



Performance of Modeling Selection Student Evaluation using Fuzzy Logic System

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Abstract

In an educational institution, various students' criteria contributed to the main reason the student is nominated as a model student. This includes cumulative grade point average (CGPA) of academic courses taken, co-curriculum involvement, soft skills, hard work, leadership, attitude, time management, attendance, attire, and technical skill in order to make the selection decision. Fuzzy Logic in order to carry out the model student selection process based on the aforementioned selection criteria of the students. Application of fuzzy logic has been gradually accepted as a decision-making tool in evaluation and performance of the academic institutions or institute of higher learning (e.g., universities). In this paper performance evolution student details for using fuzzy logic we are purposed modification of fuzzy logic (ANN Method). In this method we acquire in student data base which student have merit student with less time.

Key Words:Fuzzy logic, attendance monitoring.

1. Introduction

The importance of students doing well in all sectors of their institutes has caught the attention of parents, legislators, and government education departments since career competition growing fiercer every day. Student assessment is the process of documenting, usually in measurable terms, knowledge, and/or based on the criteria incorporated.

The assessment is formally defined as a measure of skills, attitudes, and belief. Among the numerous student body, the model student is identified as the best student among them according to certain selection criteria. For a student who performs very well in the aspects that the school or college stressed about; awarding this student is important for morale and motivation. However, the selection criteria that school or college considers about are only related to academic rating and normally this selection process is carried out manually.

These selection criteria do not bring out the true meaning of the model student as the model student should be excellent in the academic as well as good in personality. Besides that, manual selection is not enough when the selection criteria are not focused on the academic rating alone and may not be appropriate in certain cases (e.g., laboratory application). This is because criteria that related to student personality of the students are somehow vague and hard to define explicitly. Manual selection may lead to biases and inaccurate decision in the selection of the model student.

In order to select the model student, one should considerate the candidates' academic rating as well as their personality. The awarding of the model student is meaningless if simply selecting the student with the high academic rating but poor in personality.

In this paper, the personalities and behaviors of the students suggested as the selection criteria for the model student selection process are soft skills, hard work, leadership, time management, attendance, attitude, attire and technical skills. These personalities and behaviors should be taken as the selection criteria to ensure the selection criteria covered the major attributes that the model student should acquire.

There are other student selection methods which include simulation, goal programming, etc. had outlined the importance of the simulation method for surgical trainee's selection which put the student in real scenarios instead of assessing solely on cognitive abilities of medical students.

Proposed a multi-choice conic goal programming considering criteria of the best students and define the optimum assignments among the predefined programs to maximize both the total preference value and total ranking value. The ranking of the student is determined by utilizing fuzzy MULTIMOORA with respect to the institutional budget and quota of the predefined programs. Others include

assessment through phased interviews and semi-structured interviews, of medical student selections and student-athletes selection, respectively. However, this study is focused on the applying Fuzzy Logic in order to carry out the model student selection process based on the aforementioned selection criteria of the students. Fuzzy logic is an approach to computing using mathematical logic by assigning values to an imprecise, ambiguous and inaccurate range of data in order to arrive at a conclusion with the highest degree of truth as possible rather than the usual true or false (1 or 0) Boolean logic. Fuzzy logic employs an artificial intelligence that could imitate human's cognitive ability.

For example, in sports science literature, proposed a Fuzzy Inference System (FIS) for player selection and team formation in football where the qualitative aspects of human knowledge are modeled without employing precise quantitative analysis. Some studies utilize fuzzy logic as a support model for team formation in business and industry which also relevance to this study. For example, a research done by involves a fuzzy set theory and gray decision theory was implemented to form multi-functional teams based on insufficient information. The study was very subjective; however it depends solely on quantitative data tried to fix the approach of with a new fuzzy-genetic analytical model which had quantitative approaches in addition of modeling enhancements like a derivation of personal attributed from dynamic quantitative data, complex attribute modeling, and handling of necessary over-competency. In the recent years, application of fuzzy logic has been gradually accepted as a decision-making tool in evaluation and performance of the academic institutions or institute of higher learning (e.g., universities). [1] Had utilized a fuzzy logic system for evaluating the performance of students in the university. [2] Had proposed a stage-wise fuzzy reasoning approach for student performance evaluation to eliminate the issues of rule explosion, where the comparison is conducted between fuzzy and traditional averaging technique. [3] Had proposed a new performance evaluation method for laboratory application based on a fuzzy logic system which is compared with the classical evaluating method.

