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Automatic Generation of Question Paper Using Blooms Taxonomy

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Abstract - *Information and intelligence are two vital columns on which development of human kind rise and knowledge has significant impact on operating of society. Student assessment is a crucial part of teaching and is done through the process of examinations and preparation of exam question papers has consistently been a matter of interest. Present-day technologies assist the teacher to stock the questions in a computer databases but the problem which emerges is how the present day technologies would also assist the teachers to automatically create the variety sets of questions from every now and then without worry about replication and duplication from the previous exam while the question bank keeps growing, so a non-automatic path for conniving a exam paper would not be able to serve to this need so in this paper we introduce an automated way which would permit the operation of conniving exam paper to be further well organized and productive and it would also aid in developing a database of questions which could be further classified for blending of exam question paper, currently there is no systematic procedure to fortify quality of exam question paper. Hence there appears a requirement to have a system which will automatically create the question paper from teacher entered description within few seconds. In this paper we have implemented a modern evolutionary path that is able to manage multi-constraints issue along with creating question papers for examinations in autonomous institutes from a very vast question bank database. This paper describes the utilization of randomization algorithm in an Automatic Question paper Generator System which has been implemented specially for autonomous institutes.*

Key Words: **Learning objectives, assessments, question paper, cognitive level, tagging, question repository.**

1. INTRODUCTION

It is very challenging for the teachers to cover all aspects of the course objectives and avoid duplication of questions in the subsequent exams. There are no standardized methods and hence the quality of the question paper depends completely on an individual teacher's experience and expertise.

Simply to download the template, and replace (copy-paste) the content with your own material. Number the reference items consecutively in square brackets (e.g. [1]). However the authors name can be used along with the reference number in the running text. The order of reference in the running text should match with the list of references at the end of the paper.

Here we are proposing a system which automatically generates the question paper from this semantically tagged question repository. Since the existing systems are rigid and lack the flexibility of supporting all types of tags, the generated question paper may not be totally aligned with its given objectives. Our system supports all four tags and also flexible enough to provide an interface that allows user to enter specifications for each tag/property in the form of lower and upper bounds. Each property is specified with a range indicating that value should not be lower than minimum value and not exceed the maximum value of the range. Also, it is rule base system which takes all the combinations of the tags and generates output based on the rule applicable. The output is generated in xml format and in word document

Question Paper Generation In today's current ambitious world, an examination plays a crucial role in checking the academic development of students and the era of information technology is now substituted by productive application of the technology. So producing utility from knowledge is crucial for development of society into an "Information Society". For various examinations conducted in a year in any academic course, teachers need to create variation of question papers as per the autonomous college guidelines and assessment requirements. It is very difficult for the teachers to cover all features of the course outcomes and evade duplication of questions in the succeeding exams. There is no systematic procedure and hence the quality of the question paper relies entirely on an individual teacher's experience and proficiency. At times, this entire element may degrade standard of the question paper. As per research, a quality question paper is a real combination of questions supervised by varied criteria such as difficulty level, distribution of marks across the question paper in form of paper pattern and the type of examination. The procedure involved in composition of an equitable examination paper by an independent is challenging and complex. Standard of the examination paper rely on diverse set of specifications so taking into account the distinct levels of learners is also a crucial parameter and the course outcomes also play a vital role in planning a systematic question paper. So associating the learning outcome of the subject to the examination paper is also a great job. With the profound dispersal of technology in the area of education, acquiring technology to smooth the

technique of examination paper creation is a pure option and creation of extensively vast question bank and automatic exam paper generation furnishes a key provision to the issue encountered during the manual composition of examination papers. Automatic creation of examination paper yields a stage to create a well-organized examination paper and also the automation would smooth in incorporating many elements determining quality of a question paper. The structure presented in the next module is to automate the activity of examination paper generation. The system would be comprised of a cluster of questions upon which regulation would be implemented to create question paper. The structure is general and is not for any specific branch of learning. It seeks to furnish a generic procedure to the diverse requirement of distinct fields of study. This generic structure can be redesigned to all departments in colleges thus ease the assessment needs. Before the exam could be given to the student, teachers must compose the questions according to the modules covered for individual subject. A proficient question paper is habitually fit for usual students but it also encloses demanding items for clever students. Thus automatically creating question paper from a teacher's entered description using a semantically labelled question bank is the requirement of the hour in present day. Here we are implementing a system which accordingly creates the question paper from this semantically labelled question bank.

