



Performance Prediction of Student Based on Academic Activity Using Soft Computing Technique

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Abstract— One of major challenges to forecast the performance of student as we know that it's being affected by various parameters. Student academic performance predicting is one of the vital factors to measure career progress. Utmost of the ways used for assessment of student performance were only strong academic conditioning i.e only tutoring literacy. In this work, we tried to predict the performance of pupil by not only introducing strong academic education literacy parameter including other significance conditioning. Fuzzy predicated fashion has been presented along with possible set of rules for determining the closeness of performance.

Keywords — Student Performance, Fuzzy Logic, Membership Function

I. INTRODUCTION

Now a days the recent trends in career selection of students has changed us to think about other skills set of the student to understand the importance of it while examine the performance. The education is the best way to evaluate the student skills because it useful and important key factor as we all know that students are the backbone of any Nation and for its growth in every aspect whether it is economic, political or societal development. The quality attributes of student for academic institution is defined by their teaching and pupils of the institution.

The performance of the students of any institutions play major role because it plays vital role and it is directly related with future possibilities of the Country. Soft Computing tool are one of the best possible techniques available today to deal with some unclear condition or values as the prediction of student performance prediction is similar case where we have to determine the performance based on some historical data or previous performances Bakal, Shilpa Ingoley and J.W (2012). One of the applications of fuzzy system is to represent unclear or vague values into to some sort of precise one. Student performance is concern with basic elements and it is similar to annual or semester exams, additional activities like personality grooming or some techniques to find hidden talents of student apart from academic activity Biswas R. (1995). As we all know that in modern era every parent who visits educational organization talks more about other activities apart from teaching learning process.

To prognosticate the performance of pupil substantially, soft computing ways has been espoused fuzzy ways have been acclimated for evaluation grounded on numerical scores attained in an assessment and for assessing previous educational achievement grounded on substantiation similar as academic instruments. Important attention has also been given to espousing fuzzy approaches for the evaluation of tutoring using a computer, in particular in Intelligent Tutoring Systems (ITS) and Computer Supported Instruction (CAI). For case, in fuzzy approaches were proposed for determining the position of a pupil's understanding of a certain subject matter in the environment of ITS.

The focus of attention of this exploration work is an evaluation of pupil academic performance. It proposes the use of a fuzzy sense ways and fuzzy rule induction approach to gain stoner-scrutable knowledge from literal data to justify any evaluation. This exploration work shows the advantages of the approach in pupil performance evaluation as it can be erected not only grounded on information in a given dataset but also allowing expert knowledge to be added if similar knowledge is available. Information convinced from the dataset, especially that not formerly known by experts in the sphere, can be veritably useful in developing fuzzy models for practical operations.

Scholars and institutions have a tight relationship. Scholars anticipate the effects more and more in their favour or support from the institution and vice versa. Reputed institutions concentrate on the performance of scholars and try to do it more, so that they could stand in rank position as compared to the other institutions. There are two main factors, on which the performance of the scholars substantially depends first is attained marks and other is attendance. We're considering then that both the factors are necessary. However, has any one factor is good and other is less, he/ she will not be put in to the order of good scholars, If a pupil. The reason for this, is substantially institutions/ universities are having their cut off marks for passing and they've certain minimal chance of attendance that every pupil has to attend. On the base of these factors, the performance of a pupil can be estimated and consider the scholars those are in the order of 'poor' and 'veritably poor', for the performance enhancement process.

II. RELATED WORK

Assessment of understudy scholastic execution ordinarily comprises of a few parts, each including various decisions regularly dependent on loose information. This imprecision emerges from human (educator/mentor) understanding of human (understudies) execution. Arithmetical and factual techniques have been utilized for collecting data from these evaluation parts. These techniques have been acknowledged by numerous instructive establishments all over the planet despite the fact that there are restrictions with these conventional methodologies. In this proposed review, it is contended that the current strategy for grouping and evaluating understudy scholarly execution utilizing arithmetical and factual methods doesn't really offer the most ideal way to assess human procurement of information and abilities. It is normal that thinking dependent on fuzzy models will give an elective method of taking care of different sorts of uncertain information, which frequently mirrors the manner in which individuals think and make decisions.