2. Literature Survey

Institutes evaluate students' academic performance through a conventional evaluation system which is framed by the institutes under educational policies and/or the institutional rules and regulations [3]. This research study proposes a new fuzzy logic based performance evaluation method. In this method, we consider three parameters attendance, internal marks and external marks which are considered to evaluate students in an IT related undergraduate course. Then an expert system using fuzzy logic based on Mamdani technique has been designed and tested on a real sample and the two results have been compared.

The t-test is conducted using MS Excel. As per value of t test we cannot reject the null hypothesis that two results are similar as p-value of test statistics is $0.927(< 0.975)$ and the t-statistic is -0.09, which does not fall into the rejection region. In other words, we accept the null hypotheses that means conventional

result is equal to the mean fuzzy system result with 95% confidence level. This shows that the expert system can provide the same results as conventional method.

Therefore one can apply computer based Fuzzy System Approach in place of time consuming conventional method. However, in some cases, the variations in results from fuzzy system have been observed for some students who have same result through conventional method. It was due to the difference in their attendance which shows that expert system incorporates input attendance effectively. On the contrary in the conventional system, for a regular course, a student must have mandatory attendance failing to which the student may not be allowed to appear in exams. This shows that the expert system provides flexibility to the inflexible conventional system which is greatly required in present age of technology.

Students Performance Evaluation: A Fuzzy Logic Reasoning Approach

in [4] paper presents a new fuzzy logic reasoning based approach for performance evaluation of students in school or college. The attributes considered for evaluation cover academic as well as personality traits of the students.

A Stage-wise fuzzy reasoning approach has been used to eliminate the issues of rule explosion. The comparison between fuzzy and traditional average technique shows the advantage of weight age allocation in fuzzy approach. The modeling and simulation was performed in Matlab-Simulink using fuzzy logic toolbox. The simulation results proved the validity of proposed technique.

The research objective of obtaining a fuzzy logic reasoning based Matlab-Simulink model for performance evaluation of students has been achieved. The results show the superiority of proposed technique over traditional average methodology.

The fuzzy reasoning approach provides an additional advantage of allocating different weight age to each attribute according to needs and requirements of the organization. In this study academic performance is given more importance as compared to other attributes for students. Therefore, for a very low academic marks. The overall rating using average approach is 78 which are very large as compared to fuzzy approach i.e. 69.06. It also observed that the results of fuzzy approach are close to the results evaluated by the average method for almost all the experiments.

3. Methodology

Existing System

The importance of students doing well in all sectors of their institutes has caught the attention of parents, legislators, and government education departments since career competition growing fiercer every day. Student assessment is the process

of documenting, usually in measurable terms, knowledge, and/or based on the criteria incorporated.

The assessment is formally defined as a measure of skills, attitudes, and belief. Among the numerous student body, the model student is identified as the best student among them according to certain selection criteria. For a student who performs very well in the aspects that the school or college stressed about; awarding this student is important for morale and motivation. However, the selection criteria that school or college considers about are only related to academic rating and normally this selection process is carried out manually.

These selection criteria do not bring out the true meaning of the model student as the model student should be excellent in the academic as well as good in personality. Besides that, manual selection is not enough when the selection criteria are not focused on the academic rating alone and may not be appropriate in certain cases (e.g., laboratory application).

This is because criteria that related to student personality of the students are somehow vague and hard to define explicitly. Manual selection may lead to biases and inaccurate decision in the selection of the model student.

Proposed System

In this paper, the personalities and behaviors of the students suggested as the selection criteria for the model student selection process are soft skills, hard work, leadership, time management, attendance, attitude, attire and technical skills.

These personalities and behaviors should be taken as the selection criteria to ensure the selection criteria covered the major attributes that the model student should acquire.

