Automated Question Paper Generator System using Apriori Algorithm and Fuzzy Logic

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Abstract

Education has become an integral part of our society today. Hence examinations play a vital role in testing student's performance. And that is why it is important to have a smart development question model for growth of students as well as to test their learning skills thereby keeping a check on student's performance. Generating an effective question paper is a task of great importance for any educational institute. The traditional method, where lecturers manually prepare question paper, it is very tedious and challenging. Hence, we present the solution in form of Automated Question Paper Generator System which makes use of Fuzzy and Apriori algorithm. It is made to allow universities to generate question papers with random but even questions to cover most chapters of subject with difficulty level within seconds and mail them to colleges instantly.

Keywords: Apriori, Examinations, Fuzzy, Student performance, Traditional method

I. INTRODUCTION

Education is the backbone of society and examination is of great importance, so the system has to be designed and administered in a systematic manner. The examination system i.e., being followed in most of the educational institutions is conventional and is unable to access the knowledge gained by the student. The predominant methodology is that, a certain predetermined number of faculties are handed over a syllabus and allocated the task of framing a question paper out of it. One of so developed question papers is picked up randomly and used for the purpose and this method is stated as Classical Method. This system suffers from the following disadvantages: dependency on intelligence of single person might raise the probability of error, due consideration might not be given to important part of syllabi, secrecy may get compromised and full utilization of resources might not be possible, hence raising the cost. According to the need, an autonomous system named as Intelligent Question Paper Generation System (IQPGS) is proposed, so as to make the system more efficient, reliable, improve its quality, and also to reduce the time taken by instructor in setting the question papers manually. It can also help to solve some critical issues like duplicity, storage of previous data and above all secrecy of question papers. Framing of a question paper requires a number of parameters to be considered; like difficulty level, numerical and theoretical content of the paper, weightage of questions according to marks etc. Although these parameters are matter of approximate reasoning because while deciding the paper manually, there are no such hard and fast rules for every subject to follow some common terminology. Every subject has a different approach. So, precise rules cannot be made about the numerical and theoretical content, difficulty etc. of the paper. Defining separate rules for each subject of every discipline is not a feasible option and is quite illogical. Humans are good in approximate reasoning but not in precise one, converse is true for machines. We can have advantage of both types of reasoning for computation. Fuzzy Logic can utilize human reasoning effectively. In this paper present the solution in form of Automated Question Paper Generator System (AQPGS) which makes use of Fuzzy algorithm.. It is made to allow universities to generate question papers with random questions to cover most chapters of subject based on the difficulty level within seconds and mail them to colleges instantly [1]. In this system we allow the admin to give rights to staff to input a set of questions. We also allow staff to provide weight age and difficulty for each of these questions. After this the questions are stored in the database along with their weight age and difficulty. Now on question paper generating time the staff just has to select the difficulty of entire paper. Then the system selects questions in a way that their weight age makes up for 120 marks and depending to difficulty the questions are chosen. The type of paper difficulty is Easy, moderate, difficult. The project also has an option of adding multiple choice questions which can be used to create a question paper for aptitude exams

which are conducted by companies during placements. The system automatically generates paper, prepares doc file as per selected paper format. Also emails it to other colleges.

II. PROPERTIES AND FEATURES OF QUESTION PAPER

A typical examination question paper is divided into several sections which indicate different type of questions.
Each question paper has multiple properties to define its attribute. These properties are required to achieve objectives [2].

1) Marks: The marks for each of question. The marks are set by the staff.
2) Total Marks: Indicate the overall marks for the examination paper.
3) Level: Indicate the difficulty level for each main question.
4) Total Time: Indicate total time required to complete the examination[3].
5) Number of Question: As per Mumbai University pattern, 6 main questions are generated.

The following are the features of question paper system:

1) Admin login
2) Question Insertion
3) Difficulty Choosing
4) Random Paper generation
5) Wide Chapter Coverage
6) Doc File Creation
7) Emailing

III. IMPLEMENTATION

A. *Modules in Automatic Test Paper Generator:*

- Login Module
- Administrator Module
- Staff Module

1) Login Module:

Login Module is divided into two parts as Staff Module and Administrator Module. In Login Module, Administrator as well as Staff member will enter their credentials i.e. Login id and Password to access the proposed system.

2) Administrator Module:

Administrator Module has two major roles: Staff Management and Category Management.

1) Staff Management – In Staff Management, First Admin will enter his Login id and Password and then he will add staff to the system and give rights to staff members to add/update questions and generate paper.
2) Category Management – Admin will manage Categories according to the Department.

3) Staff Module:

It has following roles:

1) Question Entry –Staff member will make question bank by entering questions along with difficulty level and this question bank will be store in the database. The questions can also be updated or deleted.
2) Generate paper- By specifying the difficulty level, question paper is generated
3) Test Paper Customization – Since this system is generating paper in txt format, staff member can simply make changes in test paper. If Staff member wants to change questions of the test paper, he/she can customize test paper by simply editing questions of test paper.
4) Emailing- The generated paper can also be mailed to colleges/ universities.