Scholastic execution assessment utilizing delicate registering strategies propelled by the fruitful utilization of K-implies, fuzzy C-implies (FCM), subtractive grouping (SC), mixture subtractive bunching fuzzy C-implies (SC-FCM) and half and half subtractive grouping versatile neuro-fuzzy induction framework (SC-ANFIS) techniques for tackling scholarly execution assessment issues. Displaying of understudies' scholarly exhibition is a troublesome enhancement issue. We investigate the materialness of K-means and FCM, SC, crossover SC-FCM and SCANFIS grouping techniques to the new understudy's assignment issue, which dispenses new understudies into certain classes that comprise of comparable understudies and the quantity of understudies in each class not surpassing its greatest limit. The models were joined with fuzzy rationale methods to break down the understudies' outcomes. Fuzzy rationale hypothesis has arisen in the 20th century and by the start of the twenty-first century it was anticipated to be applied broadly in many fields.

Fauuzi Bouslama et al. (2006) One of the utilizations of the fuzzy rationale hypothesis is the estimation and assessment in training framework. Utilized fuzzy rationale for understudy assessment for lab-based assessments. They found the new framework powerful to further develop understudy execution and assessment productivity.

Hameed I.A.F.A (2010) concentrated on use of fuzzy rationale in understudy assessment by doing mix with traditional understudy assessment approach. His created engineering of understudy assessment viewed simple as perceived by understudy and educators and conquered the issue of positioning of understudies with a similar score. He noticed that fuzzy methodology can be handily applied for different assessments like venture work assessment, learning the board framework assessment and so on.

M.S Farooq. (2009) utilized fuzzy choice emotionally supportive network to survey understudies' exhibition in ventures of designing schooling. Aftereffects of his review uncover that fuzzy rationale has been persuasive in expanding the nature of schooling offices, inspiration, unwavering quality and consistency.

Nykanen O. (2006) applied fuzzy rationale to survey understudies' mindfulness and observed that it can forestall mistaken decisions related with a solitary term and will assist the educators with controlling the understudies.

Gokmen et.al (2010) utilized fuzzy rationale to assess understudy execution in one of the course of Electrical, Electronics and Computer division of Marmar University, Turkey and tracked down the distinction in result of results between old style technique and fuzzy rationale strategy.

Saxena Neetesh, Saxena Kajal Kaushal (2010) utilized fuzzy rationale to foster a model for understudy assessment dependent on his/her participation and imprints got.

R.S. Yadav and S. Kumar (2009) utilized fuzzy rationale to assess trouble, significance and intricacy of the subject for understudy assessment and thought that it is straightforward, straightforward and simple to execute.

Ramot D. (2002) proposed novel cross breed technique for understudy assessment by consolidating Conventional Content Analysis (CCA) and Fuzzy Rule Based Systems (FRB). They thought that it is more reasonable for verbal information acquired from educating polls. They applied this methodology for assessment of 138 junior understudies from Gazi University, Turkey.

S.M. Bai and S.M. Chen (2006) introduced another strategy for assessing understudies' learning accomplishment utilizing fuzzy enrollment capacities and fuzzy principles. Rasmani and Sen (2005) grouped understudy scholastic execution utilizing fuzzy methods.

Mcloone Seamus C. (2012) applied fuzzy hypothesis for versatile learning determination framework (FADS). They applied it on 200 4th grade understudies and observed that utilization of FADS empowered the understudies in the test gathering to perform better compared to the two different gatherings.

Othman et al. (2008) utilized the mix of subjective techniques utilizing fuzzy set hypothesis in investigating multi models educating quality.

Baba et al (2009) created Fuzzy Group Decision Support Systems (FGDSS) programming with the end goal of execution appraisal of examination collaborators at Marmara University, Turkey.

Ma. J. and Zhou (2000) introduced a fuzzy set methodology for the appraisal of understudy focused learning.

D.W. Patterson (2006) utilized fuzzy rationale for assessment of instructors' exhibition and thought that it is valuable for chiefs for composing yearly classified reports for them in an association. Fuzzy rationale pleasantly handles dubious and subjective information on the issue area by coordination of master framework innovation with fuzzy rationale idea.

G. Meenakshi. (2013) created Fuzzy Cognitive Mapping (FCM) for investigation of instructive association settings. They noticed that FCM system has colossal potential for commitment to the advancement of helpful intellectual instruments. The writing uncovers that there is an immense capability of fuzzy rationale application in schooling as broad and for execution evaluation, as a specific application. In this exploration, the fuzzy rationale model is created and contrasted and traditional model of present understudy assessment framework dependent on semester imprints and exercises of understudy.

III. PROPOSED WORK

The point and objective of this examination is deciding understudies' presentation utilizing a fuzzy rationale model instead of Traditional example, the proposed approach addresses the underneath notice research questions Yadav, Ramjeet Singh (2011).

