WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Smart Question Paper Generator

Swasti Sudha Punyatoya[a], Muhammed Muzzammil Shah U[b], Joseph Alvin Sajeev[c], Joshua Jacob[d], Morishetty Rithwik[e]

[a]*Assistant Professor, Department of Computer Science and Engineering, MVJ College of Engineering, India*
[b,c,d,e]*Student, Department of Computer Science and Engineering, MVJ College of Engineering, India*
DOI: https://doi.org/10.55248/gengpi.234.5.39766

A B S T R A C T

The functioning of society, particularly for engineers, is heavily impacted by knowledge. Humanity's progress is based on two main pillars - Information and Knowledge. Educational institutions play a crucial role in creating competent youth, and the teaching and learning process needs to be reinvented to achieve this goal. Assessments in the form of tests and examinations are an essential means of identifying the impact of teaching and learning. Examinations complement the learning process, prepare students in their quest for knowledge, and play a pivotal role in this pursuit. As technology continues to advance, it will inevitably blend with the assessment process, particularly in the design of examination papers and formats. The standardization of test papers has been a persistent concern. Manual approaches to designing test papers cannot cater to the requirement of testing learners on various aspects of learning. An automated approach would make the process of designing test papers more efficient, effective, fast, streamlined, randomized, and secure. The proposed system ensures total randomization of questions, avoiding repetitions, and can be beneficial to many educational institutions

Keywords: Secure Login System, Question paper generation, Automation, Random generation with no repetition, Difficulty level based, and Producing PDF File.

1. Introduction

Creating question papers is an essential task for educators, but it can be time-consuming and challenging to generate unique sets of questions for each exam. The Question Paper Generator is an innovative tool that can simplify the task of generating question papers for educational institutions and organizations.

The Question Paper Generator has the potential to revolutionize the way educators create question papers, significantly improving the quality of education. By simplifying the process of creating examination papers, educators can focus on other aspects of teaching, such as preparing lesson plans and engaging students. The system is also scalable and can be adapted to different educational systems and levels. The Question Paper Generator provides a promising solution to the challenges of traditional examination systems. It reduces the workload of educators and creates different sets of questions that are unique for each examination that is being conducted, ensuring the authenticity of the examination.

The project is implemented using Python programming language and integrated with the web-based application using the Django framework. The application provides a user-friendly interface that allows educators to select the level of difficulty of the questions needed for the examination.

2. Literature Survey

A few works closely related to this field are mentioned below. In the first work,[1] They have developed a system to generate examination questions that prevent selected questions from being repeated.

In this reference [2], they use a different approach that uses a utility-based agent along with a shuffling algorithm, which uses an agent, as the name implies, to select the most appropriate question from the question bank while taking the student's performance data into account. where [1] does not use any kind of utility-based agent algorithms.

[3] uses a genetic algorithm to generate question papers. The system is designed to create randomized question papers that are unbiased. Another feature is that the system only allows administrators to enter a fixed number of questions and respective answers for option ticking. But here the authors have made a system such that the final paper generated was based only on the difficulty level selected.

In this paper [4], the generation of the paper is based on three main components: the question bank, the ontology, and the generation module. With the help of these, they can store questions considering the different parameters and also define relationships between various topics and concepts.

[5], the classification of the questions is based on concepts that can use linguistic and semantic features which further increases the accuracy of the classified questions compared to that of traditional methods.

In this reference, [6], the authors have tried to use randomization in such a way that it is difficult for the user to even predict the questions that are going to be generated. The system uses a database of questions and a randomization algorithm to generate question papers that are unique and difficult to predict.

[7], is a similar reference to [1], but the only difference is that it does not employ any algorithms to classify the questions. The author has set up an approach for predicting difficulty level in this citation [8]. In contrast to [5], which uses Arrays and Functions to access the question.

For this reference, [9] the authors used the Apriori algorithm and fuzzy logic in their system which generates question papers by analyzing the previous year's question papers and identifying the frequently asked questions.

For the last reference [10], the author has reviewed the different question paper template generators and the various generating methods involved, like genetic, and randomization algorithms, and concludes that question paper generators have the potential to develop as a whole. This paper also acts as a very resourceful material for anyone interested in developing an automatic question paper generator.