Fuzzy logic is an approach to computing using mathematical logic by assigning values to an imprecise, ambiguous and inaccurate range of data in order to arrive at a conclusion with the highest degree of truth as possible rather than the usual true or false (1 or 0) Boolean logic. Fuzzy logic employs an artificial intelligence that could imitate humans cognitive.

4. Result & Discussion

Model Selection Student using Fuzzy Logic System

A **use case diagram** at its simplest is a representation of a user's interaction with the system and depicting the specifications of a use case.

A use case diagram can portray the different types of users of a system and the various ways that they interact with the system. This type of diagram is typically used in conjunction with the textual use case and will often be accompanied by other types of diagrams as well.

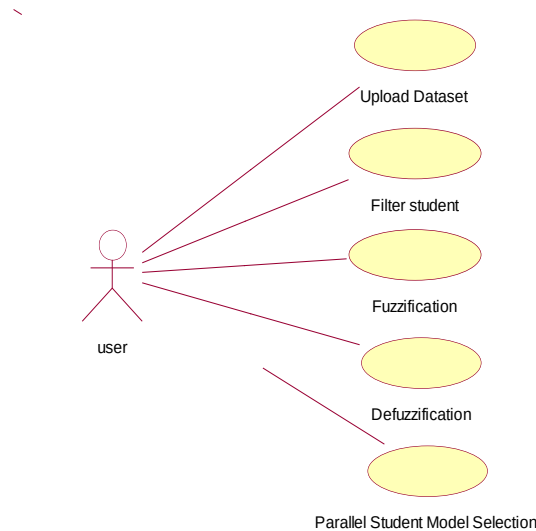


Fig.1: Modeling Selection Student System using Fuzzy Logic

In the shown in fig 1. It is a construct of a Message Sequence Chart. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called **event diagrams**, **event scenarios**, and timing diagrams we are design GUI for aquire student database In this fig 2 we are store the student attendance database

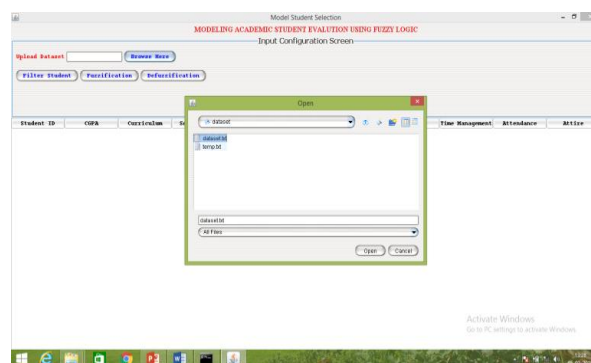


Fig.2: Students Database

Below Fig 3 we are upload the database and store the information respective files.

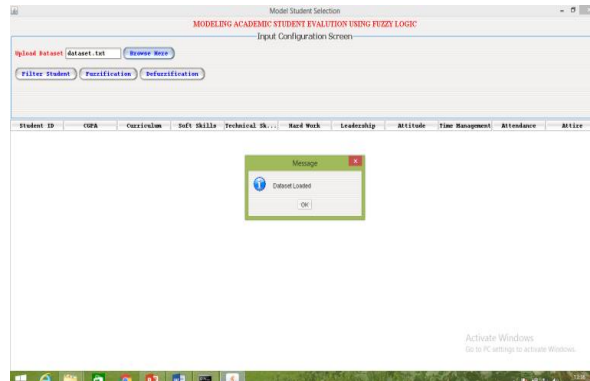


Fig. 3

In the Fig 4 : In this below fig 4. We are observing the student details in the proper manner.

Student ID	GPA	Curriculam	Soft Skills	Technical Sk...	Hard Work	Leadership	Attitude	Time Management	Attendance	Advice
A	3.82	75	4	14	2	4	9	5	4	6
B	2	56	7	10	8	5	4	9	4	7
C	3	44	4	15	5	4	2	7	5	8
D	3.3	43	9	17	7	3	4	3	4	9
E	3.5	39	5.33	15.33	4	9	7	4.83	4.33	9
F	3.45	49	8	12	3	8	5	5	8	6
G	3.25	88	7	13	4	10	7	6	7	3
H	3.73	28	4	16	6	8	8	4	10	5
I	3.4	68	6	16	5	7	4	7	8	5
J	3.8	79	6.33	16.33	7	9.5	7.5	5.83	5.33	9.5

Fig. 4: Student Details (Preprocessing)

Fuzzification: In this below fig5. We are apply fuzzification algorithm for applying student data base In this time the back propagation algorithm run in background fuzzification process.