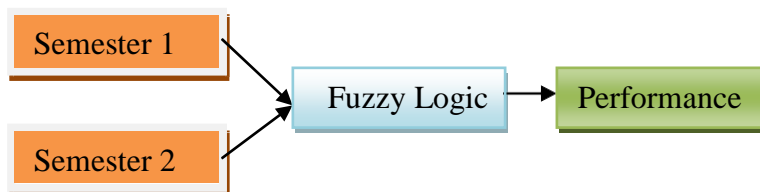


Figure 1: Fuzzy Expert System for Academic Performance Yadav, Ramjeet Singh (2011)

This is existing methodology proposed by Yadav, Ramjeet Singh (2011) in which they considered just assessment design for understudy scholastic execution

Existing methodologies of execution assessment framework just managed assessment design that is identified with (semester test) yet some more significant properties like games exercises, educational plan and character improvement (we can characterize it as a total scholastic turn of events or scholarly development) which is absent in customary assessment framework.

The proposed procedure has concentrated on such qualities since making scholastic advancement isn't just based semester test, the achievement of framework increment by expanding number of boundary. In the proposed approach we have taken insightful just as non-academic boundaries. The boundaries for execution estimation are recorded beneath

- Semester Exam Performance
- Sports Activities
- Cultural Activities
- Social Awareness

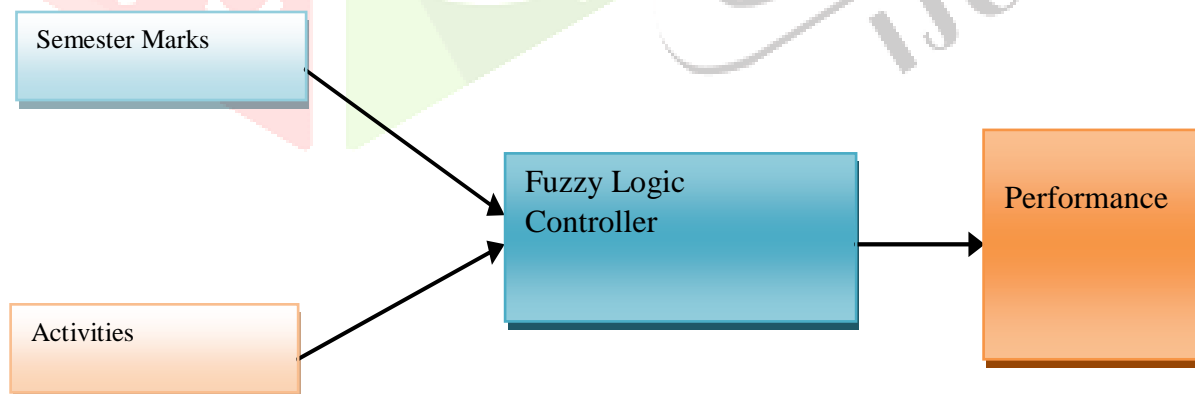


Figure 2: Fuzzy Expert System for Enhanced Model for Academic Performance (Single Version)

