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Performance Evaluation on Different Environment Candidates for Ethical Opportunity Distribution

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Abstract

The significance intention of this research method is to prove urban and rural area student skills in Kerala. In recent decades, companies hire fresher directly from colleges for their vacancies and their foremost focus rely on urban colleges rather than rural colleges. This scenario leads inequity in the employment opportunity for rural candidates. On other hand, an investigation proves that evolution in contemporary technologies makes information access for rural and urban candidates is in equilibrium. This work frames three different questionnaires to test technical, communication and attitude skills for rural and urban candidates. These skills evolve from their basic education and training that the student gets from their school days and from the society. To investigate this inequity employment opportunity, preliminary step is to take a survey among candidates in rural and urban environment college and then we try to incorporate Fuzzy Logic System (FLS), for better manipulation in investigation. The aforementioned analysis in this platform reveals quite evident result for employer to choose their employee throughout urban and rural environment.

Keywords: Urban Candidates, Rural Candidates, Technical Skill, Communication Skill, Attitude Skill and Fuzzy Logic System (FLS).

1. INTRODUCTION

The 21st century, is a period in which each circle of human life directly or indirectly affected by technologies (Smitha S. Murali *et al.* 2016). The main part of Indians live in inadequately populated and broadly scattered towns. Every such town taken together constitute rural India (S.V.C. Aiya 2015). While this group of research gives imperative bits of knowledge into the assorted qualities of gatherers and the difficulties of getting to reap locales that happen in rural and urbanizing areas (Anne G. Short Gianotti and Patrick T. Hurley 2016). A typical earlier of economists and policy makers is that education is a vital promoter of economic growth (Matthias Schündeln and John Playforth 2014). Recent educational research has built up specific contrasts in the accomplishments of rural and urban students and furthermore in their advanced education successes (Rizwan Faisal *et al.* 2016). Rapid urbanization upsets ideas of an urban centre and rural periphery as expansive quantities of rural villagers move to urban ranges because of more noteworthy economic opportunities yet cannot change their hukou status from rural to urban, therefore existing in a managerial gap (Nalini Mohabir *et al.* 2017). Despite a rising concentration by governments to target rural areas for extraordinary help, rural-urban disparities in scholastic execution are still an uncertain problem (Osman Rani Hassan and Rajah Rasiah 2011). However, to make progress in expanding the accomplishment of rural students, framework leaders must give satisfactory monetary assets as well as improve the nature of human resources (Philip Hallinger and Shangnan Liu 2016). Alongside different variables, for example, resources, availability of technology and quality of teachers, the geographic location assumes an imperative part in the preparing, inspiration and academic execution of the students (F.O.Ezeudu and Obi Theresa N 2013). A progression of studies has recommended the significance of beginning tutoring and private condition on the personality and behaviour of an individual (Joseph Sunday Owoeye and Philias Olatunde Yara 2011). However, these co-operations assume a key part in advancing urban-rural improvement, the spatial structure and impacts from various sizes of worldwide powers, the state, and nearby operator make distinctive urban-rural societal transformations (Yanfei Wang *et al.* 2016). On the issues of urban–rural student accomplishment differentials, it has been contend that such differentials exist since schools in urban zones appreciate a greater number of enrichments than their rural counterparts (Kiatanantha Lounkaew 2013). The advancement of the rural basic education system and school mapping rebuilding exceptionally identified with the relationship between rural areas and urban areas (Jing Rao and Jingzhong Ye 2016). The worry in regards to the scholarly execution of rural and urban students is not restricted to one nation but instead it is by all accounts a worldwide issue (Alokan *et al.* 2013). This issue can be settle by utilizing fuzzy sets and fuzzy logic theory, which takes into account a mixing of the move between two contiguous classes through fuzzy degrees of membership. It is not the point of this paper to present fuzzy sets and logic theory rather we will likely create a guide

utilizing a fuzzy inference system (FIS) in a forerunner analysis (Vít Paszto *et al.* 2015).

2. LITERATURE REVIEW

In 2011 Ronelle Burger had anticipated that the surveys have demonstrated that Zambian urban occupants have altogether higher schooling accomplishment rates than rural inhabitants and will probably be proficient. To address this disparity in education results it is essential to comprehend to what degree this is an after-effect of a resource gap (for instance, differences in teachers or textbooks) or diverse profits for assets (for instance, an extra instructor has to a greater extent an effect in urban zones. The outcomes demonstrated that the rural–urban gap was inferable from both contrasts within the sight of resources (55% of the gap) and contrasts in the profits on resources (45% of the gap). Since profits for resources are impressively lower in rural areas, extra resource venture alone is probably not going to close the gap amongst rural and urban schooling results.

In 2013 George Grekousis *et al*. had expected to give a synthetic spatiotemporal approach to the investigation, expectation, and understanding of urban development. The proposed urban model considers the progressions after some time in populace and building use designs. Spatial elements with comparative qualities were assembling in clusters by the utilization of a fuzzy c-means algorithm. Each cluster speaks to a particular level of urban development and advancement. The proposed system expects to help organizers and decision makers in picking up knowledge into the move from rural to urban.

