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Question Paper Maker using Natural Language Processing

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Abstract **- The knowledge of a student is examined at every stage from the day he/she starts their journey to acquire it. Continuous examination is required for testing the student's learning ability in a particular domain. Traditional way of generating question papers can't fulfill such continuous examination process. The proposed system, Question Paper Maker can be used to overcome the drawback of traditional method and helps to generate a better-quality paper which will cover the domain requirements. Question Paper maker can generate theoretical papers based on adaptive evaluation. A student can also use Question paper maker as a practice tool for preparation of competitive exams.**

Keywords - QPM – Question Paper Maker, NLP – Natural Language Processing, AE – Adaptive Evaluation, ML – Machine Learning

I. INTRODUCTION

Generating Question paper manually is a time-consuming work. It's a difficult task to create a paper which can cover all the requirements required for testing the knowledge acquired by the students in a particular subject/field. Most of the time papers which are generated may have same questions as professor's priorities the question based on their importance which help students to find out which question may occur based on previous years questions paper. So, to avoid the prioritization of question and to provide a variety of question we proposed a system named as question paper maker which makes use of natural language processing for generating a series of question papers based on student's previous marks and advancing the quality of paper at each iteration.

The solution can be used by students for practicing as well as by the teacher for creating multiple sets of question papers. Teachers can use the solution for generating question papers based on the constraints which need to be followed while designing a question paper. It automates the task for providing a set of question papers in front of moderator, from which the moderator selects the paper which will be the final one for the university. As every subject is divided into modules, teachers can generate paper based on selecting the modules from which the question must be selected. The solution can also be useful for generating mid-semester examination by selecting module wise questions.

The solution makes use of NLP based models and concepts to grasp the context of the input given to the software and compile it together. It is here that the questions are generated for the examinee to have a crack at it. The system attempts to take textual data as input and extract the context from it for generating the questions. The system can also generate questions set by scrapping questions from a website, where the user must provide the URL of that particular web page. Thus, providing a way for the examiners to create questions based on the material they desire rather than a present subject. That's how the examination side of the software will shape up. The question set provided is cleaned by extracting the unwanted/incomplete questions. The questions are categorized based on the parameters like difficulty level, logical based, theoretical based, numerical, etc. Considering such parameters, classification of questions is done with the help of NLP models and a difficulty level is assigned to each question.

II. LITERATURE SURVEY

G. Nalawade and R. Ramesh [1] has proposed "Automatic generation of question paper from user entered specifications using a semantically tagged question repository". In this system the question generation is based on semantically tagged question repository. The person going to generate paper must manually enter specifications for generating question paper in the form, which is then converted into word document.

Zalte S.V., Jadhav C.C et al. [2] proposed "Automatic Question Paper Generator System" was implemented in C#. The author uses randomization technique for avoiding repetitive questions. The question paper is automatically generated by the traditional method and the questions were kept in the database. The difficulty and priority must be mentioned along with its question.

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Pratik Pisat, Shrimangal Rewagad et al. [3] "Question Paper Generator and Answer Verifier", The system generates subjective as well as objective question. The user must enter the subject name and difficulty, based on that paper is generated. For objective paper, score is continuously calculated and saved in the database.

Akhil Killawala, Igor Khokhlov, et al. [4] "Computational Intelligence Framework for Automatic Quiz Question Generation", the system generates quiz questions based on semantic correctness and follows a rule-based approach. It generates 4 kinds of questions like MCQ, True/False, Fill in the Blanks and "Wh" type questions.

Amit Khairnar, Bhagwat Jadhav, Pramod Patil, el at. [5] "Automatic Question Paper Generator" was built in Microsoft visual studio and uses Microsoft SQL server for storing questions. The user must enter the question at the time of paper generation and within a short time the question paper is generated. The system makes use of shuffling algorithms to avoid duplication and repetition while generating questions.

Ashraf Amria, Ahmed Ewais, Rami Hodrob el at. [6] "A Framework for Automatic Exam Generation based on Intended Learning Outcomes" has proposed system which can select questions based on intended learning outcomes. For generating paper, parameters such as variety of questions, randomization, marks distribution, and mapping questions with learning outcomes were considered. It is a web-based system, built using PHP and MySQL as Database for storing questions and related intended learning outcomes.

