Academic Placement Using Automated Examination System

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Abstract

With the onset of computer-based technology, there have been evolutionary changes in many areas of our professional environments. There are some shortcomings in the existing placement systems such as instability, relatively narrow range of topics, and inappropriate candidate selection. Therefore, with the use of computers, the automatic generation of test papers is an important measure for achieving the separation of students according to the company's requirements. Here in Automated Examination System (AES) is proposed, consisting of several modules such as Student, Company TPO, question entry, question management, paper generation, and result management. AES falls into three types, namely: (1) random-algorithm-based systems (2) the backtracking system, and (3) artificial intelligence and information processing systems to generate output. The design process performs the analysis and composes the examination paper using a randomization algorithm with a high possibility of success. With the AES algorithm, the user can identify the subject, question type, and specialization in a particular field. The system has characteristics such as easy operation, a good interface, good usability, high stability, and reliability.

Keywords: AES, Paper generation, TPO, J2EE, AI

I. INTRODUCTION

In today's era, education is the most important way of achieving success. When it comes to education, it is imperative to mention tests and examinations. As examinations prepare students within the go after knowledge, having a correct test paper and format is necessary. Traditionally certain officials used to paper down the questions for generating the test. But this method can be ineffective at times owing to bias, repetition, authenticity, and security concerns. We have implemented an Automated process for Question Paper Generation which is swift, well-organized, randomized, and secure. Furthermore, we have proposed an algorithm thatensures total randomization of questions avoiding repetitions. The implemented system can be helpful to many educational institutes and NGO-based institutes.

Hence, we proposed implementing the Automated Question Paper Generator System scaling down the time of consumption by restoring the traditional method of question paper generation system. It also needs lesser manpower. In our system we allow administrators to input a set of questions. This system allows the admin to provide weightage and complexity for each of these questions. After this, the questions are stored in the database along with their complexity. The questions are chosen randomly based on their level of complexity. The project also has multiple choice questions which can be used to create a question paper for aptitude exams that are conducted by companies during placements. The system automatically generates paper. This implemented system aims at an unbiased selection of questions in a question paper as well as reducing the manpower and time required for the same.

The system also deploys security mechanisms that prohibit the redundancy of question papers. There are provisions to enter and amend data suitable for any educational organization with complete freedom of specifying courses, semesters, syllabus, and patterns. Our system aims to provide fast operations, data storage, and high security for all its task.

II. LITERATURE REVIEW

A. Abbreviations and Acronyms

AES: Automated Examination System
TPO: Training and Placement Office
J2EE: Java 2 Enterprise Edition
AI: Artificial Intelligence

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 [4]. A framework is designed as a three-tier model. This model includes components namely Syllabus Engine, Pattern Composer and Question Aggregator. Questions are entered with the help of Question Aggregator. The attributes related to questions are category, weightage and complexity to generate the question paper according to the one designed for course. This engine also introduces a marking system to prevent the redundancy of questions in subsequent papers. Finally, generated papers are stored as PDFs [4].
- "Automatic Question Paper Generation System using Randomization Algorithm" is a paper that briefs about the system using a shuffling algorithm (existing algorithm) as a randomization technique [5]. The system establishes several modules such as user administration, subject selection, difficulty level specification, question entry, question management, paper generation, and papermanagement [5]. The system introduces a highly efficient shuffling algorithm that uses an array to store randomly generated numbers, questions are then selected against these array elements.
- The Question Paper Generator System has provided a ready-to-use built-in question bank [3]. The paper aptly describes CQZ (Cloze Question Generation) putting more emphasis on the actual type of the questions [3].
- "Automatic Test Paper Generation Based on Ant Colony Algorithm" is another paper that has implemented a complex but highlyefficient Ant Colony Algorithm [6].
- "An Integrated Automated Paperless Academic Module for Education Institutes" is the paper that briefs the importance and workof switching from Paper-based systems to Paperless Systems. The document also covers the importance of automation in the context of Task Engineering. The paper also clearly defines the importance of Information and Communication Technology (ICT)in academics and educational organizations.[1] The paper also describes many Access Control Methods such as MAC (MandatoryAccess Control), DAC (Discretionary Access Control), RBAC (Role-based Access Control), and DTE (Domain Type Enforcement) [1]. Role-based Access Control is very helpful in automation due to the user hierarchy comprising of different roles[1].