3. Proposed System

This Question Paper Generator has been developed to overcome the difficulties present in the existing system. Our system is user-friendly with an easy-to-adapt interface. This system is structured into two main sections: The Admin Privileges and the User privileges. The admin will have the highest privilege and access control across the entire platform. Only the Admins of the respective University can add users (i.e., Teachers) and the courses offered in their university. Apart from creating user accounts and adding courses, the admin will also be given the option to create the departments present in their respective university. Only the Admins have been given the privilege of deleting users, courses, or departments from the website. Teachers have access only to their respective departments, within which they can access the courses, add modules and add the Questions i.e., both MCQs and Theory questions in the respective modules. All the admin and user functionalities add to the security feature provided by the website. If a department has been removed, then all of its courses including the modules present within those courses along with the question banks will also get deleted.

3.1 Deployment

The entire platform will be Web-based i.e., it will be accessible through our highly responsive and well-designed UI Website. Both the Admins and Users will land on the same website. If an Admin has logged in to the website, an admin page can be accessed which will have all the features mentioned in the proposed system i.e., the power to Create, Update and Delete users, departments, and courses. If a User has logged into the website, then the admin page cannot be accessed including all the admin privileges which won't be visible to the user. The users however have the authority to go to their respective assigned departments, access the courses and add questions to each of the modules.

Finally, after all the questions have been added the admin can then go to the Generate Question Paper option in the admin page to download and view the final set of papers.

3.2 Advantages of the Proposed System

i. The proposed system allows the creation of Question Papers digitally with ease, avoiding the traditional method of setting Question Papers manually.

ii. Less consumption of time for formatting and editing the paper as the platform does the majority of the work.

iii. The Question paper is structured into Part A (MCQs) and Part B (Theory questions), where the questions are selected randomly from the database and the same question won't be repeated.

iv. The system automatically generates the required number of questions with the right number of marks so that it doesn't exceed the maximum mark weightage the paper is set for.

v. Provides a very efficient Question Paper generation system along with various security features to avoid any kind of paper leakages before the examination date.

4. Methodology

The generation of the paper goes through the following methodology: First, the admin selects the course and the difficulty level of the paper to be generated. Then the questions from each module of that course are taken from the database.

The final question paper generated will contain 2 main sections: Part A and Part B containing MCQ questions with a total of 20 marks and Theory questions with a total of 80 marks respectively. The structure for the MCQ section will have the following conditions: An MCQ question can be of

either 1 or 2 marks. The total marks selected from each of the five modules is 4, thus giving a total of 20 marks. So, from each module, a minimum of 2 MCQ questions or a maximum of 4 MCQ questions can be selected.

ALGORITHM:

Step 1: Create List ‘question_mcq’

Step 2: For each module in course:

Step 3: Create List ‘mcq’

Step 4: mcq_total=0

Step 5: While mcq_total< 4:

Step 6: Select ‘Q’ randomly from ‘mcq’ then add to ‘question_mcq’

Step 7: Remove ‘Q’ from ‘mcq’

Step 8: mcq_total=mcq_total+Q.marks

Step 9: If mcq_total==4

Go to Step 2

Similarly, the structure for the Theory section will have the following conditions: A Theory question can be of either 8 or 16 marks. The total marks selected from each of the five modules is 16, thus giving a total of 80 marks. The questions in each module are divided into two optional sets (i.e., either one of the two sets can be attempted). Each set is of 16 marks and hence each module contains a total of 32 marks only. A set can contain either one 16 marker or two 8 markers. Thus, the total number of questions in each module cannot exceed more than 4 and it cannot be less than 2.

ALGORITHM:

Step 1: Initialize easy=0, medium=0, hard=0

Step 2: Create List ‘question_theory’

Step 3: For each module in course:

Step 4: Create List ‘theory’

Step 5: Initialize theory_total=0

Step 6: While mcq_total< 32:

Step 7: If (easy or medium or hard) == MAX_LIMIT

Remove corresponding difficulty questions from ‘theory’

Step 8: Select ‘Q’ randomly from ‘theory’ then add to ‘question_theory’

Remove ‘Q’ from ‘theory’

Step 9: If Q.difficulty == easy

Add 1 to ‘easy’

Else if Q.difficulty == medium

Add 1 to ‘medium’

Else

Add 1 to ‘hard’