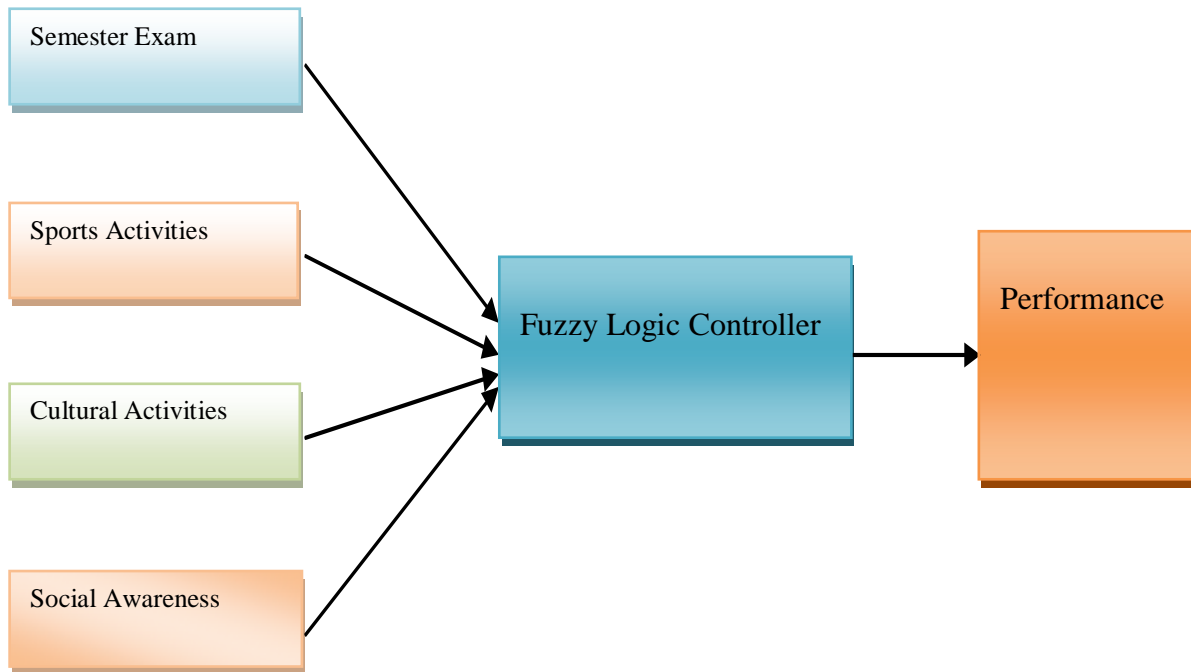


Figure 3: Fuzzy Expert System for Enhanced Model for Academic Performance (Activities Split Version)

IV. FUZZY LOGIC CONTROLLER

The fuzzy logic controller act as device to control the entire system which accept the input value take action and produce the result based on certain set of rules defined by the fuzzy logic controller The developed system has consist of three basic components.

- Input (Semester Marks, Activities)
- Fuzzy Logic Controller
- Output : In term of performance

Academic Performance Evaluation with Fuzzy Logic Controller:

- Fuzzification
- Inference Rule

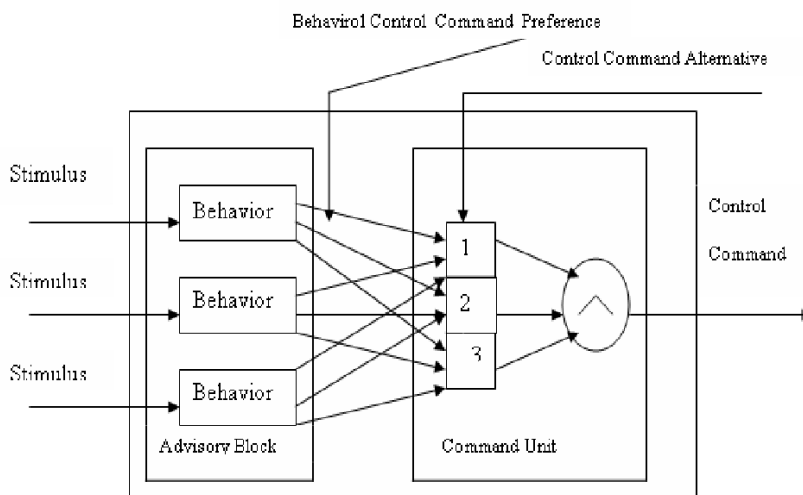


Figure 4: Fuzzy Preference Controller

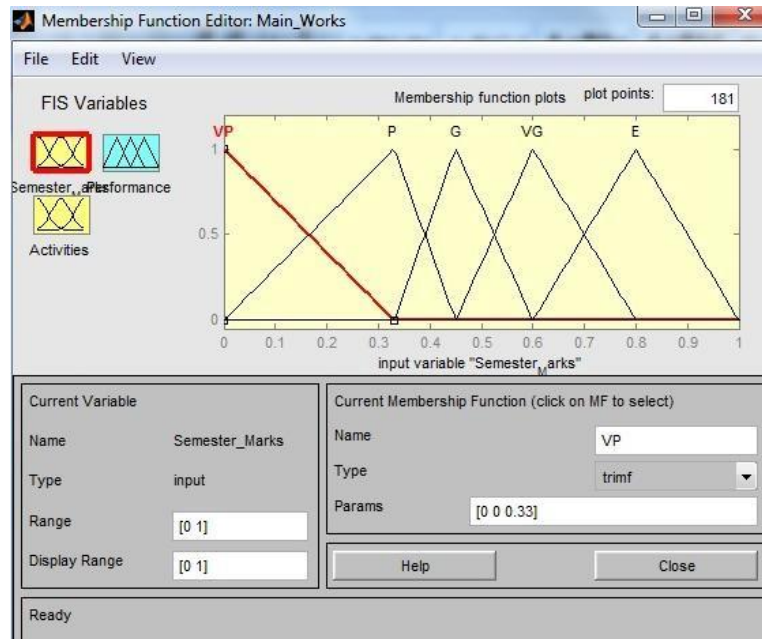


Figure 5: Fuzzy members function for Semester marks

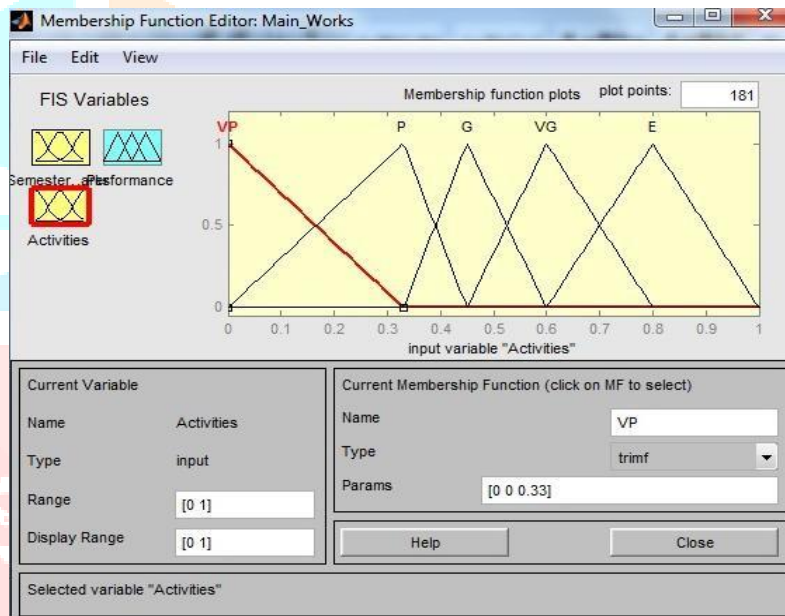


Figure 6: Fuzzy members function for Activities

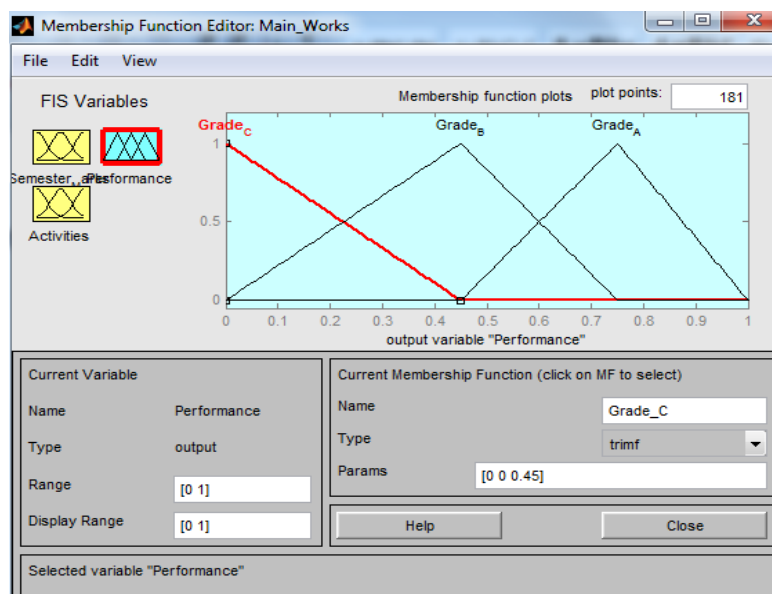


Figure 7: Fuzzy members function for Performance

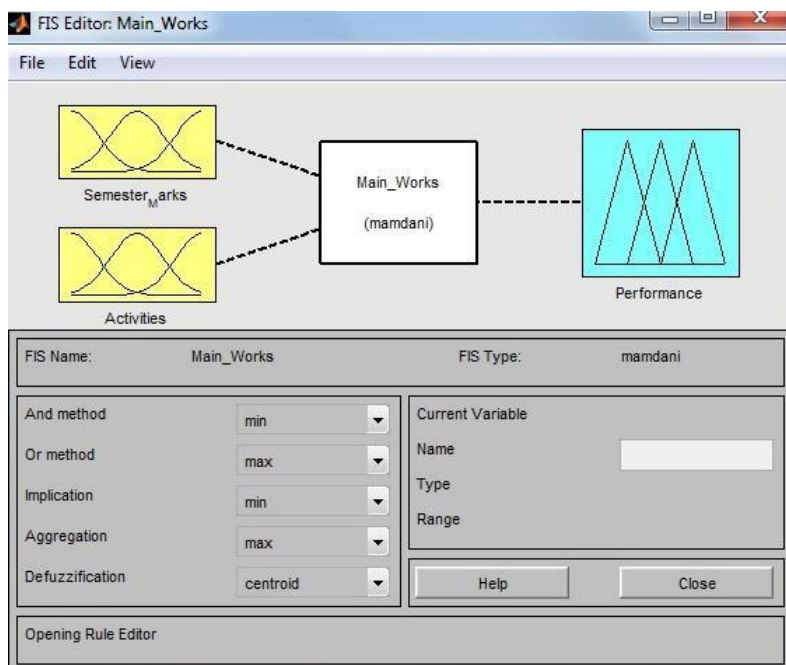


Figure 8: Complete View of Fuzzy Input and Output

V. FUZZY INFERENCE RULE

Table 1: Fuzzy set of input variable (Semester Marks, Activities)