III. METHODOLOGY

In this Implemented system there won't be manual entries. So, data redundancy cannot occur. The preparation can be rapid.
It is secured and well-maintained storage system since it is automated. Automation means to replace the manual operations with computer procedures and other machines. Automation is aimed at increasing productivity, manufacturing prowess. It also reduces costs, labor and eliminates human error.

There are three modules namely ADMIN, STUDENT and COMPANY with their basic functionalities that are mentionedbelow describing about the roles of actors performed in the system.

- ADMIN: Login, Enroll Students, Schedule Exam, View Student, Create Exam.
- STUDENT: Take Exam, Get Result, Get Placement.
- COMPANY: Place the student, View Results, View Student and Login.

Admin makes the skeleton of the question paper which consists of various questions and sub-questions. Faculties are made to enter questions into the database along with their respective difficulty level and priorities. This question bank is then sent for paper generation. Question paper is prepared on the basis of the difficulty level set by the admin. Question chosen will be unbiased and based on the fuzzy logic algorithm. This question paper is then analyzed by the admin. After analysis, the generated question paper can be mailed to different colleges by the university.

The system is the interaction between different modules i.e., Student, Company and TPO(Admin). It consists of the process known as Question paper generation where question paper is generated along with the related results and actions to be performed oncethe test is completed by interacting with the system modules. Data related to the process is fetched from database which is maintained at backend.
Below diagram gives the basic layout of the system which appears in the front end.

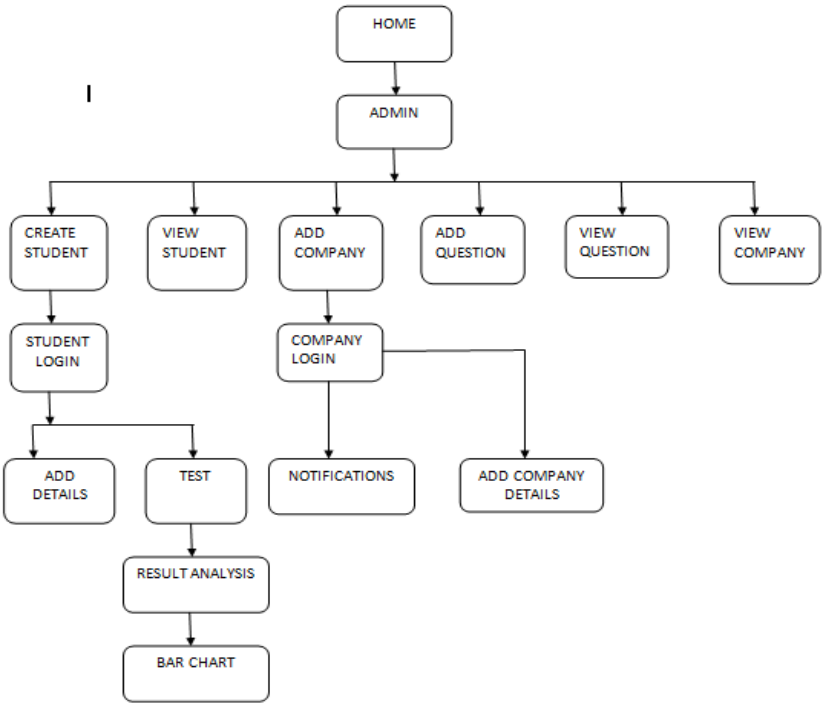

Fig. 1: Block Diagram

The figure below describes the actual execution of the automatic question paper generation in which questions are categorized according to the parameters proposed that is course, complexity (easy, very easy, hard, very hard) and weightage assigned for each question with one more added component known as time management which assigns time that helps to terminate the exam within decided time frame. Post the exam a graphical view is the analysis of the performance of the student during the tests which is used to generate final report which is stored in the backend against his profile. This helps the company to shortlist the students according to theircriteria by viewing their student's profile generated post exam.

