 2 have been considered:

Table 2: Employee Evaluation Parameters

Personality	Communication skills
Attendance	Cooperative
Punctuality	Qualifications
Initiative	Work Experience
Self control	Job Knowledge
Responsibility	Leadership
Quality of Interpersonal Relationships	Innovativeness
Quality of work	Accomplishments
Attitude	Effectiveness
Commitment	Result-Oriented

4.1 EVALUATION CRITERIA IN PERFORMANCE APPRAISAL

One of the steps in designing an appraisal programme is to determine the evaluation criteria related to the job.

4.1.1 Behaviour

Rating employees according to job behaviours is based on the assumption that there are effective and ineffective behaviours and that these have been identified for each job or type of job. Evaluating employees along behavioural dimensions it is especially important for employee development purposes.

4.1.2 Standards

The performance standards are expressions of the performance threshold(s), requirement(s), or expectation(s) that must be met for each element at a particular level of performance.

➢ QUALITY, addresses how well the employee or work unit is expected to perform the work and/or the accuracy or effectiveness of the final product. Measures can include error rates (such as the number or percentage of errors allowable per unit of work) and customer satisfaction rates (determined through a customer survey/feedback).

➢ TIMELINESS addresses how quickly, when, or by what date the employee or work unit is expected to produce the work.

➢ COST-EFFECTIVENESS addresses cost savings or cost control. These should address cost-effectiveness on specific resource levels (money, personnel, or time) that can generally be documented and measured.
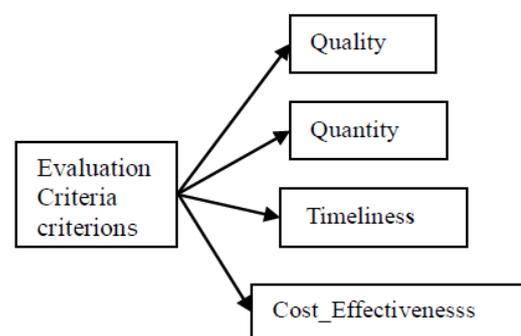

Fig: 1. Evaluation Criteria

4.1.3 Time period

Performance can be appraised
• After each project is completed
• After a milestone is reached
• Quarterly
• Semi-Annually
• Annually

Many employers use rating committees to evaluate employees. These committees rate the employees based on the set criterions.

4.1.4 Raters

When appraisal is made by superiors, peers, subordinates and clients it is called 360- degree system of appraisal.
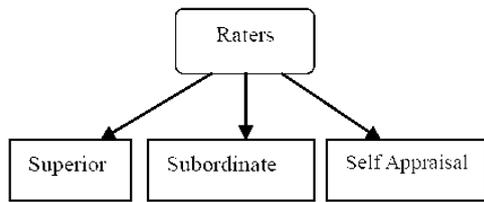
Fig 2.Apprial Supervisor Raters

V. BASIC ALGORITHM OF FUZZY CLASSIFIER SYSTEM

The basic algorithm of our fuzzy classifier system in our previous work [11] can be written as follows.

Step 1: Randomly generate an initial population of fuzzy if–then rules.

Step 2: Evaluate each fuzzy if–then rule in the current population.

Step 3: Generate new fuzzy if–then rules by genetic operations.

Step 4: Replace a part of the current population with the newly generated rules.

Step 5: Terminate the algorithm if a stopping condition is satisfied, otherwise return to Step 2.

5.1. Generating an Initial Population

Because the consequent class and the certainty grade of each fuzzy if–then rule can be easily determined by the heuristic procedure in Section II, only its antecedent fuzzy sets are handled by genetic operations in our fuzzy classifier system. When we use the five linguistic values in Fig. 3 and "*don't care*" as antecedent fuzzy sets, they are denoted by the following six symbols (i.e., 1, 2, 3, 4, 5, and #) in our fuzzy classifier system:

$$
\begin{aligned}
\text{S: } small &\rightarrow 1 \\
\text{MS: } medium\ small &\rightarrow 2 \\
\text{M: } medium &\rightarrow 3 \\
\text{ML: } medium\ large &\rightarrow 4 \\
\text{L: } large &\rightarrow 5 \\
don't\ care &\rightarrow \#.
\end{aligned}
$$

Fig.3. Symbols for Fuzzy Classifier

5.1.2 Evaluating Each Fuzzy If–Then Rule

The fitness value of each fuzzy if–then rule is evaluated by classifying all the given training patterns using the set of N_{pop} fuzzy if–then rules in the current population. The fitness value of the fuzzy if–then rule R_j is evaluated by the following fitness function

