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Automatic Question Paper Generator

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Abstract

This system proposes an intelligent question paper generation tool for universities, enabling the rapid creation of well-balanced question papers that cover a broad range of subject chapters with varied difficulty levels (Easy, Medium, and Hard). The system can generate and distribute these papers within seconds.

Administrators can input a collection of questions . The system also allows the admin to assign weightage and complexity to each question. These questions and their attributes, including weightage and difficulty, are stored in a database. When the time comes to generate a question paper, the administrator selects the desired difficulty percentage, and the system randomly selects questions that match the complexity level and ensure the total weightage adds up to 100 marks.

The system is designed with multiple difficulty levels for each question. When the admin selects a difficulty type (Easy, Medium, or Hard), the system automatically generates a question paper by selecting questions from the database that meet the chosen difficulty and weightage criteria. Once the questions are selected, the system formats the paper into a document according to the chosen paper format and sends it to the selected department.

The primary objective of this system is to automate the manual process of question paper generation, offering a streamlined, efficient solution that ensures easy storage and access to valuable academic data over extended periods, while minimizing human effort and potential errors.

Keywords: Question Paper, Difficulty Levels, Randomization, Admin

Introduction

Examinations are a fundamental aspect of the education system, serving as a means to assess students' knowledge and understanding. Across educational institutions worldwide, exams are conducted to evaluate students' learning progress. However, the traditional method of creating question papers is often inefficient and labor-intensive. It can be challenging for educators to cover all aspects of the syllabus within the constraints of time, leading to the need for a more effective solution.

To address this challenge, we propose an automated question paper generation system that is fully customizable to meet specific requirements. This system is designed to efficiently generate question papers that comprehensively cover the entire syllabus with minimal effort. It features a role-based access model to restrict user permissions, ensuring that only authorized personnel can input or modify data.

Administrators can input questions into the system along with their corresponding weightage and complexity levels. When generating a question paper, the user simply specifies the desired difficulty lev-

el and the modules or chapters to be included.
The primary objective of this system is to reduce the time and effort required for question paper creation, making the process faster, more efficient, and less prone to human error.

Problem Statement

The process of creating question papers in educational institutions is often manual, time-consuming, and prone to errors. Teachers and administrators must manually select questions, ensuring proper coverage of the syllabus and appropriate difficulty levels. This approach not only takes up valuable time but also increases the likelihood of mistakes, such as imbalanced papers or incomplete topic coverage.
Additionally, as institutions expand and offer more courses, the manual generation of multiple question papers becomes increasingly inefficient. There is a need for a solution that can streamline this process by automating the generation of question papers while ensuring that they meet specific requirements, such as difficulty levels, topic coverage, and weightage.
The aim of this project is to develop an Automatic Question Paper Generator (AQPG) that can efficiently create question papers by automating the selection of questions based on predefined criteria. The system will allow administrators to specify desired difficulty levels, chapters, and total marks, and it will generate question papers in a format ready for distribution. This automated solution will reduce the time and effort required to generate question papers, improve accuracy, and allow for easy customization according to the institution's needs.

Literature Survey

Automatic Question Generation system called GAsk:

The GAsk system is an automated tool for generating questions to support student learning. A case study involving 24 supervisors and 33 students compared software-generated questions with those created by humans, showing that the software was more efficient. The system's performance is evaluated using precision and recall for classification tasks and Cohen's Kappa coefficient for question quality.

Automatic question paper generator system

The Automatic Question Paper Generator system employs a randomized approach and includes several modules, such as user administration, subject selection, difficulty level specification, question entry, question management, paper generation, and paper management. The system stores questions in a database, allows administrators to select the complexity level for each question, and ensures the maintenance of the database for smooth operation.

Framework for Automatic examination Generation System:

The Automatic Examination Generation System offers a method for automatically creating question papers, which is typically a challenging and time-consuming task when done manually. This system provides a simple and efficient approach to generating examination papers. It follows a three-tier model consisting of the Syllabus Engine, Pattern Composer, and Question Aggregator, which manage the paper generation process. The system is structured around the course's pattern or framework. Questions are input through the Question Aggregator, and attributes such as weightage, difficulty level, and marks are considered when generating the question paper.

Automatic Question Generation Using Software Agents for Technical Institutions:

The system for automatic question generation in technical institutions takes a user-provided document and produces questions based on Bloom's Taxonomy. This approach allows the generation of questions

that assess students' cognitive abilities. The framework uses software agents to handle tasks like document processing, information classification, and question creation, making it a multi-agent system. For processing, the system uses tools like TreeTagger and stemming to prepare the text. It then classifies keywords from the document, identifying their Bloom's Taxonomy category by matching them with action verbs in a repository. Finally, the question generation module creates questions by inserting the keywords into predefined templates, following the appropriate Bloom's level.

Linguistic Considerations in Automatic Question Generation:

The technique follows a straightforward pipeline. Initially, the source text is divided into sentences, which are then processed using the SENNA software. SENNA handles tasks such as tokenization, part-of-speech tagging, syntactic constituency parsing, and semantic role labeling within the system. For each predicate and its associated semantic arguments, a matching function is invoked to return a list of arguments that correspond to the sentence's predicate-argument structure. This paper focuses on evaluating the linguistic quality of the generated questions. The evaluation was carried out on a chemistry dataset, which included 59 human-generated questions and 142 questions generated by the system.