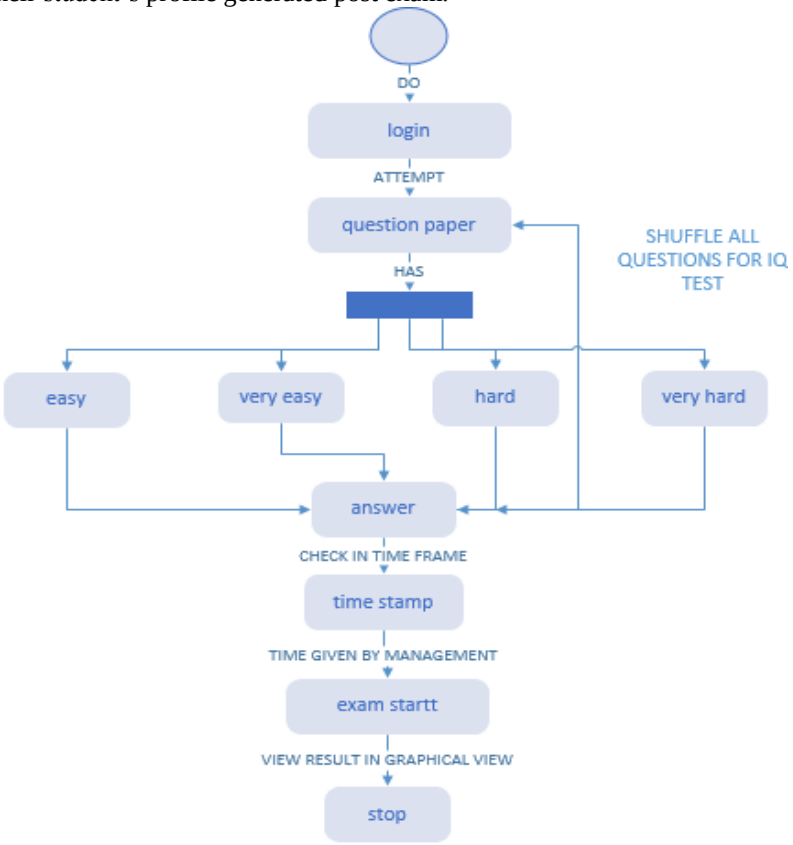

Fig. 2: Activity diagram

There are two algorithms used for implementation of tests:

A. Randomized Algorithm for Question Paper Generation:

This algorithm checks for duplication and repetition of the randomly generated questions. The nature of this algorithm is as followed, for a set of N(the total number of question in the database) elements for generating a randomalteration of the numbers 1–N, the algorithm goes as follows:

Step 1: Create an array of N locations.
Step 2: Generate random number.
Step 3: if(loc==0)
store generated number
else
compare the generated number with previous number in array.
if matching value found,
go to step 2;
else
store the no in next location.
Step 4: Repeat step 2 for N numbers.
Step 5: Select questions from DB matching with values from array location one by one.Ex: select * from question bank where question no=array[n];

B. Backtracking Algorithm:

This algorithm guides the system to switch in between the level of complexity according to the response given bythe student. This helps student to either increase or decrease the level of complexity which helps later in profile generation.

Step 1: Let N: Number of Question (1 to m)C: Complexity of Question
Step 2: N=1
Step 3: If student can answer the question correctlythen C=C+1 and N=N+1 go to step 5;
Step 4: If student cannot answer the question correctlythen Change the question category,
and N=N+1;
Step 5: If N<m
then N=N+1, repeat step 2;Else
Return Result
Step 6: Stop

In the figure below, it shows the flow of implementation of the actions to be performed. Initially admin has to register henceit sends request to the server. The server accepts the request and responds to the admin by giving its login details. Admin gets logged in into the system and generates the question paper which is stored in to the server. Here the lifeline of admin ends. Now student will participate in the exam by creating its session. After giving exam student has to submit the question paper which is again stored in theserver. Here the lifeline of the student ends. The results are generated at the backend of the system by performing the necessary calculations and generates the final output which is stored in the server. Whenever the result is been requested by any of the module, the server will respond accordingly.