Student ID	GPA	Curriculam	Soft Skills	Technical Sk...	Hard Work	Leadership	Attitude	Time Management	Attendance	Advice
A	3.82	75	4	14	2	4	9	5	4	6
B	2	56	7	10	8	5	4	9	4	7
C	3	44	4	15	5	4	2	7	5	8
D	3.3	43	9	17	7	3	4	3	4	9
E	3.5	39	5.33	15.33	4	9	7	4.83	4.33	9
F	3.45	49	8	12	3	8	5	5	8	6
G	3.25	88	7	13	4	10	7	6	7	3
H	3.73	28	4	16	6	8	8	4	10	5
I	3.4	68	6	16	5	7	4	7	8	5
J	3.8	79	6.33	16.33	7	9.5	7.5	5.83	5.33	9.5

Fig. 5: Fuzzification Process

Fuzzy output:

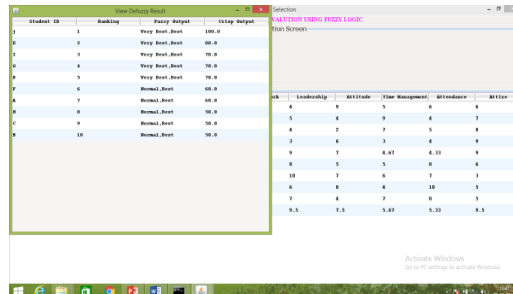


Fig. 6: Fuzzy Output

Proposed parallel student model selection: In this fig7. Next we are purposed parallel student model selection it will be used for reduction of time and it will be given proper result

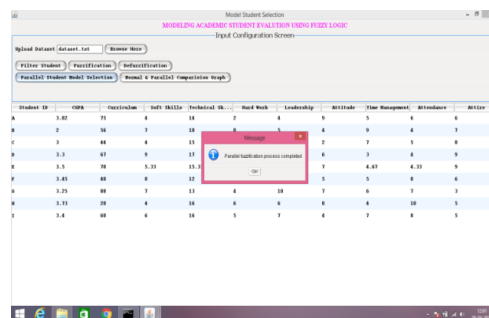


Fig. 7: Proposed Parallel Student Model Selection

Normal and Parallel Comparison Graph: In this below fig8 the normal and parallel comparison graphs. Then we are observe the parallel student model selection is more accumulation and normal technique.

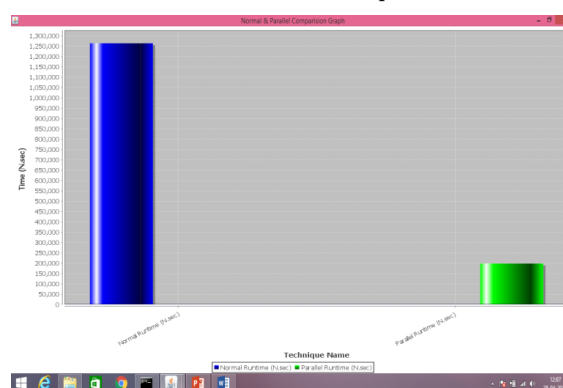


Fig. 8: Normal and Parallel Comparison Graph

5. Conclusion

The proposed system was able to conduct student selection by the implementation of the fuzzy set as its base rule that producing humanlike decision minus the weakness of the human counterpart. The fuzzy data then undergo fuzzification process, where Mamdani's implication procedure was adopted as the inference operator, maximum algorithm as the accumulation operator, and CoG as the fuzzification method. The fuzzification process had successfully obtained output (fuzzy) score and converts this qualitative data into an overall (crisp) score. The proposed solution would assist reviewer or examiner as a support system in his or her process of decision making in selecting the most appropriate model student for their respective faculty or institution.

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