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ADVANCED QUESTION PAPER GENERATOR USING FUZZY LOGIC

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Abstract - *The current generation is very competitive in nature, hence examination is needed at each level which is used to test the quality of student's knowledge and expertise in a particular field. So it becomes necessary to conduct exams more frequently which is difficult with the traditional way of manually question paper setting. In this paper we propose a system named as Advance Question Paper Generator which provides feature to automatically generate a question paper. In this system the concept of Fuzzy Logic in soft computing is used which allows to generate a paper every time uniquely. The paper can be generated even before few minutes of examination which denies any possibility of paper leakage, hence security is also provided.*

Key Words: **Fuzzy Logic, Analytical, Descriptive, Fuzzification, Defuzzification**

1 INTRODUCTION

Education has become essential thing for human kind. Education has ability to change the life of a person. It is very important to evaluate students' knowledge about some particular subject he/she is learning, so the system has to be designed and administered in a systematic and precise manner. The ongoing examination system i.e. currently being followed in most of the educational institutions is very conventional and old. Thus it becomes inefficient to evaluate the knowledge gained by the students. The predominant and most followed classical methodology is that, some predetermined faculties are responsible for a syllabus and allocated the task of framing a question paper. In this case, some of the so developed questions are picked up randomly and used to generate the paper which evaluates students' knowledge and thus, this method is stated as Classical or old-school Method. This classical method of paper generation suffers from the following disadvantages: dependency on intelligent people which might increase the probability of error as they might have different levels of knowledge on some particular topic from the syllabus or they might like some particular questions which results in degrading the quality of question paper that is being set, there are chances that proper consideration might not be given to important part of syllabus ,secrecy may get compromised and full utilization of resources might not be possible, hence raising the cost. To overcome these disadvantages, Advanced Question Paper Generator (AQPG) is being proposed, so as to make the system more efficient, reliable, improve the paper setting quality, and also to reduce the time taken by the instructor in setting the question papers. It can also help to solve some critical issues like duplicity, cost, time wastage and above all the secrecy of question papers. To frame an exam question paper, various parameters are to be considered; like difficulty level, amount of numerical type questions, theoretical questions, weight age of questions according to marks etc. We cannot exactly tell that this particular question is difficult and that one is easy. Every person has different approach to look at the question. Some people may find it easy, some may find it difficult or some may find it moderate. Defining exact level of the question like easy, medium, hard then storing that level in database and just retrieving those questions from database using simple queries is not a feasible option. Humans are good in approximate reasoning. We can have advantage of both types of reasoning for computation. Fuzzy Logic can utilize human reasoning effectively. In this paper a Fuzzy logic based approach is implemented for logical selection of level of the question, while framing question paper for every subject irrespective of its discipline. System decides the paper pattern, difficulty level and what user wants by taking some inputs from the users. Also system can extract data from various previously existing databases which also reduces the work of manually entering questions into the database. Use of random function will give new paper every time, However probability of giving same paper two or more times is almost negligible.

2 LITERATURE SURVEY

We have done the survey of existing papers and found following information:

In the first paper we referred fuzzy logic and apriori algorithm is used for generating question paper. In this login module can differentiate between admin and staff. Admin fills the information about staff members, give them access credentials and various rights. All the operations such as question insertion, modification, deletion are possible in the system. System uses 'TOP N Query' method of fuzzy logic. This method limits the number of rows returned from ordered sets of data. Also TOP N query method chooses random questions every time. Apriori algorithm is used for data mining where importance is given to the frequently occurring items. Paper is generated according to user defined level. Paper is stored in txt format. In Apriori large number of questions sets are analyzed every time and hence it results in large number of computations. [1]

In the second paper, they have used fuzzy logic to determine the level of the questions. In this all users for particular question enter analytical and descriptive indices. They have divided this process into three stages. In this system, analytical and descriptive parameters may alter depending on all users' response. Changing values increases number of calculations and hence workload increases. [2]

In this System question paper containing multiple choice questions is generated. System is based on two techniques which are fuzzy logic and ants' colony. In this system admin has rights to enter the questions and their respective options into the database. Admin also provides the weightage and complexity level for the questions. In this admin chooses type of the paper (which can be easy, medium or hard) and generates question paper. After generation of pdf file, System makes email to the appropriate college. It is mainly required for competitive exams. [3]

3 EXISTING SYSTEM

The current system is manual and used in most of the institutes and universities which says that one or two person has authority to set the paper. Some of the professors just refer previous year paper and generate paper with very small amount of innovative work. However in this there is major problem of security. It may cause paper leak. This conventional system does not consider all respective professors' view at the time of question paper generation. Also the time taken by this method is also more. Other System we referred is based on apriori algorithm which gives importance to frequent item sets due to which some questions may omit totally and won't be included at all. This may also omit some important questions.