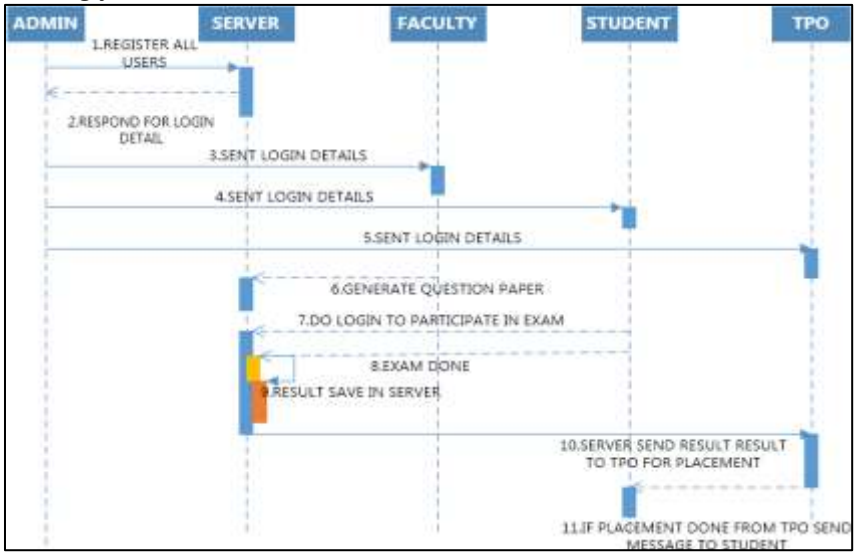

Fig. 3: Sequence of the system

Below diagram consist of the flow of entire execution of the system along with basic functionalities assigned to each module.

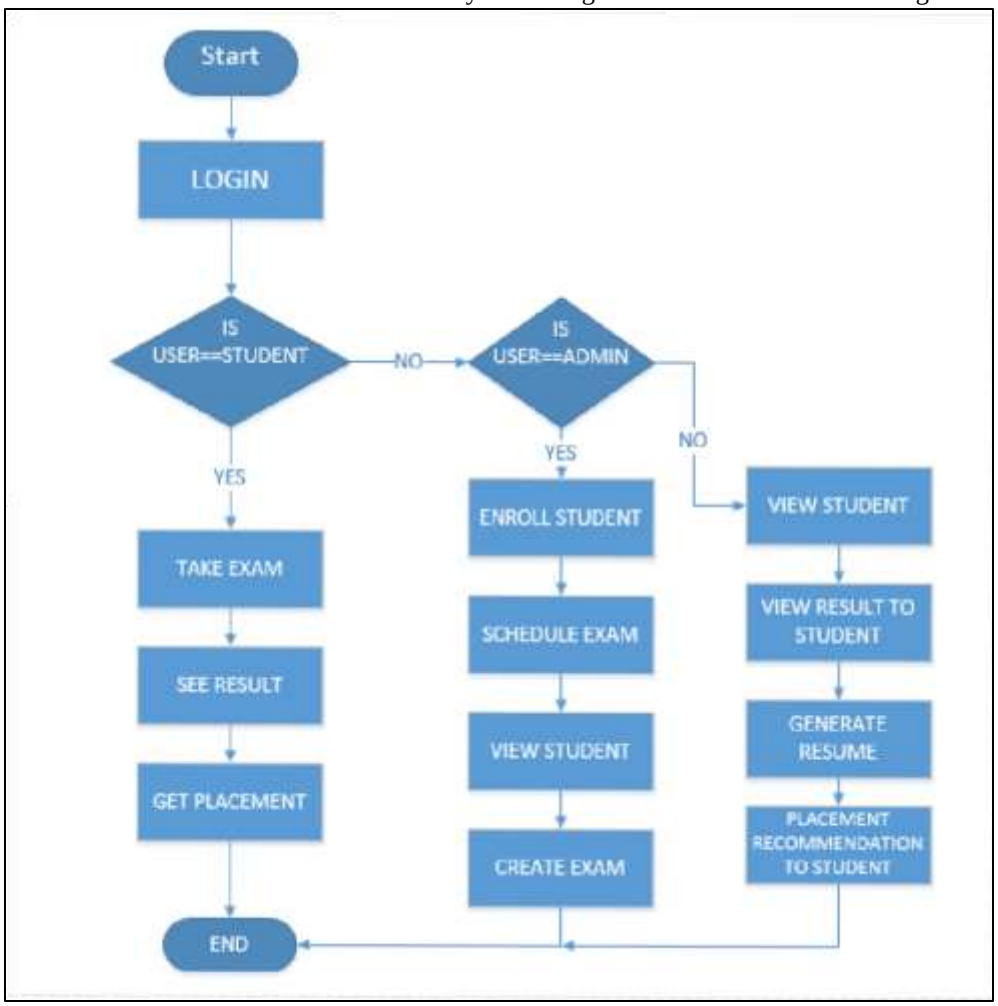

Fig. 4: Flowchart of the system

IV. IMPLEMENTED SYSTEM

1) Home Page

Fig. 5: Home page

Home page is the first page of the project.
It contains admin login module and student login module.
Student and admin can login through that page.