In 2016 Ayman M. Zakaria Eraq had suggested new urban communities have not possessed the capacity to draw the inhabitants of those ranges, because of absence of responsiveness to the requirements and needs. A prior review by the specialist utilizing a fuzzy model of needs demonstrated that the independent results of each class of agreeable trinity was divided, which made a model giving a double-headed choice. The point of this examination was to build up the previous fuzzy model to make it ready to pick a solitary perfect other option to speak to similarity between agreeable trinity. Results demonstrated the productivity of the developed model and the likelihood of coming to through it to a perfect other option to the pointer of urban improvement.

In 2017 Dan Wang *et al*. had proposed the teaching gap amongst rural and urban schools in China from the viewpoint of teacher professional learning communities (PLCs). Attracting on profundity interviews with 36 elementary teachers, the review discovers striking inconsistencies amongst rural and urban schools in the working of Teaching and Research Groups (TRGs). These differences in TRGs result in disparate examples of the instructional limit working in rural and urban schools. The

confirmation demonstrates that the school authoritative setting unequivocally forms teaching and teachers. It proposes that strengthening school-wide PLCs was an imperative method for narrowing the rural-urban teaching and learning gaps.

3. PROPOSED METHODOLOGY

The significant objective is to provide equilibrium state of employment opportunity for urban and rural candidates in ON/OFF campus recruitment. Here, we generate three set of question type to evaluate the skills of candidate from different department final year various engineering colleges placed in rural and urban environment. With this, survey report we intent to incorporate Fuzzy Logic System (FLS) for evaluating the performance of urban and rural candidates. Let us discuss the configuration of FLS in detail, initially three different FLS is to develop for technical, communication and attitude and finally the output of those three FLS fed to another FLS to retrieve eligibility score for the given candidate.

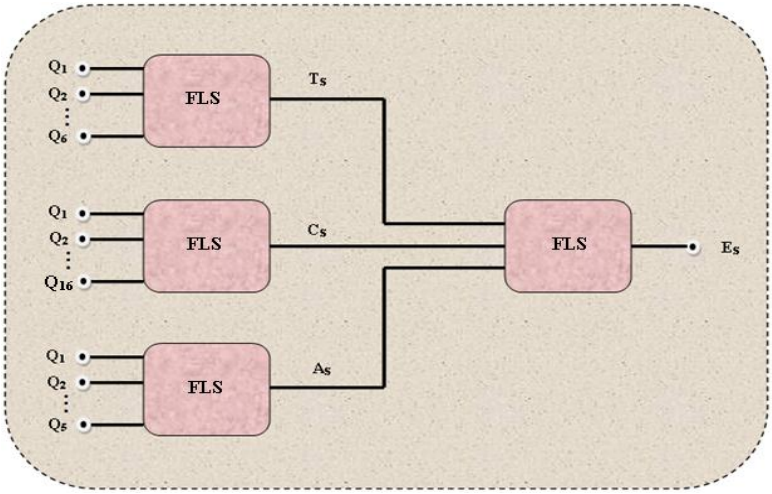

Fig.1 Schematic architecture of proposed layout

3.1 Fuzzy Logic System

Fuzzy Logic System (FLS) is the process of mapping nonlinear system of input dataset to a scalar output. FLS architecture consists of four significant divisions namely Fuzzification, Rule generation, Inference System and defuzzification. Let us discuss basic steps of FLS,

- Define the linguistic variables and terms (initialization)
- Construct the membership functions (initialization)
- Construct the rule base (initialization)
- Convert crisp input data to fuzzy values

- using the membership functions (fuzzification)
- Evaluate the rules in the rule base (inference)
- Combine the results of each rule (inference)
- Convert the output data to non-fuzzy values (defuzzification)

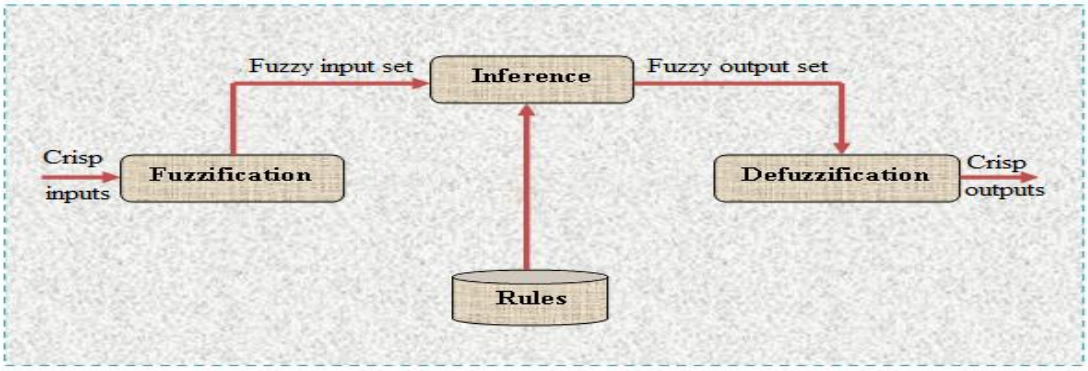

Fig.2 Architecture of Fuzzy Logic System

Fuzzification

The process of switching a scalar value in to fuzzy set value said to be fuzzification, fuzzy sets are nothing but the inputs in the FLS are generally mapped by a set of membership function; in general the process of converting a crisp input value to a fuzzy value is called "fuzzification". A fuzzy subset A of a set X represents a function $A: X \rightarrow L$, where L signifies the interim [0, 1]. This function also called as a membership function.