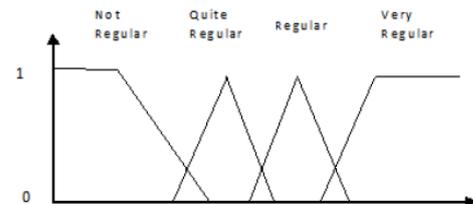$$fitness(R_j) = W_{\text{NCP}} \cdot NCP(R_j) - W_{\text{NMP}} \cdot NMP(R_j)$$

Where $NCP(R_j)$ is the number of correctly classified training patterns by R_j, W_{NCP} is the reward for the correct classification, $NMP(R_j)$ is the number of misclassified training patterns by R_j, and W_{NMP} is the penalty for the misclassification.
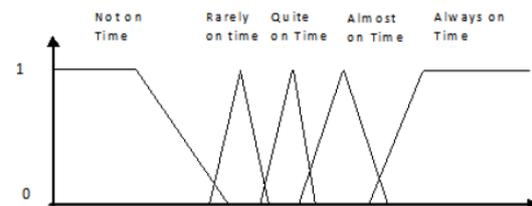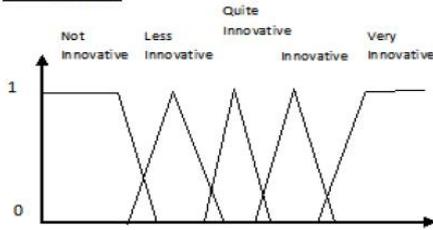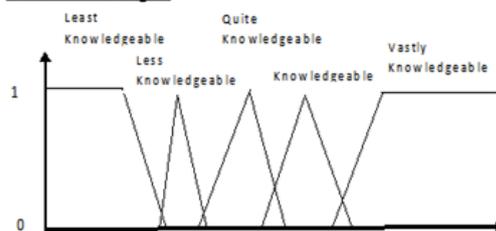
5.1.3. Generating the Wave Graph
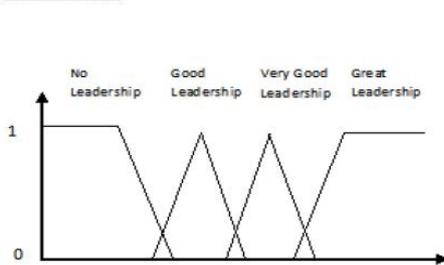
Personality:
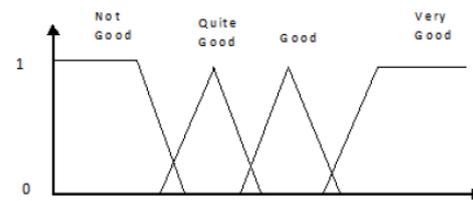
Attendance:

Punctuality:

Innovation:
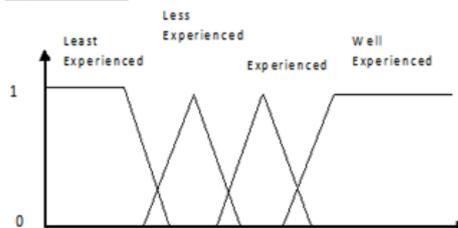
Leadership:

Result-Oriented:

Accomplishments:

Communication Skills:

Job Knowledge:

Experience:
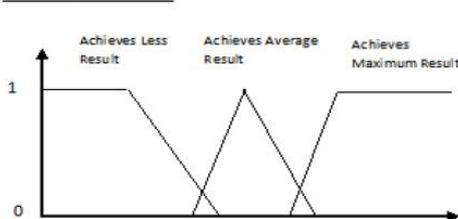
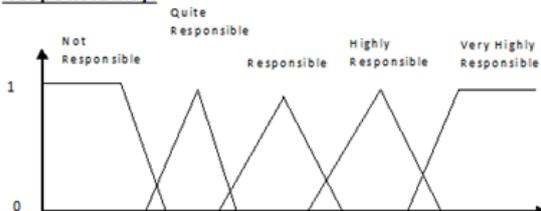**Effectiveness:**
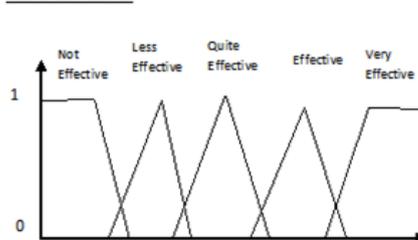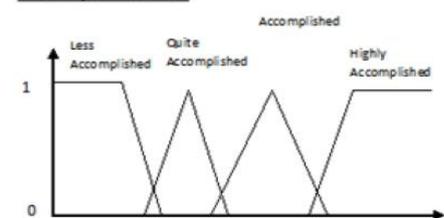
Initiative:
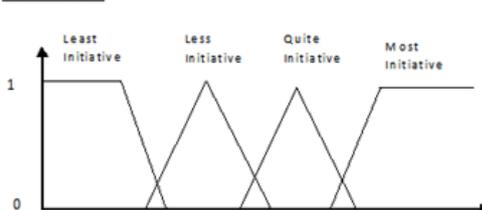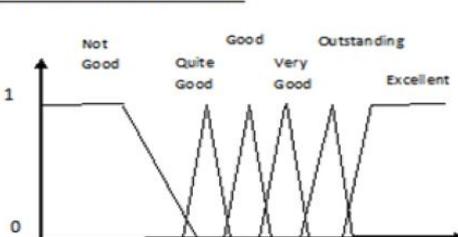
Cooperative:
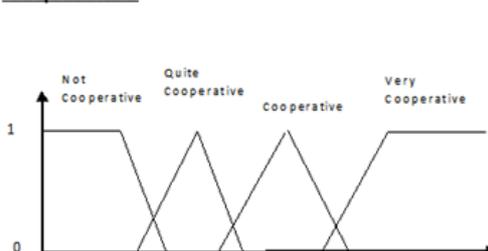
Responsibility:
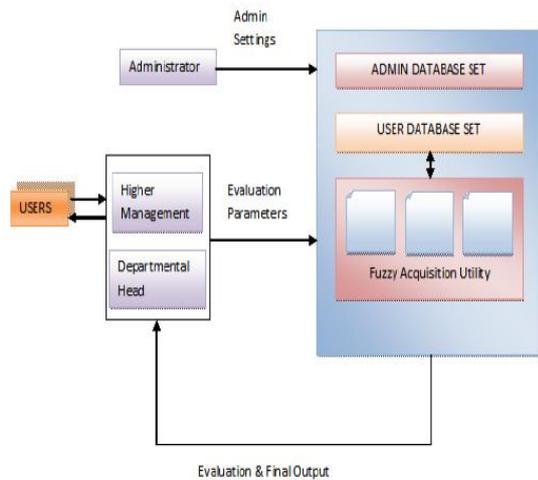
B. System Architecture

Fig.4 System Architecture for Performance Appraisal using Fuzzy Evaluation Methodology

VI. Result and Analysis

For good performance of the system, the design of fuzzy membership function is very important. Here, Performance System is used for implementation of fuzzy inference mechanism. This is the Graphical Representation of Chart for feedback given by student as well as feedback from 360^0 degree which include self, peer, H.O.D.and Principle of the Organization. On this bases we can find out the which faculty is going to have the appraisal for the current year and which faculty is having lankness in the work and which can be overcome by the employee's of the organisation for further improvement of the works.

Graphical Representation
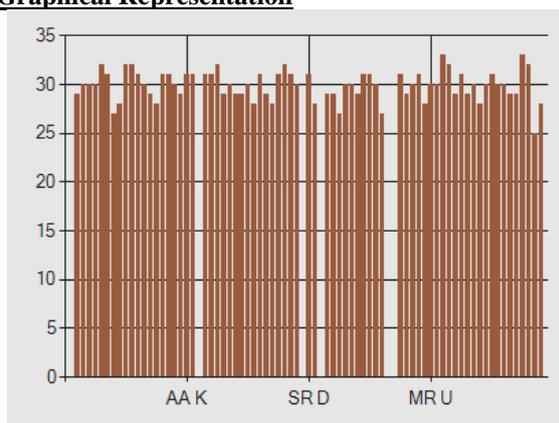
Questioners from student and percentage wise result

1	Engage lectures regularly & on time	96	94	93	99	94
2	Overall appearence & personality of faculty	91	90	92	97	90
3	Communication skill of faculty	91	90	89	97	89
4	Ability of facultyfacultyfaculty to explain particular concept	93	89	89	97	89
5	Use of supplementary teaching methods like providing printed notes, references etc	90	83	88	96	88
6	Readiness to solve the student difficulties	93	89	91	96	92
7	Particularity in conducting tests, giving assignments	90	91	85	94	88
8	Availability of lecturer during college working hours	95	95	92	97	93
9	Use of black board & transparencies while teaching	95	93	94	98	91
10	Relationship with students	88	87	90	97	88
	TOTAL(%)	92.2	90.1	90.3	96.8	90.2

VII. Conclusion and Future Work

The presented application is an intelligent system design to identify students' different skills in education domain. It offers many advantages such as handling imprecision. The framework of system is generalized which can be mapped into different types of applications which reduces efforts for creation and documentation of knowledge. The architecture of evolving rule based model using genetic-fuzzy approach can also be applied to various domains like advisory systems, decision support systems.

The use of fuzzy logic in performance appraisal allows inputting evaluation parameters in the form of linguistic variables that do not have sharp distinction like black or white but have colors of spectrum. Thus fuzzy logic based performance appraisal allows the decision maker to introduce vagueness, uncertainty, and subjectivity into the evaluation system, which models human like decision making approach.

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