4 PROPOSED SYSTEM

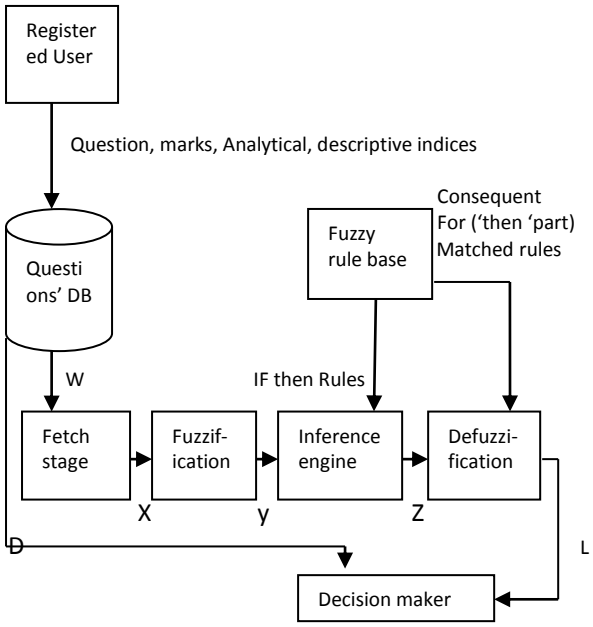
Our AQPG is based on fuzzy model which will be implemented using Microsoft visual studio. We will use Microsoft SQL server as a database management system. Our System will have registration and login functionalities. After registration, the credentials provided by the user will be verified by the admin.

If user is authenticate then admin will make his username and password valid and access will be granted. While registration user can select maximum four subjects for which he wants to set the paper. Admin has rights to change the subjects of a particular user. Each question has attributes like analytical index, descriptive index and marks. While entering the question into database, registered user has to enter its analytical, descriptive indices and marks. Analytical index specifies amount of thinking or reasoning required to solve a particular question. Highly analytical index means question tends to difficult level. Descriptive index means how much theoretical the question is. User can also modify Analytical index, Descriptive index of the question. Average of previously existing indices and user entered indices will be stored into database. User can also delete the question. If all users of that respective subject are agree for deletion then that question will be deleted. These indices are fuzzy input descriptors. Fuzzy output descriptor for a particular question is the level of the question. We have five levels namely-very easy, easy, medium, difficult and very difficult. We will make the system distributed with questions' database deployed on one node or server.

5 METHODOLOGY: FUZZY LOGIC

Lotfi Zadeh, a professor in California is founder of fuzzy logic. The use of fuzzy logic has increased considerably in wide variety of applications of fuzzy in recent years. The applications comprises of hardware as well as software products. We know that humans are very good in approximate reasoning and can interpret vague information. We have two types of sets – fuzzy and crisp. Crisp set theory says that degree of membership of an element to a particular set can be either zero or one. Consider example in which we have two sets even and odd with natural numbers as a universal set. In this example, number can be either even or odd. There is fixed boundary between even and odd numbers. So there is no confusion

and we can have 100% degree of membership for any number to a particular set. But some real life estimations cannot be derived using crisp set theory. Consider height of a man, say 1.8 meter. We cannot exactly tell whether he is tall or medium heighted, but we can have degree of membership to both sets (like 0.7 for 'medium' and 0.4 for 'tall'). This degree also varies from person to person. Some people may say that 1.8 meter height falls in tall category while some may say that it falls in medium category.



W=Analytical & descriptive indices (crisp form).
X= Analytical & descriptive indices.
Y=sets corresponding to indices & their membership values for those sets.
Z=set of matched rules, membership values.
D=Question and its level.
L= Level of the Question

Where X, Y, Z are labels for the arrows which are above them.

Important components of fuzzy model with respect to our system

5.1 Questions' database: This is the database which contains various subjects' relations (tables). Attributes of subject relation are serial number, question, Analytical index, Descriptive index, marks.

5.2 Fetch stage: This is a block of code which fetches the questions after getting particular subject's name from a valid user. It passes Analytical index and Descriptive index to the fuzzification block.

5.3 Fuzzification: After getting crisp input from fetch stage,
This block decides appropriate fuzzy sets for these crisp values and gives membership values for those sets. For example: Particular question's membership value (u) for 'difficult' set is 0.8 and 'very difficult' set is 0.5. Where 0<=u<=1.

5.4 Fuzzy Rule base: This module stores fuzzy rules generally in the form of two dimensional array. This module is read-only and is designed by the system developer. However storage technique or data structure for rule base is also decided by the system developer. This module should be designed carefully because it will play very important role while decision making.

5.5 Inference engine: This is also very important module. This will match if then rules and select some rules out of predefined rules (say 4 rules out of 16). Membership values for those rules will be passed.

5.6 Defuzzification: This block uses min-max composition function for our system. It takes membership values from previous stage, does certain computations and finally gives level of the question.

5.7 Decision Maker: This module gets level of the particular question from defuzzification stage and user selected level. If user selected level matches with the level given by Defuzzification block, then question is included otherwise rejected.

6 CONCLUSIONS

With this paper we present a system which is standalone application as Advance Question Paper generator designed for educational organization in such a way that, a question paper is generated with the set of predefined questions in the database. Operations like question insertion, modification, deletion are also possible in this system which makes it dynamic. In this, it is ensured that each time the question paper generated is unique. With this system the question paper can be generated on the day of examination, so it eliminates the chance of paper leakage.

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