III. OBJECTIVE

The major objective of the project is to avoid human error while manually generating question sets for final exams. Every question paper generated must be unique and should be generated following the constraints. Another objective is to develop a system for students, through which they can theoretically attempt question papers by providing the previous marks for the subject based on which the difficulty of the papers keeps on changing.

IV. EXISTING SYSTEM

In the existing system, the questions were added to the database along with its difficulty manually assigned to it by the user. The generation of question papers was based on the level of difficulty and priority assigned by the generator to the questions. Randomization algorithms, NLP algorithms, shuffling algorithms and random function techniques were followed to avoid repetition of questions while generating papers. The aim of the system was to only generate a single question paper using randomization algorithm listed above. The papers which were generated do not cover the modules of the selected subject. The format used for paper generation was static or similar. Once the exam has been conducted, the outcome/result of the exam is not considered for the next iteration. The existing system uses various relational databases for storing questions, such as MySQL, Microsoft SQL Server, SQLite, etc.

V. SYSTEM ARCHITECTURE

The system will consist of two main modules. The first module will be the questions dataset cleaning and assigning parameters required for generating question paper. And the second is the question paper generation module.

A. Questions Dataset Module

In this module, the questions can be scrapped from a website or can be taken from the teacher/student for generation of the paper. A single dataset is maintained for all the questions related to the subject. The questions are scrapped and cleaned using NLP techniques. Cleaning includes removing duplication, null values, incomplete questions, etc. Questions are assigned with the difficulty level based on bloom's taxonomy. The questions dataset can be displayed along with its level of difficulty in the system once it is generated. The dataflow of the question set generation is shown in figure 1.

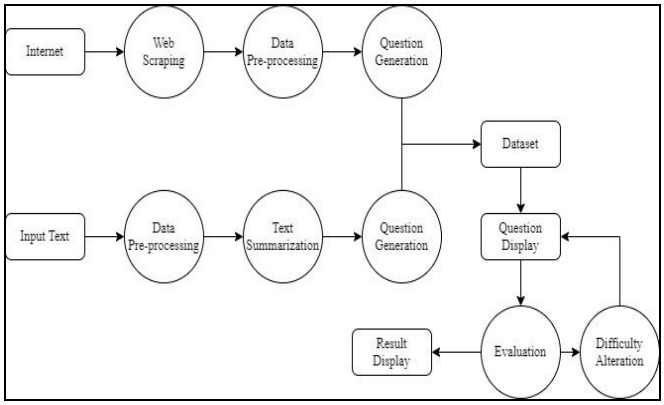

Figure 1. Dataset Generation Flow

B. Question Paper Generation Module

This module will generate one or multiple questions papers based on the parameter which are considered while generating a final exam paper. Generally multiple question sets are presented in front of the moderator from which the moderator selects one. This module will do the same task automatically. The system will generate question sets considering the constraints and will present these sets in front of the moderator. The format of the paper will change based on the total marks provided.

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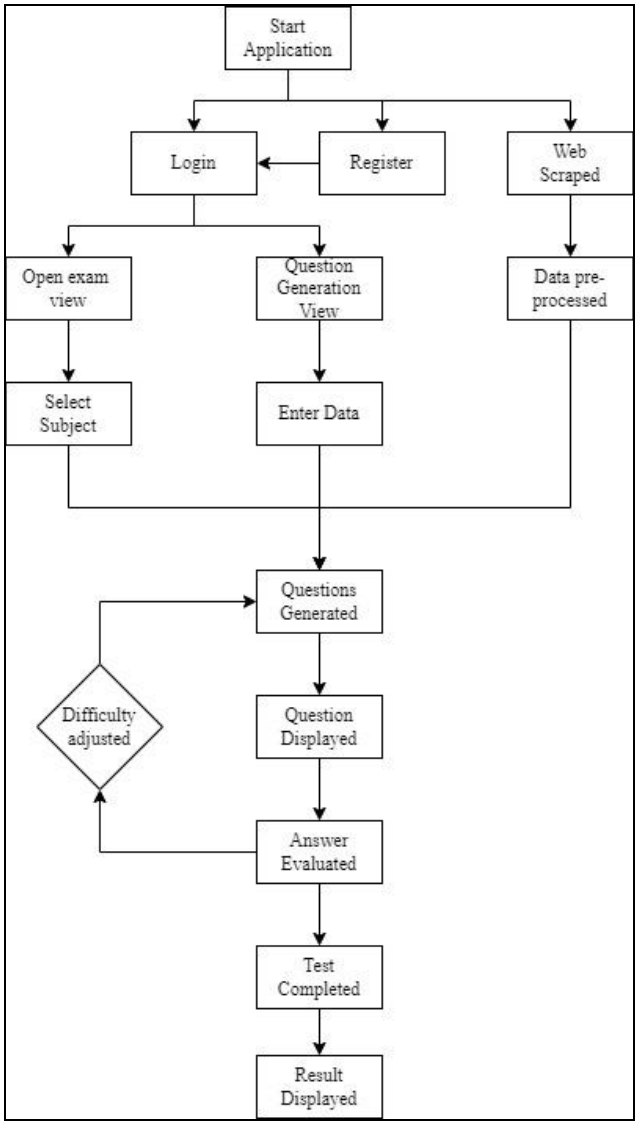