2) Admin Login

Fig. 6: Admin Login

In admin login page, admin will enter the email address and The password. After login he can add the questions, view the student list.

3) Create Student

Fig. 8: Create Student

In create student, user will enter the email address and after submitting he will get the password through his mail.

4) Student Login

Fig. 9: Student Login

In student login page, user will enter the email address and the password assigned to him in the mail and he can login into that page.

5) Add Question

Fig. 10: Add Question

This page is of addition of question which is done by admin. Admin will add the questions and its respective options and the correct option for that particular question. The minimum time for answering the question and the type of question will be entered.

6) View Question

Fig. 11: View Question

View question is also present in the admin module. Admin can view the list of question and can do changes. It is done using excel sheet having columns and their respective entries

7) Add Details

Fig. 12: Add Details

After login, user will enter the details like his name, address and mobile number in the add details page.

8) Question Paper

Fig 13: Question Paper

In this page, question will appear. The question will have four options and minimum time is set for the answer for a particular question depending on the type of question and if user answers the question in given time, then the difficulty level of the question will be increased otherwise it
will decrease the difficulty level.

9) Results

Fig. 14: Results

In this page, the rank will be given to the user depending on the results of the online paper with his details.

10) Company list

Fig. 15: Company List

In company list page, the companies and their details like company name, address, email, etc. will be shown

11) Company Login

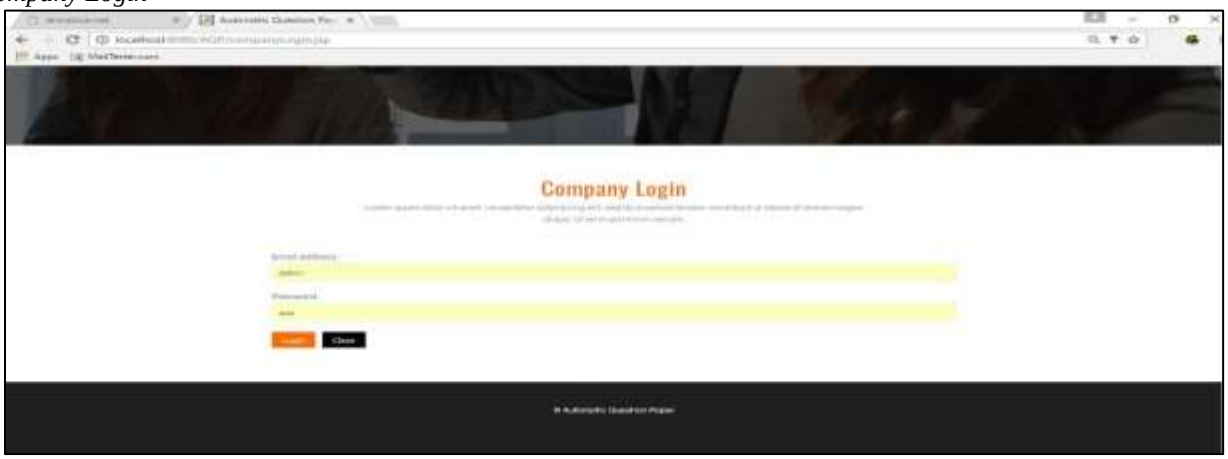

Fig. 16: Company List

This page comes under company module. Company will enter the email address and the password.

V. RESULT ANALYSIS

"Academic Placements Using Automated Examination System" is been designed to check how accurately the student responds to the questions asked irrespective of the knowledge he possess. Depending upon the way he answers, the system will decide in which field he is good with. This analysis is done on the basis of the time taken by him to answer that question which is decided by using some constraints, which decides whether he has randomly selected the answer or he is true to the knowledge. According to the answers selected by him, his rank is decided accordingly and he will be assigned to suitable company. This will help to the company to narrow down their efforts. The system aims to computerize all the procedures that is been done manually reducing the time and efforts by minimizing the errors and increasing efficiency.