Membership function

A membership function invested with different shapes for assessment in fuzzy logic, the least demanding membership functions being define by methods for utilizing straight lines. From among them, the least demanding is the triangular membership function, whose function name is trimf. With a specific angle, the equation is utilize to calculate the functions.

$$f(x,[a,b,c]) = \begin{cases} 0 & x \le a \\ \dfrac{x-a}{b-a} & a \le x \le b \\ \dfrac{c-x}{c-b} & b \le x \le c \end{cases} \quad (1)$$

This work comprises of initially three sort of fuzzy interference systems for Technical, communication and attitude skills.

Technical score fuzzy logic system

In this technical score fuzzy logic system six different questions is taken as inputs and single output. The membership function range for input Q_1 is (0 to 3) and linguistic variables is Low, Medium, High (L, M, H) then for input Q_2 the membership function range is (0 to 10) and linguistic variables (L, H). The membership function range for input Q_3 is (0 to 100) and linguistic variables is (L, H), for input Q_4 the membership function range is (0 to 1) and linguistic variables (L, H).

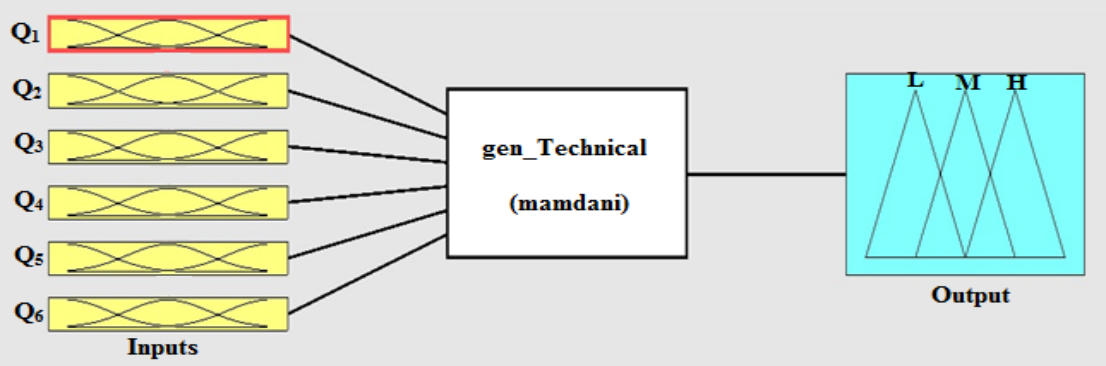

Fig.3 FLS generation for technical score

The membership function range for input Q_5 is (0 to 10) and linguistic variables (L, H) then for input Q_6 the membership function range is (0 to 10) and linguistic variables (L, H). The single output perform membership function range is (0 to 100) and linguistic variables (L, M, H).

Communication score fuzzy logic system

The communication score fuzzy logic system has taken 16 different types of questions as inputs and single output. The membership function range for input Q_1 is (0 to 10) and linguistic variables is (L, H). For inputs Q_2, Q_3, Q_4, Q_5, Q_6, Q_7, Q_8, Q_9, Q_{10}, Q_{11}, Q_{12}, Q_{13}, Q_{14}, Q_{15} and Q_{16} the membership function range is (0 to 1) and the linguistic variables is (L, H). The single output perform membership function range is (0 to 100) and linguistic variables (L, M, H).

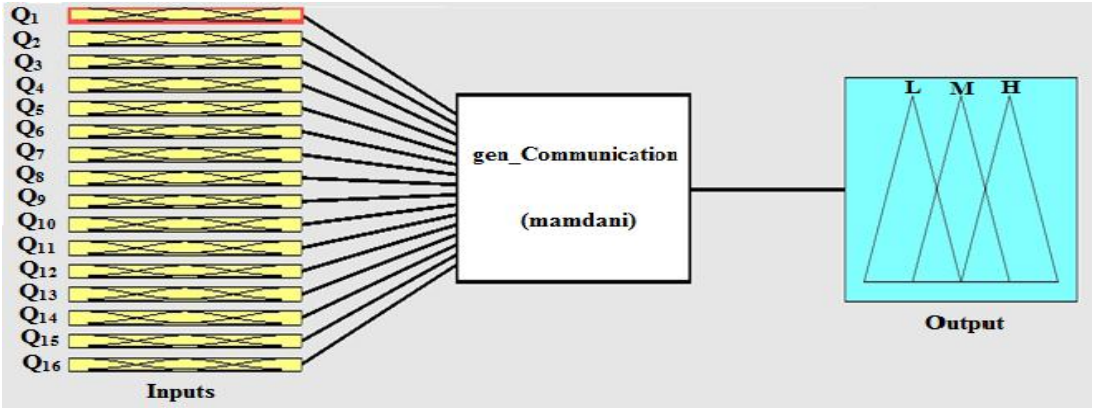

Fig.4 FLS generation for communication score

Attitude score fuzzy logic system

The attitude score has five types of questions as inputs and single output shown in figure. The membership function range for input Q_1 is (0 to 10) and linguistic variables is (L, H). For inputs Q_2, Q_3, Q_4 and Q_5 the membership function range is (0 to 10) and the linguistic variables is (L, H). The membership function range for output performed (0 to 100) and the linguistic variables is (L, M, H).