Linguistic Variable	Interval
Very Poor (VP)	[0.0, 0.0, 0.33]
Poor (P)	[0.0, 0.33, 0.45]
Good (G)	[0.33, 0.45, 0.60]
Very Good (VG)	[0.45, 0.60, 0.80]
Excellent (E)	[0.60, 0.80, 1]

Table 2: Fuzzy set of Output variable (Performance)

Linguistic Variable	Interval
Grade C	[0.0, 0.0, 0.45]
Grade B	[0.0, 0.45, 0.75]
Grade A	[0.45, 0.75, 1]

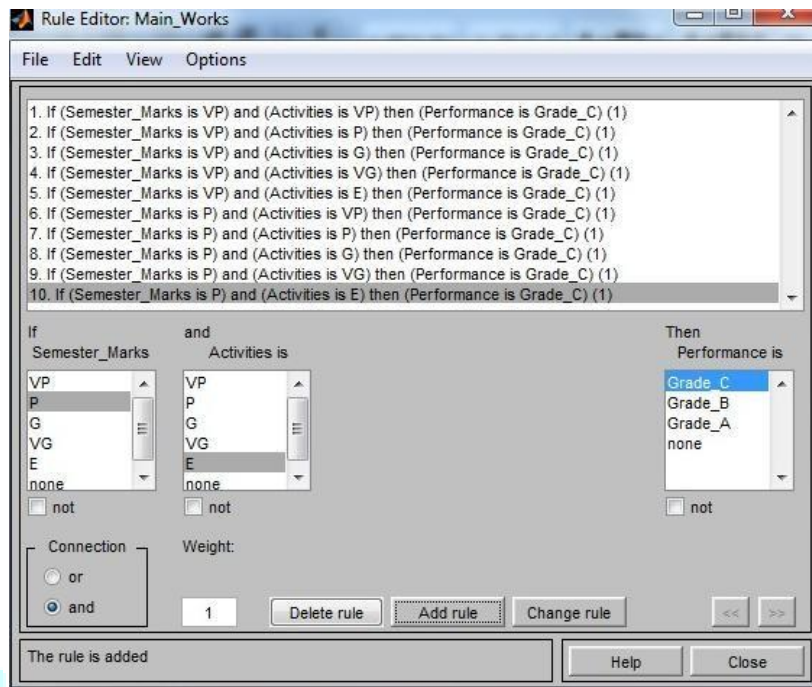


Figure 9: Fuzzy Rule Set (i)

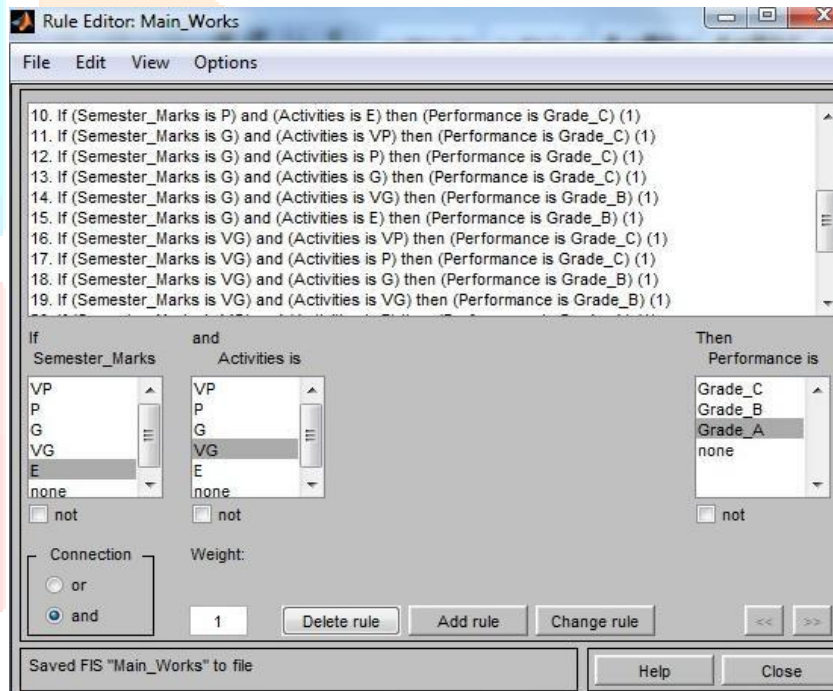


Figure 10: Fuzzy Rule Set (ii)

