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DEPARTMENT OF COMPUTER TECHNOLOGY

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Title of Project

"DEVELOPING AUTOMATIC QUESTION GENERATOR SYSTEM USING ANT COLONY OPTIMIZATION ALGORITHM"

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INTRODUCTION

- Traditionally question papers were generated manually and Preparing any exam paper is a very challenging task for the educators.
- So, here we are proposing an “Automatic Question Paper Generator System” using “Ant Colony Optimization Algorithm”.
- “Ant Colony Optimization Algorithm” – specifies a technique for solving optimization problems which means to find the best solution from a large number of possible solutions.
- Here we have proposed an integrated automated system that stores questions related to a particular course and prints question papers based on the course and criteria.

AIM AND OBJECTIVES

AIM:

- The Aim of "Developing Automatic Question Generation" is to design and develop an automated system for generating question papers that ensures a balanced distribution of questions based on predefined criteria such as difficultylevel, topic coverage, and diversity.

OBJECTIVES:

- To make the question paper generation process faster.
- To implement the Ant Colony Optimization (ACO) algorithm to select and optimize questions from a large database.
- To save time and effort for teachers.
- Enable MCQ-based and topic-specific paper generation.

PRIOR ARTS(PATENTS)

Patent Application No	Title of Patent	Existing Solutions (Abstract of Patent)
EP 2 575 123 A1	The European Patent Application	Developments in the field of information technology have resulted in production of fast, secure. Reliable computing and communication systems. The computing systems have been used as Content generation systems to generate content which may be used for imparting education to an End user. Alternatively, the content generation systems may also be used to develop assessment tests to measure the knowledge level, expertise, and skill of an end user.
EP 2575 123 005	The Generation Of Customized Paper	In one implementation, a method to generate a customized question paper is described. In one implementation, the method includes assigning at least one key value to each of a plurality of questions, and storing the questions along with the at least one associated key value in a question bank. The method further includes fetching the stored questions based on rules in a question paper template, where the rules are based on the at least one key value.

LITERATURE REVIEW

Title of Paper	Details of Publication with Date and Year	Literature Identified for Project
Automatic generation of Multiple-choice questions For e-assessment.	2017	This literature review depicts generation of multiple choice questions on any user defined domain that is proposed.it first extracts text relevant to the given domain from web and summarizes it.
Automatic-question paper generator system	2017	In this system question paper can be generated through keywords. without worry about replication and duplication from the previous exam. In this paper there is implementation of modern evolutionary path that is able to manage multli constraints issue along with creating question papers for examination.
Automatic-Question Paper System	May, 2022	In this system administration of the database inputs set of question-paper with an option of check box to tick the correct answer. More ever weightage of the particular question in terms of marks and hours and the complexity of the question is determined.
Automatic Question Paper Generator System by Keyword based ShufflingAlgorithm	May 2021	Automatic test paper generation selects questions from a database to-create a test paper, relying on a large question pool, advanced algorithms, and careful consideration of question quality and relevance to ensure effective assessments.

SYSTEM ARCHITECTURE

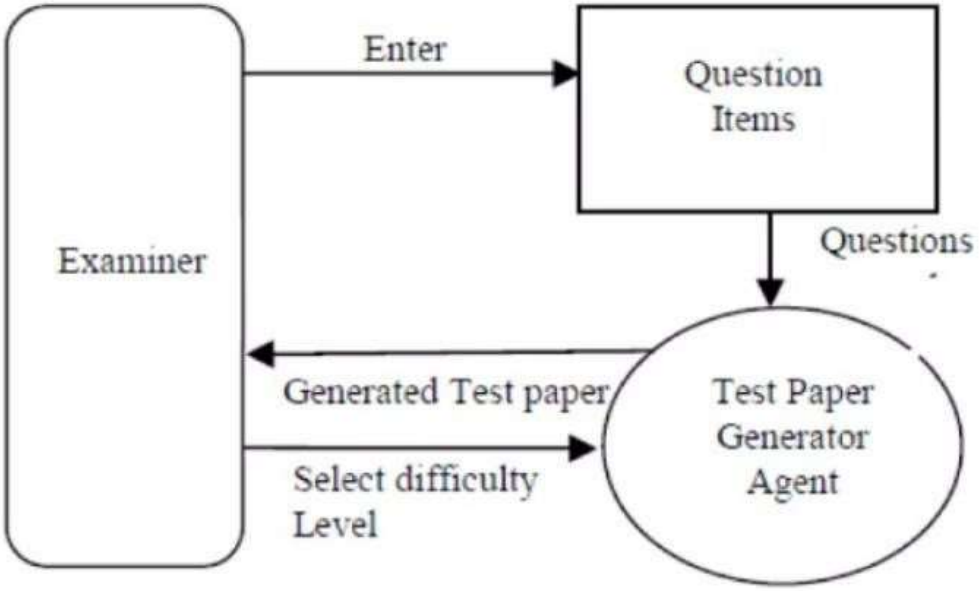

Fig: System Architecture of Automatic Question Paper generator

PROPOSED APPROACH & SYSTEM ARCHITECTURE

The proposed system aims to automate and optimize the process of generating question papers, leveraging the Ant Colony Optimization (ACO) algorithm to select appropriate questions from a database based on predefined parameters such as difficulty level, subject, module, and more.

Below are the key components of the proposed system:

1. Student Mock Test Flow:

- Login → Select Mock Test → Fetch Questions → Submit Answers → Evaluate Results → Store Results.

2. Educator Topic-Based Paper Generation Flow:

- Login → Select Topic(s) → Generate Paper → Customize PDF → Download/Save.

3. PDF Customization Flow:

- Select Paper → Customize Preferences (Fonts, Layout, etc.) → Generate Preview → Confirm Download.

4. MCQ Paper Generation Flow:

- Login → Select MCQ-only Option → Generate Paper → Download as PDF.

PROPOSED APPROACH

The extended architecture will follow a modular and scalable approach, ensuring that the new features integrate seamlessly with the existing system. Below is the high-level architecture:

1. Frontend (Client-Side):

The UI/UX will include additional pages and forms for:

- Student login and access to mock MCQ tests.
- Topic-specific paper generation for educators.
- Options for PDF customization (e.g., fonts, layout, and watermarking).
- MCQ paper generation settings.

2. Backend (Server-Side):

- Use Spring Boot to extend existing RESTful APIs.
- Implement new modules for:
- Mock MCQ test generation and evaluation.
- Topic-specific paper generation logic.
- PDF customization features.
- MCQ-specific paper selection using the ACO algorithm.

Technologies Used:

•Frontend: HTML/CSS/JavaScript.

•Backend: Java with Spring Boot.

•Database: MySQL for question storage.

CONCLUSION & FUTURE SCOPE

Conclusion:

In this project, we have successfully developed an Automatic Question Paper Generator System utilizing the Ant Colony Optimization (ACO) algorithm. The system addresses several challenges faced in traditional methods of question paper generation, such as time inefficiency, human bias, and the difficulty of ensuring balanced and diverse question selection.

Future Scope :

- Multi-language Support:Adding multi-language support would enable the system to cater to educational institutions in different regions
- Expansion of Question Bank: The system can be extended to support larger and more diverse question banks, covering multiple subjects, branches, and educational levels

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THANK YOU!