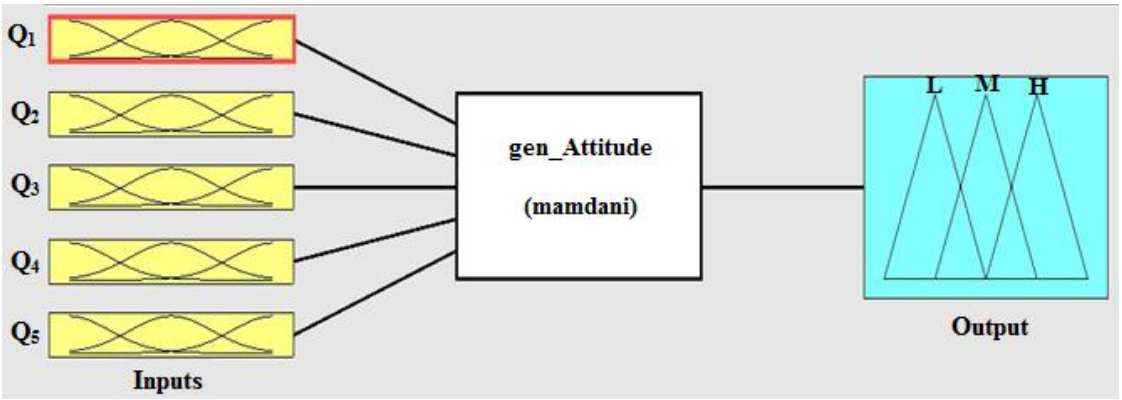

Fig.5 FLS generation for attitude score

Cumulative eligibility score fuzzy logic system

The combined score elaborate that three score namely technical, communication and attitude in figure. In this, the membership function range for technical input is (0 to 100) and linguistic variable is (L, M, H) then for communication input the membership function range is (0 to 100) and linguistic variable is (L, M, H). At the end, membership function range for attitude input is (0 to 100) and linguistic variable is (L, M, H).

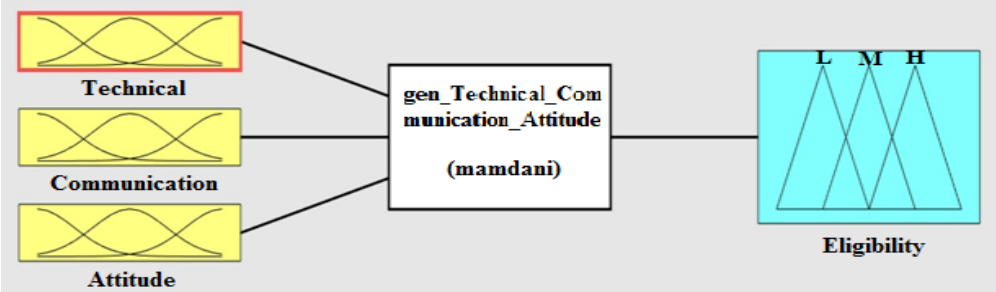

Fig.6 FLS generation for cumulative eligibility score

The eligibility score is the output of this combined score fuzzy logic system and the range of membership function is (0 to 100) and linguistic variables is (L, M, H).

Rule generation

While in the required membership function the rules have been generated, in light of the input and output the rules will be generated autonomously and the procedure is acquired in the fuzzy logic controller. The procedure produces fuzzy if-then rules with non-fuzzy singletons (i.e. genuine numbers) in the resultant portions. From the predetermined input and output sets of training data, a resultant real number is acquired for each fuzzy if – then rule created from the fuzzy subspaces is shaped on the assumption that the space interim of each input variable is isolated similarly into fuzzy sets.