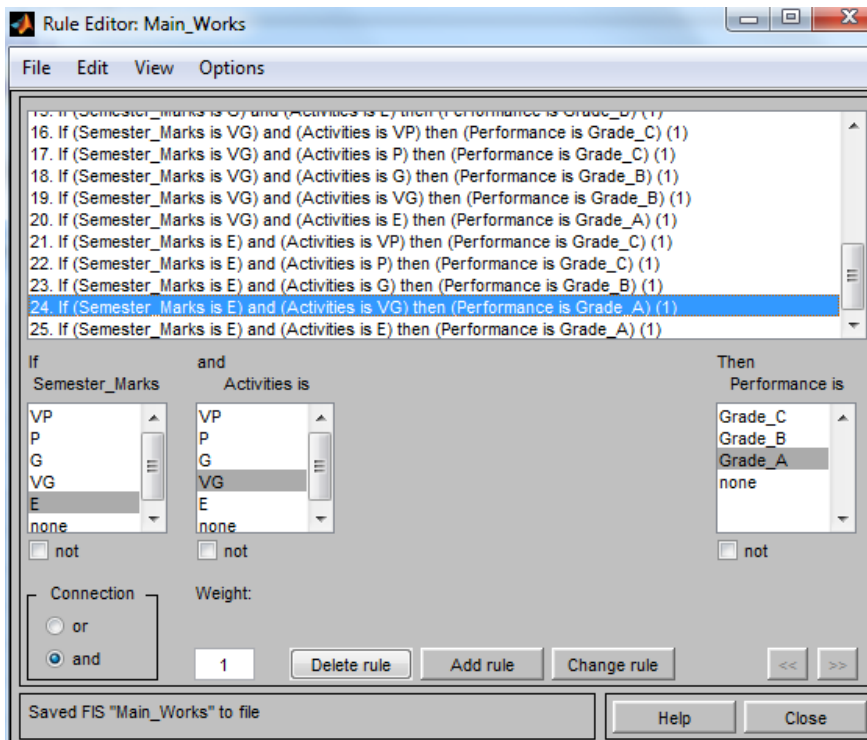


Figure 10: Fuzzy Rule Set (iii)

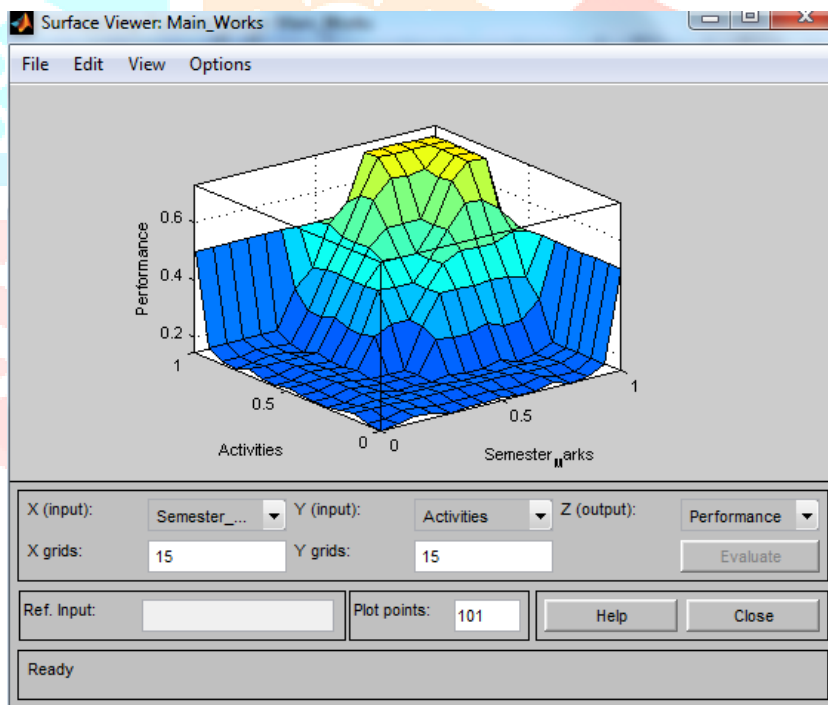


Figure 11: Surface View

V. EXPERIMENT RESULTS

The experimental simulation of proposed work has been done in MATLAB environment. Result set produced by fuzzy system is presented underneath:

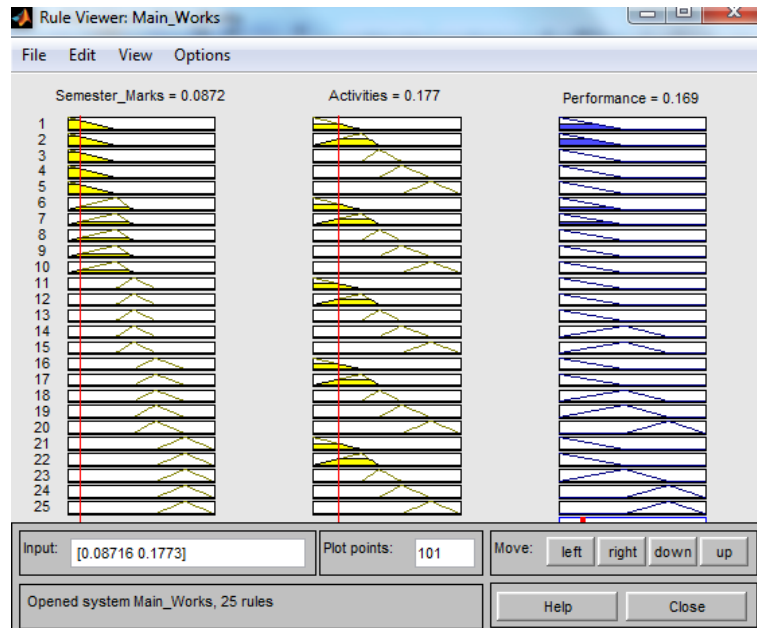


Figure 12: Performance View_1

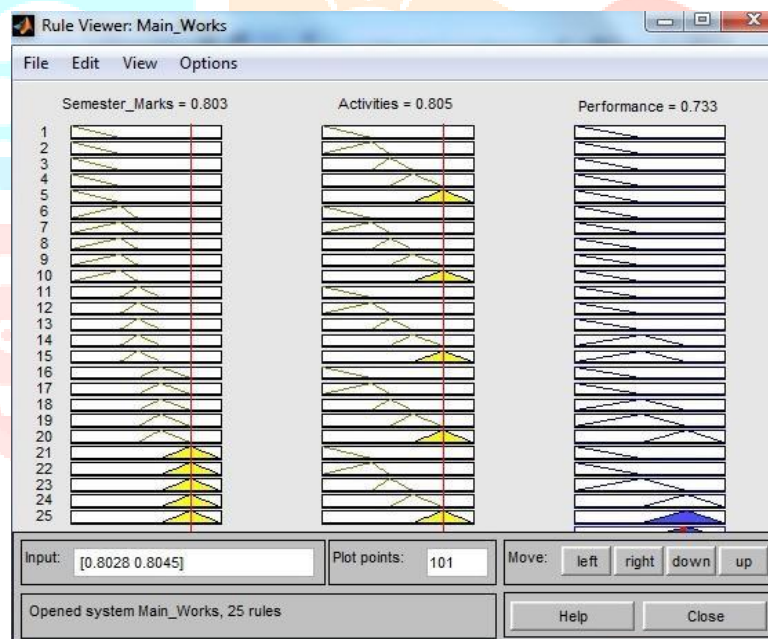


Figure 13: Enhanced Performance View_2

CONCLUSION

The created method for understudy execution expectation utilizing solid scholastic movement just as a portion of the curricular action which accommodating to gauge the general character improvement of the understudy insightful and non-academic ascribes utilizing fuzzy technique. The exhibition of created framework gives better precision by thinking about a few vital boundaries while execution expectation. At the point when the outcomes are assessed from fuzzy framework, our created framework work well than Yadav, Ramjeet Singh (2011). The created framework further develop the understudy scholastic execution by considering significant scholarly properties pertinent to understudies as opposed to focusing on just insightful trait viz. semester assessment based assessment.

Fuzzy logic based new methodology for understudies' assessment of commonsense part of understudies assessment framework and other significant trait i.e. exercises is managed in created framework When the understudy's presentation in three sub-parts is assessed by fuzzy rationale approach, a distinction in result is seen between the traditional and proposed fuzzy approach. While the traditional strategy adheres to a steady numerical guideline, fuzzy rationale based assessment approach gives adaptability just as unwavering quality. The fuzzy rationale based assessment is mind boggling and needs MATLAB programming, yet it is very appealing as the guidelines are editable by the educator in the start of the scholastic term according to his/her decision.

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