Fig. 17: Bar Chart

In this page, system will show the result. Using graph system will show the correct answers, incorrect answers and the guessing answers.

l) Assign Student

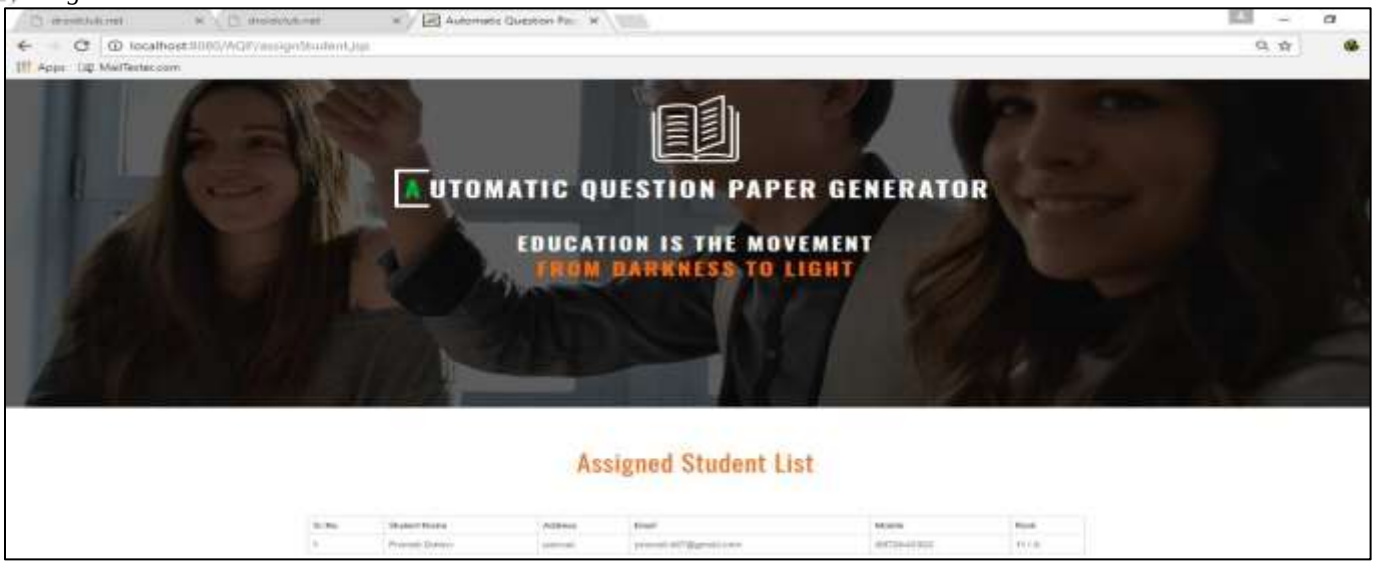

Fig. 18: Assign Student

According to the answers given by the user and the rank, he will be assigned to the particular company.

VI. CONCLUSION AND FUTURE SCOPE

A. Conclusion

In this paper, Question Paper Generation has proposed an automated model which is implemented as a real-time application. The proposed work describes an automated system that advances from the traditional method of paper generation to an automated process, by providing controlled access to the resources. This is achieved by properly understanding users andtheir roles in the institute.

We have also considered the importance of randomization and backtracking in the task of a paper generation. Our systemhas deployed an efficient algorithm that is totally randomized and avoids repetition of questions in consequent question papers,making it impossible to derive any pattern in the papers. We distinguish between administrators and candidates by their tasks. Therefore, Question Paper Generation is an automated model that provides an improvement in terms of controlled access to theresources, random generation of question papers, and a secure platform.

B. Future Scope

This project aims in development of the whole procedure required for the placement procedure. There is a probability ofstudent may randomly select any option to answer the question and it might be appropriate option. Therefore, a one-line answer for justification of selected answer should be made mandatory while answering the question. The question thus generated duringthe examination can be generated by entering any number of questions through Excel Data Sheet.

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