Technical rule generation

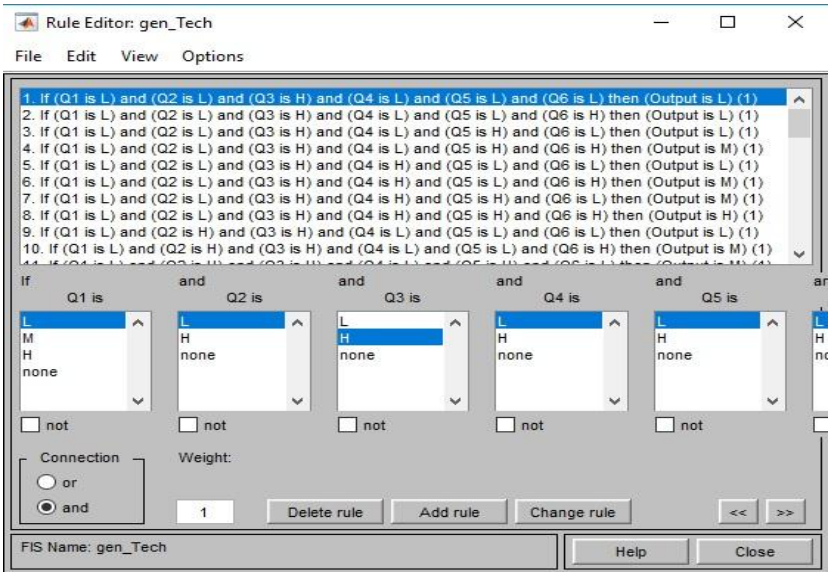

Fig.7 Rule generation for technical

In figure 7 technical rule generation, the different rules generated based on six inputs and one output. The logic behind rules easily derived. For example,

Rule1: if (Q_1 is low and Q_2 is low and Q_3 is high and Q_4 is low and Q_5 is low and Q_6 is low) then (output is low). In this same model, the different rules are generating.

Communication rule generation

Figure 8 shows communication rule generation, in this a variety of rules are generated based on 16 inputs and one output. The logic behind rules easily derived. For example,

Rule1: if (Q_1 is low and Q_2 is low and Q_3 is low and Q_4 is low and Q_5 is low and Q_6 is low and Q_7 is low and Q_8 is low and Q_9 is low and Q_{10} is low and Q_{11} is low and Q_{12} is low and Q_{13} is low and Q_{14} is low and Q_{15} is low and Q_{16} is low) then (output is low). In this same model the different rules are generated.

