

# AUTOMATED QUESTION PAPER GENERATOR WITH DATA LEAKAGE PREVENTION

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**Abstract**— Education builds the nation and it must be given in a very efficient manner. In today's world it is not easy to have a fair process. Examinations prepare students in their quest for knowledge. Security is the important concern in the examination process and generation of question paper. So, keeping data leakage in mind we have introduced data leakage prevention in our system using transparent data encryption which will keep our data secure and safe. So, we have introduced an automated and secured system with many new features like voice input, database security using transparent data encryption.

**Index Terms**— TDE, Question Paper Generation, Random Generation, PDF file, Paper Pattern Generator.

## I. INTRODUCTION

Question paper generator with data leakage prevention is an efficient way of generating question paper and improving the security in the field of education. Data leakage has become a very sensitive issue in making the organization weak. However, preventing data leakage is not always possible because of the need to access, share and use information, which leads to inevitable release of confidential data. This revelation comes in the form of information leak, which might be the result of deliberate action or spontaneous mistake. Information security is the practice of preventing unauthorized access, disruption, modification or destruction of information.

We have thus implemented a data prevention technique called **Transparent Data Encryption** which will ensure the security of our data and system.

### A. Existing System

The examination system that is being followed in most of the educational institutions is that, a certain number of predetermined number of faculties are handed over a syllabus and allocated the task of framing a set of Question Papers. Professors select the questions according to the syllabus and pattern prescribed in the curriculum. There might be some questions which might be repeated in many question papers as the professor has personal inclination towards them. So, there is no guarantee of pure randomly generated question paper. Also, security of the system can be easily compromised.

### B. Automated System

Automation means to replace the manual operations with computer procedures and other machines. We have proposed an integrated automated system whose objective is to replace the manual operation with computer procedures. In our system, we present a smart question paper generator to generate random but even questions within seconds. Our system reduces the loads of human effort. Also, it provides a secure environment. Database security is provided using a data leakage prevention system which will use Transparent Encryption method and thus ensure confidentiality of data. The major improvements from paper-based system are:

- Speed
- Efficiency
- Randomization
- Security

Manual Paper Generation	Automatic Question Paper Generation
Human process	Automated Process
Patterns or repetitions may occur	Totally random and unbiased process
Low Security as chances of paper leaking are high	Higher Security as chances of paper leaking are zero present
Slow as human labour involved	Faster due to computer based automation
Less variety of different types questions	Huge variety of different types of questions

Table 1

## II. LITERATURE SURVEY

We have reviewed some existing systems also we have done survey of some data leakage prevention methods and also implemented transparent encryption.

In the Question Paper Generator System paper [1] author proposed a model system for smart question paper generation of universities. The mechanism behind this system is that many random question papers are generated along with the difficulty

level of the questions in terms of percentage. After generation that particular question is then mailed to the respective university.

In [2] The paper generator selects a question according to the pattern and complexity. This engine also introduces a marking system where in any selected question is marked so that it might not be selected again. This prevents repetition of questions in subsequent papers. Finally, generated papers are stored as pdfs In [3] The paper “describes a system which uses a shuffling algorithm (existing algorithm) as a randomization technique. The system defines several modules such as user administration, subject selection, difficulty level specification, question entry, question management, paper generation, and paper management

In [4] the paper defines an explains an algorithm to generate question paper by considering various constraints such as proper coverage of coverage of difficulty levels .an algorithm is created to generate question paper template by satisfying such various constraints. This template is used to generate actual question paper. The algorithm presented in the paper is extensible to support any number of design constraints. The algorithm is implemented in Java and results are discussed for four constraints.

In [5] authors focus on data leakage prevention system using time-stamp. In Data Leakage Prevention, the time stamp is very important for giving permission to access a particular data, as in a particular period of time the data is confidential after the time stamp the same data could be nonconfidential.

In [6] author aims on Trustworthy based model, in which the data leakage is prevented using a trustworthiness-based model. Here the application, the distributor, the distributing files are studied and a final decision is taken. A trust between the company and its employees has a major effect on its growth and development. User’s behaviour can be recorded to generate a trust factor. The trust factor could be used to decide the guilt probability.

In [7] authors focus on data leakage prevention with transparent encryption. The transparent encryption is established on the basis of Windows File Driver. By capturing requests of specific file, the technology can realize the dynamic encryption and decryption for the sensitive data.

In [8] author uses a concept of physical mantrap where there is a small space between two doors such that first door closes before second door opens. This allows security guard to identify the identity of incoming personnel and if the identity of the personnel is suspect they can trap the intruder. In a similar way, author implements this concept in Linux kernel. First thing is to identify the point where files get transferred into packets and at that point mantrap can be built. Using JProbe (a tool for debugging and analysing Linux kernel).

**Limitations of existing system:**

- Dependency on intelligence of single person might raise the probability of error.
- Due consideration might not be given to the important part of syllabus.

- Secrecy may get sacrificed.
- Repetitions of question paper
- Mappings of course objectives and outcomes and pattern
- Voice input option not available
- No Intercommunication among different users.
- Data leakage prevention System is not implemented.
- Authentication and Verification not present.

**III. PROPOSED SYSTEM**

*A. Features and Benefits*

Following are few of the characteristic of the Automatic Question Paper Generation System:

- Simple user interface which increase the smooth the process of updating data.
- Generates and develops the well formatted question Paper in a matter of few seconds.
- Question category can be knowledge-based, Memory-based, Logic-based, or application-based.
- Questions can be comfortably modified.
- User can generate test papers randomly and instantly, thus saving a lot of time.
- More Effective and contains lots of new features like inter communication messages, voice inputs, user profiles.
- A new question can be added to the database at any instance and different sets of test papers could be generated without any limitation.
- With the use of this system for exam paper generation there are zero chances of exam paper getting leaked as paper can be generated few minutes before the exam. The Automatic Question Paper Generation System delivers diverse benefits to the user when compared to the traditional system.