1.1 Objective

1. To make question papers with varied questions and which meet learning objectives of the course.

2. To generate the question paper from teacher entered specification within few seconds.

3. To cover all aspects of the course objectives and avoid duplication of questions in the subsequent exams.

1.2 Literature survey

The existing Learning Management Systems (LMS) support very basic level or limited tags such as question types [7]. Even the most preferred LMS, Moodle allows creating only subjective/objective type of questions. Thus automatically generating question paper from a teacher's entered specification using a semantically tagged QR is the need of the hour today. The system to semi automatically tag the questions of a repository is in place [8]. Here we are proposing a system which automatically generates the question paper from this semantically tagged question repository. Since the existing systems are rigid and lack the flexibility of supporting all types of tags, the generated question paper may not be totally aligned with its given objectives. Our system supports all four tags and also flexible enough to provide an interface that allows user to enter specifications for each tag/property in the form of lower and upper bounds. Each property is specified with a range indicating that value should not be lower than minimum value and not exceed the maximum value of the range. Also, it is rule base system which takes all the combinations of the tags and generates output based on the rule applicable. The output is generated in xml format and in word document.

A literature survey was started to understand the need for automatic generation of QP. As mentioned in [7], many existing LMS support tagging feature but users may not utilize this feature fully. The comparative study shows that Moodle is best LMs to support large number of users and also for any educational institution [7] [9]. But it allows user to define only question type. Hence the questions in the repository may have only basic tags or no tags at all. So it becomes overhead for teachers to tag these questions before using them. Properly tagged questions can be efficiently retrieved from repository [10]. Hence it is very much necessary to tag the questions before adding them to repository. Most teachers and researchers recommend four types of tags such as topic, question type, cognitive level and difficulty level. A system which offers generation of question paper using user given input parameters considers only fixed range of values [1]. Our system not only supports upper and lowers bounds for inputs but also supports more granular level of topics than chapters and more question types as compared to only three types offered by this system. We are using automatically tagged question repository as input instead of untagged questions. Automatic Question Paper Generator System described in [2] has great interface, but supports only question type tag. Hence the question paper generated would have only one difficulty level

A. Existing Paper-based Systems

The existing system for Question Paper Generation requires human staff to chalk out questions that appear in the question paper. These teachers or professors select the questions according to the syllabus and pattern as prescribed by the curriculum. The question paper then may be referred to a higher authority who has the final say in these matters [5]. B. Limitation of Paper-based Systems As most human working processes, this system suffers due to bias. There might be some questions which are repeated in many question papers as the professor has a personal inclination towards them. So there is no guarantee of pure randomly generated question paper. Other problems that may plague this system are non-availability of staff and resources, natural calamities and accidents. Also, the security of the system can be easily compromised if leverage over the person responsible for generating question papers is obtained. Other limitations include: -

a) Lack of storage space
b) Prone to damage
c) Inefficient document transportation
d) Supply costs
e) Poor environmental credentials

f) Limited collaboration

g) Editing problems

B. Existing Question Paper Generation Systems

The research paper „Framework for Automatic Examination Paper Generation System" has provided a thorough insight into the process of automated paper generation [3]. As the manual generation of a balanced question paper by an individual is quite complex, the blending of technology into teaching and learning process is inevitable. A simple and efficient way for an examination paper generation is provided. A three tier model is provided in this framework [3].

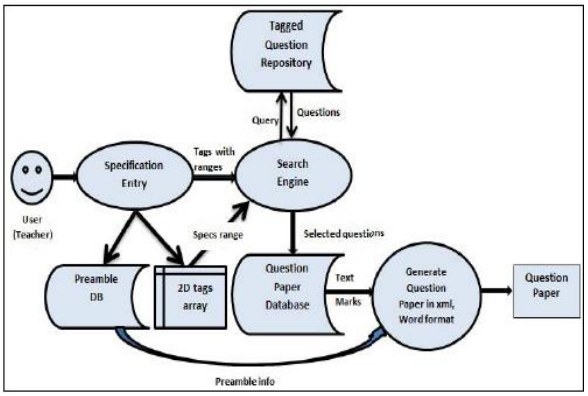
Generation of Examination Papers is governed by the Syllabus Engine, Pattern Composer and Question Aggregator.

The generated question paper is based on the pattern or skeleton of the course. Another component called Bank Management takes care of User Rights and Privilege assignment. Questions are entered through the Question Aggregator.

The attributes related to questions are type, marks and complexity. All these attributes are efficiently used during Question Paper Generation [3].

The paper generator selects a question according to the pattern and complexity. This engine also introduces marking systems wherein any selected question is marked so that it might not be selected again. This prevents repetition of questions in subsequent papers. Finally, generated papers are stored as pdfs [3].

1.3 Architecture Diagram



1.4 Input Database

A well tagged question repository contains questions with four tags: topic (content), question type, cognitive level, and difficulty level [8]. We are using Bloom's taxonomy for cognitive level [11]. The two tables i.e. Concept table and Question table of the existing repository will be used to extract information from database as per requirement. The Concept table stores the qid, topic names and chapter title of the question from a particular domain. The Question table stores the metadata about the semantically tagged questions. The attributes include id, cognitive level, question type, topic, difficulty level, question text and max_marks allotted to the question.