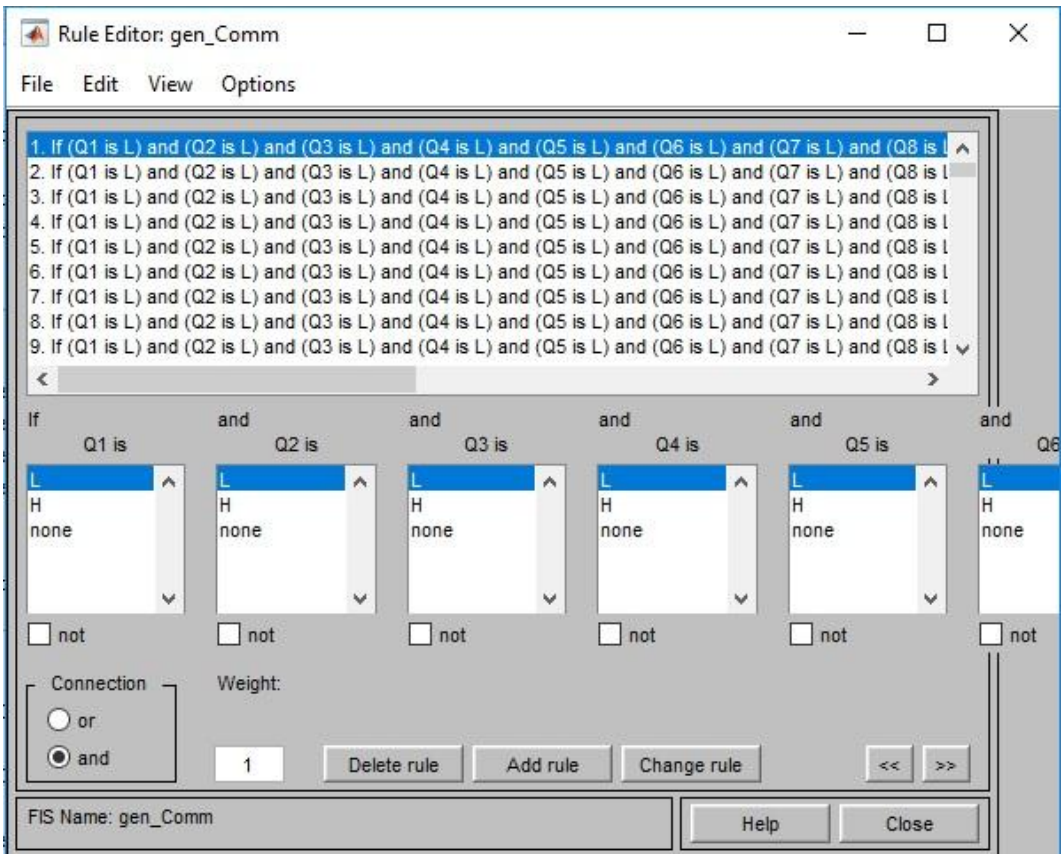

Fig.8 Rule generation for communication

Attitude rule generation

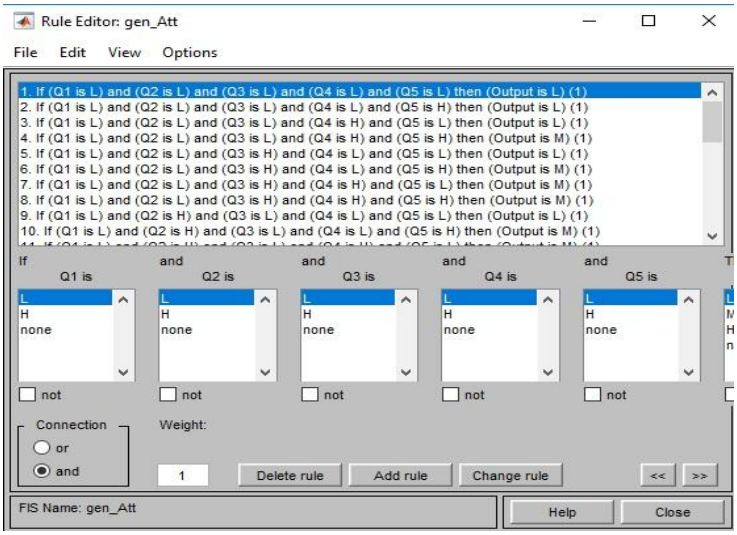

Fig.9 Rule generation for attitude

In figure 9 attitude rule generation, the various rules generated based on five inputs and a given output eligibility score. With the possible combination of predefined linguistic variable, the aforementioned rules generated. For example,

Rule1: if (Q_1 is low and Q_2 is low and Q_3 is high and Q_4 is low and Q_5 is low) then (output is low).

Combined fuzzy system rule generation

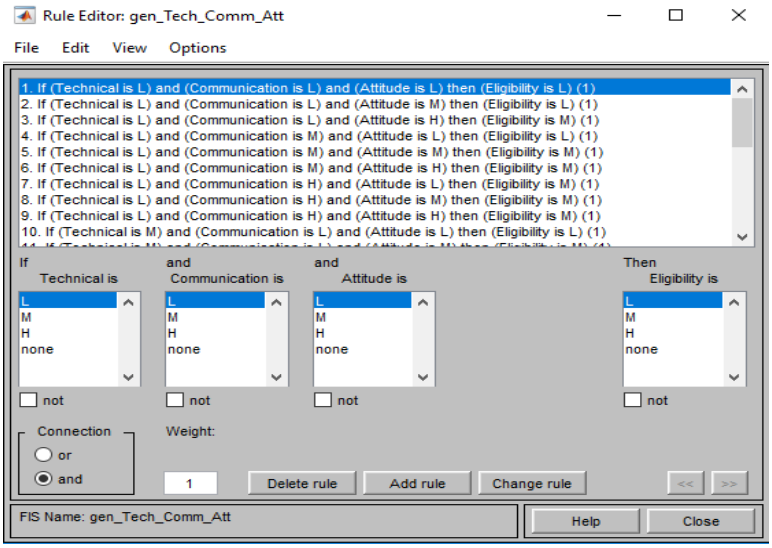

Fig.10 Rule generation for combined

Figure 10 shows the rule generation for estimating cumulative eligibility score, in this various rules generated based on three inputs (technical, communication and attitude) and eligibility output. With technical, communication and attitude the linguistic variable low, medium and high combinations of all possible probabilities get together to generate rule.

For example,

Rule1: if (technical is low and communication is low and attitude is low) then (eligibility is low).

Defuzzification

In light of the rule, the defuzzification is analyzed by different strategies for foreseeing output. There are a few strategies for defuzzification like the centroid method, maximum method, height method and so on. In the centroid method, the crisp value of the output variable is assessed by finding the variable estimation of the centre of gravity of the membership function for the fuzzy value. In the maximum method, one of the variable qualities at which the fuzzy set contains its most prominent truth-value is taken as the crisp value for the output variable.

4. RESULTS AND DISCUSSION

This section comprised of various analysis for identifying the skills of candidate brought up from urban and rural environment. This analysis ensure that both candidates having well stuff in grabbing employment opportunity from Multi National Companies (MNC). Let us discuss the detail description of college based urban and rural analysis, department based urban and rural analysis, attributes (Technical, Communication and Attitude) based urban and rural analysis and finally individual student wise urban and rural candidate's comparison. This complete analysis process implement in the working platform MATLAB installed in 6GB RAM, i3 processor Intel (R) Core (TM) i3-2328M CPU @ 2.20GHz.

College wise comparison

Here, ten engineering colleges from urban and rural environment are randomly select for analyzing skills of the candidates. This analysis shows the evident results that both environment college candidates reveal almost similar eligibility score, but fact is college situated in urban environment having slightly having upper hand than college situated in rural environment. In average, college located in urban environment having eligibility score of 98.36% and in other hand college located in rural environment having eligibility score of 96.85%; which shows that the rural environment based college eligibility score 98.07% close to urban environment based

college eligibility score. This analysis shows hiring employer that the college from rural environment also having close enough potential for employment opportunity.