Step 10: theory_total=theory_total+Q.marks

Step 11: If theory_total==32

Go to Step 3

The selected questions are also based on the difficulty level set. There are three levels of difficulty: Easy, Medium, and Hard. For a paper with the overall difficulty selected as easy, the percentage distribution ranges from 55% - 65% for easy questions, 30% - 40% for medium questions, and 0% - 10% for hard questions. Similarly, when the overall difficulty is set to medium, the percentage distribution ranges from 35% - 45% for easy questions, 40% - 50% for medium questions, and 10% - 20% for hard questions. And finally, when the overall difficulty of the paper is set to hard, the percentage

distribution ranges from 15% - 25% for easy questions, 35% - 45% for medium questions, and 35% - 45% for hard questions. Once the questions are selected based on the percentage distribution of the difficulty levels, the question paper is generated. The admin can now view and download the final question paper as a PDF file. One major advantage is that all the generated final question papers are stored and can be used for future reference.

4.1. Database Collection

Django framework has been used for creating the website along with its provided feature of Administration of the backend database. The Django Administration page consists of two main sections: 'Authentication & Authorization' tables and User-created tables. The 'Authentication & Authorization' section contains the tables Users and Groups which are used for storing the information of the users and departments respectively in their particular organization. The User-created tables section consists of the tables that were specifically created for this project which include Courses, Modules, Questions, and Papers.

5. Conclusion and Future works

The smart question paper generator has the potential to significantly impact the educational sector and simplify the task of creating question papers for educators. With the integration of technology, this tool can save valuable time and effort while minimizing errors and biases in the question paper creation process. The ability to randomize questions and difficulty levels, streamline examinations, and enhance the overall experience for teachers make this system a valuable asset for educational institutions. As the system evolves and becomes more accurate, it will save a great deal of manpower and effort across multiple academic disciplines.

References

[1] Rohan Bhirangi, Smita Vinit Bhoir, "Automated Question Paper Generation System" Bhirangi et al., International Journal of Emerging Research in Management & Technology, ISSN: 2278-9359 (Volume-5, Issue-4).

[2] Sahar Abd El, Ali Zolait, "Automated Test Paper Generation Using Utility Based Agent and Shuffling Algorithm", International Journal of Web-Based Learning and Teaching Technologies (Volume 14, Issue 1), January-March 2019.

[3] Shakeel Ahmad, Sana Showkat, "Randomized Question Paper Generation" 2018 IJ CRT, Volume 6, Issue 2, April 2018, ISSN: 2320-2882.

[4]Ashokj Immanuel V, TulasiBomatpalli, "Framework for Automatic Examination Paper Generation System", IJCST Volume 6, Issue 1, January-March 2018, ISSN: 0976-8491 (Online), ISSN: 2229-4333(Print).

[5] Adaptive Question Paper Generation System by Roshni Dwivedi, Kriti Kashyap, PranitaDhoke, Swati Korhale, Prof. G.S. Navale; Department of Computer Engineering, SITS Narhe, Pune-411041, India. International Research Journal of Engineering and Technology (IRJET) Volume: 04 Issue: 05 | May -2017.

[6]Parth Shah, Uzair Faquih, RutujaDevkar, Yogesh Shahare, "An Intelligent Question Paper Generator using Randomization Algorithm", Paper ID: IJERTV11IS040041, ISSN: 2278-0181(Online), IJERT Volume 11, Issue 04 (April 2022).

[7] Anjali Sunil, "Smart Paper Generator", International Journal of Progressive Research in Science and Engineering, Volume-1, Issue-9, December-2020.

[8]Zhenya Huang, Qi Liu, Enhong Chen, Hongke Zhao, Mingyong Gao, Si Wei, Yu Su, Guoping Hu, "Question Difficulty Prediction for READING Problems in Standard Tests", University of Science and Technology of China.

[9] Aishwarya Chavan, DivyaKarekar, Mojitha Mohandas, Rasika Manjarekar, SupriyaMandhare, "Automated Question Paper Generator System using Apriori Algorithm and Fuzzy Logic", IJIRST- International Journal for Innovative Research in Science & Technology, Volume 2, Issue 11, April 2016, ISSN (Online): 2349-6010.

[10]Rusyaizila Ramli, Salvester Sivan, HusnizaRazalli, "A Review on Automated Examination Question Paper Template Generator", 2020 16th IEEE Internation Colloquium on Signal Processing & Its Applications (CSPA).