B. *Steps involved in Automatic Test Paper Generator*

1) Step 1: When the application starts with a login window where admin or Staff member will enter their credentials i.e. Login id and Password to access the proposed system. According to admin or staff member, the user validation takes place
2) Step 2: After successful admin authentication, the admin can add categories and staff details to the database and give login id and password to each Staff member.
3) Step 3: After successful staff authentication, questions along with its difficulty level can be added to the database by staff member.
4) Step 4: The staff member will generate test paper by entering difficulty of question paper.
5) Step 5: Then staff has to click on the "Generate Paper" button to generate test paper. Test paper is generated should be saved in text (.txt) format.

IV. METHODOLOGIES

A. Fuzzy Logic Algorithm

Classical logic only permits conclusions which are either true or false. However, Fuzzy logic has been extended to handle the concept of partial truth, where the truth value may range between completely true and completely false. One such method of applying fuzzy logic is Top-N queries. Top-N query is used for limiting the number of rows returned from ordered sets of data. They are extremely useful when the top or bottom 'N' number of rows has to be returned from a set of data. In the proposed system, Top-N query helps to select random questions from the question set. Question once selected is stored in a different database and every time new questions are entered, it selects the questions apart from the ones contained by that particular database holding questions that are previously entered. Thus every time random question paper is generated.

B. Apriori Algorithm

Apriori algorithm is itemset mining. It can fetch data using subsets of subsets from large transactional databases. It proceeds by identifying the frequent individual items in the database and extending them to larger and larger item sets as long as those item sets appear sufficiently often in the database. Apriori uses a "bottom up" approach, where frequent subsets are extended one item at a time. The algorithm terminates when no further successful extensions are found. Apriori uses breadth-first search and a Hash tree structure to count candidate item sets efficiently. In the system, once paper generation commences, questions from the corresponding category is fetched by Apriori algorithm. Firstly it fetches for the specified category name/subject name. The algorithm then searches for the difficulty level mentioned by the admin from the existing difficulty levels namely: Low, Medium and High. Questions are then selected from the database since there are no further subsets available.

V. RESULT

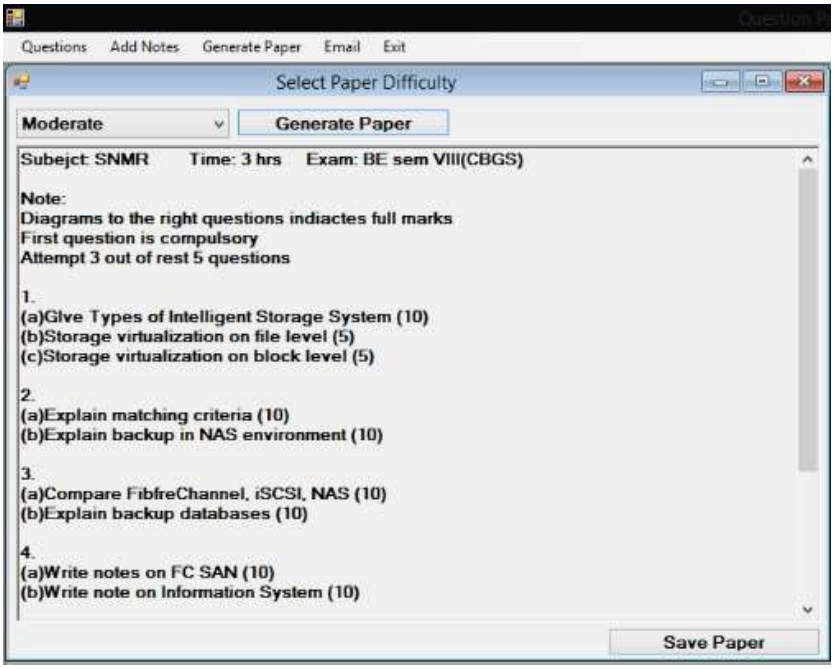

Fig. 1: Output paper

In order to generate the question paper, the user (staff) needs to specify difficulty level (Easy, Moderate and Difficult). According to the difficulty mentioned the paper is generated where the questions are fetched randomly and are displayed according to a particular skeleton depending upon the difficulty. The paper has additional details mentioned at the beginning of the paper. The paper generated is then saved in and can be mailed to different universities or colleges.

VI. CONCLUSION

A novel prototype of fuzzy logic scheme has been described in this paper. The main purpose of this application is to describe automatic question paper generator using fuzzy logic for randomization. This system is desktop-based application system with several features mainly producing unduplicated sets of exam paper. The result shows the potential proofs of employment of such algorithm for this type of system. Our future effort is to employ different types of randomization as well as in addition to question generation we can enhance the same software by making provision to produce questions from simple text, which can be achieved using natural language processing algorithms.

ACKNOWLEDGMENT

On this momentous occasion, we wish to express our immense gratitude to the range of people who provided invaluable support in the completion of this project. Their guidance and encouragement has helped in making this project a great success. We express our gratitude to our project guide Prof Supriya Mandhare, who provided us with all the guidance and encouragement and making the lab available to us at any time. We also would like to deeply express our sincere gratitude to Project coordinators. We are eager and glad to express our gratitude to the Head of the Information Technology Dept. Prof Neelima Pathak, for her approval of this project. We are also thankful to her for providing us the needed assistance, detailed suggestions and also encouragement to do the project. We would like to deeply express our sincere gratitude to our respected principal Prof. Dr. Shrikant Kallurkar and the management of Atharva College of Engineering for providing such an ideal atmosphere to build up this project with well equipped library with all the utmost necessary reference materials and up to date IT Laboratories. We are extremely thankful to all staff and the management of the college for providing us all the facilities and resources required.

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