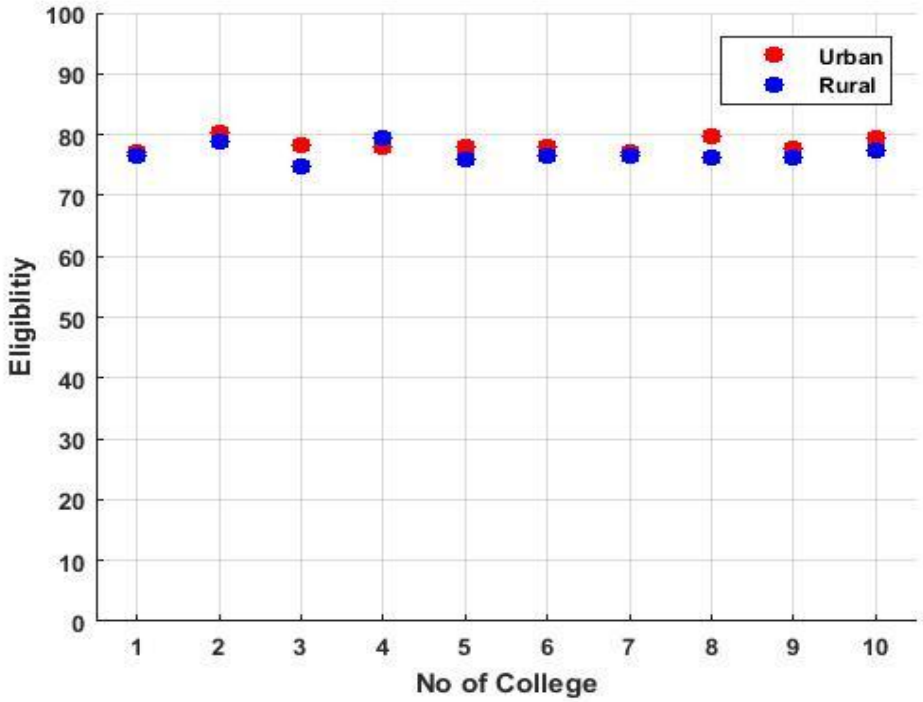

Fig.11 College vs Eligibility score for urban and rural candidates

Department wise comparison

This is another sort of analysis in this investigation, which carried out six different engineering departments from urban and rural environment. Among six engineering department, in CSC, ECE and EEE both urban and rural eligibility score almost collide in single point whereas in Civil, IT and Mech urban take an upper hands. In general, the average eligibility score for urban based candidates in the department having 98.31% and rural based candidates in the department having 76.85%; which shows that the rural environment based departments in the college eligibility score 98.13% close to urban environment based departments in the college eligibility score.

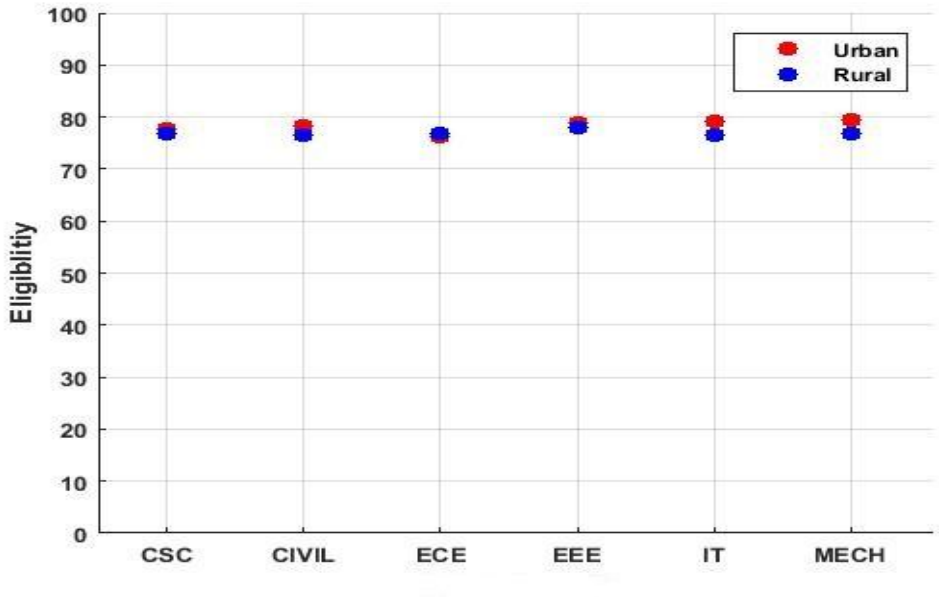

Fig.12 Department vs Eligibility score for urban and rural candidates

Attribute wise comparison

This is key significance section of analysis in this investigation; three attributes which laid the platform in this investigation namely Technical, Communication and Attitude. Three different sorts of question patterns for aforementioned attributes resolve the unstable situation in grabbing employment opportunity between urban and rural environment candidates. For technical, we try to develop seven different questions out of which six questions answers fed to fuzzy logic system to evaluate its eligibility score likewise communication carries three different criteria namely general, testing sentence skills and testing reading skills and finally for attitude five different questionnaire for testing the candidates intellectual skills towards employment. In technical questionnaires, rural candidates take a lead of 77.97% than urban candidates, for communication questionnaires both urban and rural places a trailing role; whereas urban take a lead, as 65.43%, for attitude the questionnaires are fames in the basis of candidates from urban and rural environment behave intellectually in working environment for the benefit of the concern. Whereas urban candidates takes the lead 78.69% over rural candidates and rural candidates having narrow escape of 95.27% in urban candidates.