Figure 2. Paper Generation Flowchart

VI. SYSTEM USERS

The system will be used by three users' group, they are Student, Teacher, and Moderator.

1. Student

The students will have their separate database. They need to register and login into the system. Questions will be provided by them and are classified based on the subject he/she may enter. Multiple questions papers can also be generated based on the marks provided. The question dataset and question paper generated by the student is stored into the database.

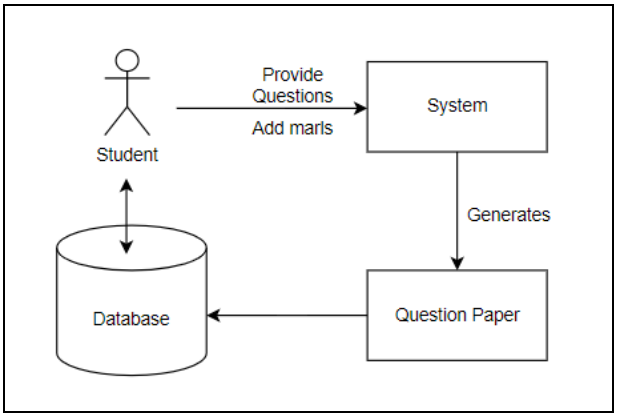

Figure 3. Student System Architecture

2. Teacher

The teachers can create several sets required for final selection of the question paper. For that they must provide the question bank which states questions related to each module of the subject. They question papers are stored in the database.

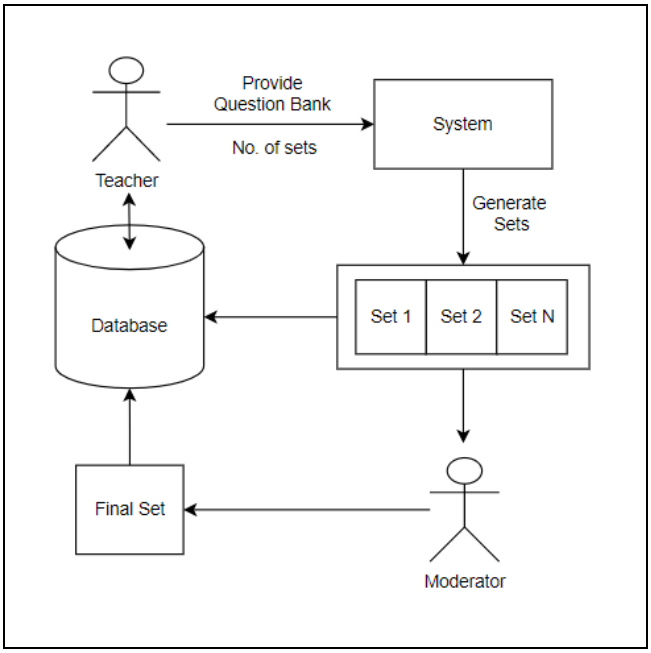

Figure 4. Teacher-Moderator System Architecture

3. Moderator

The Moderator acts as an admin in the system. The sets generated by the teachers are passed to the moderator where he/she has the right to select the question paper form that sets. Only Moderator has the right to modify the paper. No one can access the papers which are selected by the moderator. The paper which is finalized is stored securely into the database.

VI. CONCLUSION

The main purpose of this application is to generate question papers considering the constraints required for generating final exam papers. Questions in the paper generated cover all the modules which are present in the subject. The

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algorithm used for paper generation avoids repetition of questions in every set. The format of the paper keeps on changing depending on the marks provided.

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