CQG (Cloze question generation)

The Cloze Question Generation (CQG) system is designed to automatically generate cloze-style questions from an English article. The system is divided into three main modules: sentence selection, key selection, and distractor selection. In the first module, relevant and informative sentences are selected from the text. In the second stage, keywords or key phrases (those that will be questioned) are identified within the selected sentence. These keywords are chosen not as simple nouns or adjectives but based on Named Entity Recognition (NER). The third module focuses on selecting distractors (incorrect answer options) for the generated question. This stage is domain-specific, as the quality of the distractors depends on the subject matter. Distractors are generated based on the selected keyword and retrieved through web searches and knowledge-based lists. Finally, the system is manually evaluated in three phases.

Automated Question Paper Generator System

This paper proposes a new Intelligent Question Paper Generation System (IQPGS) based on fuzzy logic for autonomous paper creation. When compared to traditional methods, the proposed system proves to be more reliable by effectively eliminating duplicates, ensuring quality issues are addressed, requiring less manpower, and offering logical, unbiased question selection. Additionally, the use of fuzzy logic in the system enhances both approximate and precise reasoning, making the process faster and more efficient.

System Architecture

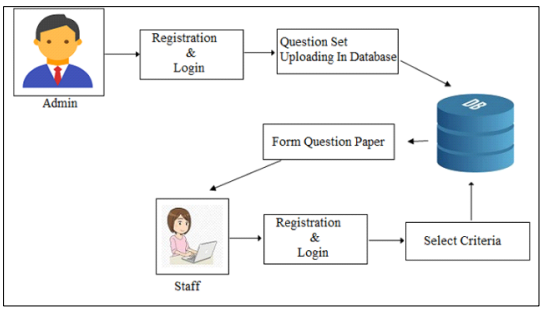

Figure 1 System Architecture

Admin Login: Every school, college, or institute using the QPG system will have an Administrator, who holds the primary responsibility for managing the examination process within the institution. The admin is authorized to perform two key tasks: - Staff Registration The admin registers staff members and assigns login credentials to them. - Question Paper Generation: The admin can generate a question paper by selecting essential parameters, such as the type of question paper, total marks, and difficulty level.
Teacher Login: Based on credentials provided by the admin, teachers will have access to the system. Their main responsibility is to update the question database by inserting new questions or modifying existing ones as needed.
Student Login: Students can register using their college enrollment ID to gain access to exam-related updates. They can also practice and prepare for upcoming exams by accessing subject-chapter module-based questions.
Question Insertion: As mentioned earlier, teachers are responsible for adding and updating questions in the database. The process of question insertion requires filling in the following fields: - Course - Semester - Subject - Question Priority
Difficulty Selection: To ensure fair and accurate results, the QPG system includes a feature called "difficulty choosing", which not only randomly selects questions but also filters them based on the defined priorities for different difficulty levels. The predefined priorities are as follows: - Easy, Medium, Hard.
Templates: The Templates module is designed to streamline the question paper creation process. This module is particularly helpful for both private and public institutions, allowing them to quickly and efficiently generate question papers using predefined templates.
Question Paper Generation: Each institution is assigned an Admin responsible for generating question papers. After the admin selects the difficulty level and template, a query is executed to retrieve relevant questions from the database, which are then stored in an array. The system triggers a predefined function called shuffle(), which randomizes the order of the questions. These randomized questions are then displayed as a preview of the question paper.
System Auditing: Auditing is a critical component of the system to ensure transparency and track operations. The system logs the following actions: - After a user signs up or logs into the system, an entry is created in the database containing the {time, date, Teacher ID}. - When a question is added or updated, key details such as {time, date, semester, subject, teacher ID} are logged. - When a question paper is downloaded from the website, the timestamp is recorded along with the examiner ID, ensuring full traceability of the actions.

Future Scope

The Automatic Question Paper Generator is designed with future enhancements in mind, aiming to make the software more efficient and secure. The methodologies we've introduced for question paper generation have shown promising results and could serve as a foundation for developing a more advanced and fully automated paper generation system. - This software's true potential will be realized when a vast collection of questions is added to a dedicated database, offering greater portability and scalability. - As the database expands, security becomes a crucial concern. To address this, implementing a more secure database solution will ensure that only authorized personnel can access the software. - Our goal is to develop this software to cater to important exams such as SSC and HSC, providing students with the opportunity to practice multiple papers, which will aid their preparation. -

With these improvements, the software will not only be more secure but will also deliver significantly better results. - Looking ahead, this system could be enhanced further to operate as a web or mobile application, making it accessible across a variety of academic disciplines.

Conclusion

The proposed system introduces an automated approach that transforms the traditional method of generating question papers into a more efficient and controlled process. This is achieved by managing user roles and their access within the institution. We have also emphasized the importance of randomization in the question paper generation process. The system utilizes an efficient algorithm that ensures complete randomness, preventing the repetition of questions across consecutive papers and making it impossible to identify any patterns. By distinguishing between administrators and their subordinates based on their assigned tasks, the system ensures a streamlined workflow. As a result, the automated Question Paper Generation system enhances resource management, ensures randomization, and provides a secure platform for all users.

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