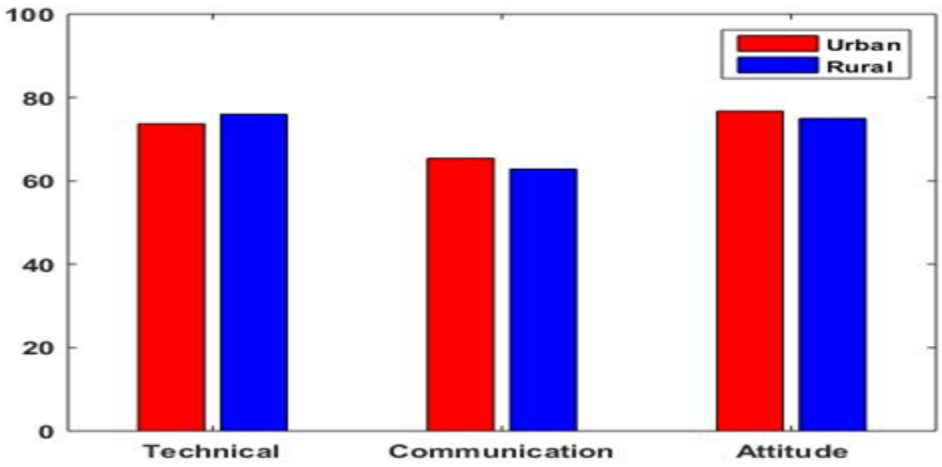

Fig.13 Attributes vs Eligibility score for urban and rural candidates

Cumulative analysis for urban and rural candidates

This section conspire cumulative performance analysis between rural and urban candidates towards employment skills. It is quite evident that both rural and urban candidates having almost similar potential in their knowledge and ability to grab employment from companies. Intense analysis reveals that the urban candidate takes a marginal lead over rural candidates, this analysis classify the graph in three stage first and top most is eligible level, second and mid position is average and least and third position is unfit level. Urban candidate contribute 11.6% and rural contribute 10.2% in eligible level, in average stage both urban and rural environment contribute 84.6% and 84.2% respectively. In least stage urban contribute 3.8% and rural contribute 5.6% in the cumulative analysis.

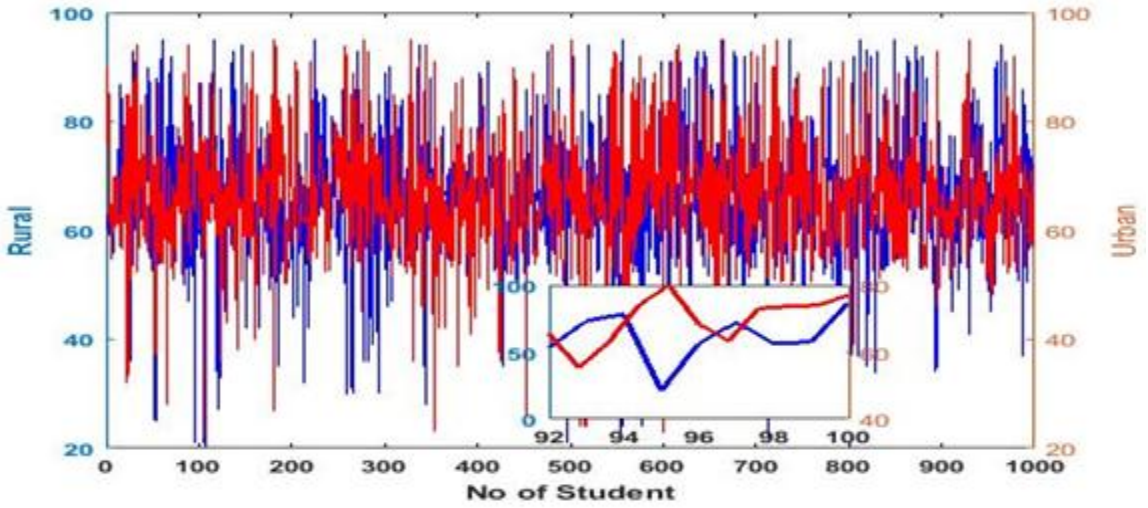

Fig.14 Cumulative eligibility score for urban and rural candidates

5. CONCLUSION

The intention of exposing educational quality of urban and rural candidates well executed in this analysis. From the different aspect of analysis, it is quite evident that the rural environment candidates having slight upper hands though rural environment based candidates having 96.38% close enough with urban candidates. Especially in technical skills, rural candidates having upper hands over urban candidates, an urban candidate lags 2.92% than rural candidates in technical skills. This analysis reveals the skills of rural candidates and their potential in employment towards upcoming employment opportunity from reputed companies. The entire process utilizes the working platform MATLAB that incorporates fuzzy logic system as a tool to execute effectively. We assure, with this effective analysis impartiality scenario in urban and rural environment towards grabbing employment, opportunity will continue. In future the generation of rules in this analysis process will seriously taken care of to conserve the time consume in this process alone without compensating the accuracy of result.

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