1.5 Specification entry

User will be asked to enter two types of specifications (i) the header or preamble; (ii) question paper specification.

a) Header/Preamble:

At the first level user will be asked to enter the question paper preamble specifications such as university, course, course_year, semester, subject, total marks, date of examination and notes if any. All the fields are validated for non-blank values. Only numeric values are accepted in marks field whereas rest of the fields accept alphanumeric values. The valid fields go to qp_header table to print them further on question paper.

b) Question Paper Specification:

The next web page interface will ask the user to select the Question Paper Specifications (QPS) and enter the values for each property in the form of lower and upper bounds. The validations on this page are done as follows: (i) only numeric values will be accepted in all the minimum and maximum range. (ii) The lower bound total for a tag must always be equal to 100 and upper bound total for tag must always exceed 100. (iii) Any upper bound value of a tag attribute must always be greater than or equal to lower bound value of the respective tag attribute. These validations also remain valid for question type, cognitive level and difficulty level min-max values.

User may also prefer to give partial specification to generate question paper on specific topics only irrespective of question type, cognitive level or difficulty level. For the given specification, the search engine will apply the rule base and extract the questions from the database which fits in all criteria specified.

2. SEARCH ENGINE

The valid specifications are received, the search engine starts searching for the question in a tagged repository which fit within the minimum and maximum marks range specified for a selected tag. The questions are picked up randomly every time from the repository. So, the user will get new set of questions for the same specifications next time

3. CONCLUSION

While the system designed by us stands out in all available systems, there is scope for more enhancements to make it

more useful. Depending on the type of assessment required, the system can be made to select particular question types. For example, if user wants assessment for online quiz, it could smartly include all MCQs. Or if user is choosing term test assessment, more objective type and short answer questions must be preferred. Also, users would be delighted to have a feature to present statistics for gaps in user given specifications and system generated specifications.

REFERENCES

[1] Vijay Krishan Purohit', Abhijeet Kumar', Asma Jabeen', Saurabh Srivastava', R H Goudar' ,Shivanagowda, "Design of Adaptive Question Bank Development and Management System", 2nd IEEE International Conference on Parallel,Distributed and Grid Computing, 2012.

[2] Kapil Naik, Shreyas Sule, Shruti Jadhav, Surya Pandey, " Automatic Question Paper Generation System Using Randomization Algorithm", (IJETR) ISSN: 2321-0869,Volume-2, Issue-12, December 2014.

[3] Kumar, Ajit, and N. Shukla. "Criteria for evaluating the quality of a question paper." Journal of Technical Education and Training 3.1 (2011): 1-6.

[4] J. Millman, and J. A. Arter, "Issues in item banking," Journal of Educational Measurement," 21(4), pp.315-330, 1984.

[5] W. Harlen and M. James, "Assessment and learning: differences and relationships between formative and summative assessment," Assessment in Education, 4(3), pp.365-379, 1997.

[6] J. Biggs, "Aligning teaching and assessing to course objectives," Teaching and Learning in Higher Education: New Trends and Innovations, 2, pp.13-17, 2003.

[7] Caminero, A.C. ; Dept. de Sist. de Comun. y Control, Univ. Nac. De Educ. a Distancia, Madrid, Spain ; Hernandez, R. ; Ros, S. ; RoblesGomez, A. , "Choosing the right LMS: A performance evaluation of three open-source LMS", Global Engineering Education Conference (EDUCON), 2013 IEEE, March 2013

[8] Ramesh, R. ; Mishra, S. ; Sasikumar, M. ; Iyer, S., "Semi-Automatic Generation of Metadata for Items in a Question Repository", Technology for Education (T4E), 2014 IEEE Sixth International Conference, Dec 2014

[9] Vyshnavi M R, "A rubric to Evaluate Learning Management Systems", Teaching, Assessment and Learning for Engineering (TALE), 2013 IEEE International Conference, 2013

[10] Saha, A.K. ; Univ. of Saskatchewan, Saskatoon, SK, Canada; Saha, R.K. ; Schneider, K.A., " A discriminative model approach for suggesting tags automatically for Stack Overflow questions", Mining Software Repositories (MSR), 2013 10th IEEE Working Conference , May 2013

[11] D. R. Krathwohl, " A revision of Bloom's taxonomy: An overview. Theory into practice," Vol. 4 41, pp. 212-218, 2002.

[12] J. Brooke, "SUS-A quick and dirty usability scale. Usability evaluation in industry, " 189, 194