The below is the basic outline of different modules available in system and how they will work.

**SYSTEM FLOW**

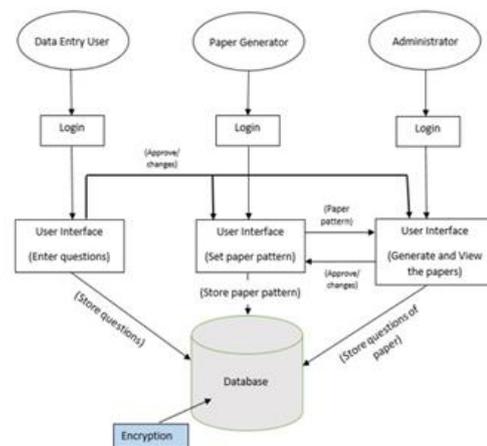


Fig. 1

The Automatic Question Paper Generator System is developed and built up using PHP programming language. Our proposed

System has different level of users and their modules. Data base entry operator enters data. Pattern generator generates the pattern and then admin confirms the pattern and generates the paper. Explanation and working will be explained in detailed in the below section.

#### B. Modules in Automatic Test Paper Generator

- a) Sign Up Module
- b) Login Module
- c) Pattern Generator Module
- d) Data Entry module
- e) Question Paper Generator Module
- f) Editing Parameters Module

In our project we have implemented a data leakage prevention technique which is Transparent Data Encryption.

Transparent Data Encryption (TDE) is an industry methodology that encrypts database files at the file level. Transparent Data Encryption(TDE) would be used for data leakage prevention. Encryption Hierarchy starts with Windows level Data Protection API(DPAPI). During the setup or installation of SQL Server Instance, the Service Master Key is encrypted with DPAPI. Service Master Key Encrypts the Database Master Key on Master database. Using Database Master key, a certificate on Master Database is created. The Certificate on Master Database is used to create Database Encryption Key(DEK). Finally, the DEK is used to Encrypt the entire User Database. After taking backup when TDE was enabled we get Encrypted database.

For random generation of questions, we use the query "SELECT TOP 10 PERCENT \* FROM TABLE ORDER BY NEW ID ()" which selects random rows from the created table. A question is fetched and displayed and then the table is dropped.

### IV. IMPLEMENTATION

#### A. Database Structure

The following figure shows an overview of a sample database depicting the working of automated paper generation. The question paper table would be mapped to the paper pattern and according to the pattern the question number, chapter number and marks would be mapped and worked through the randomized algorithm. This algorithm chooses the questions randomly. In this way the questions are selected in random and according to the pattern, the paper is generated.

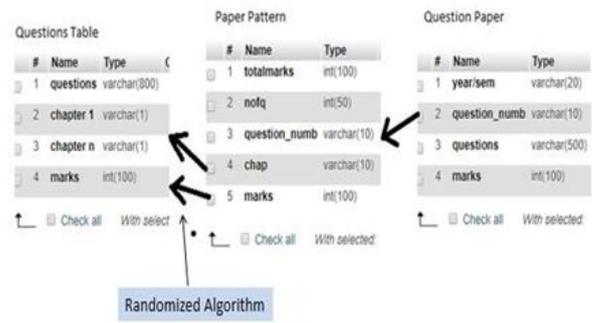


Fig. 2

B. Steps Involved in Automatic Question paper generator system are as follows

#### 1) Admin Login:

Admin username and password will be pre-set. Admin will verify every user that sign up for different post i.e. data base entry operator and paper pattern generator. Verification will be done by checking the entered details with the institutes database.

#### 2) Sign up for getting Credentials

Staff will sign up for getting credentials. After the user sign up. The pre-filled form gets mailed to admin and when the admin verifies the user. A mail having users credentials is mailed to him.

#### 3) Question Insertion:

Now after getting credentials those who have been approved for the role of data base entry operator can enter questions in the database.

#### 4) Transparent data encryption

Once the database is ready it is necessary that it should be secure and should not be easily accessible so we enable the transparent data encryption in SQL server by performing all TDE steps mentioned above in TDE process.

#### 5) Pattern Generation:

Paper pattern generator will login and will select the semester and subject and will set the pattern i.e. Total number of questions and chapter and marks of each question. Once the pattern is set. Admin will check the pattern and will approve or reject by using intercommunication messages.

#### C. Paper Generation:

If admin is satisfied with the pattern he will click on generate question paper button and question paper will be generated by randomly selecting questions from database according to pattern will be generated as PDF.

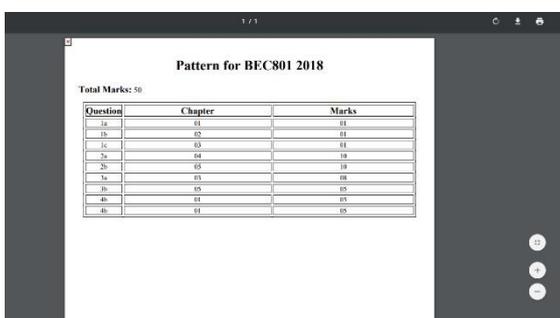
### V. RESULTS

We created a question paper for Data warehouse subject for semester eight BE computer. We first Select the total marks and then set the pattern by selecting chapter for each question and marks for each question.

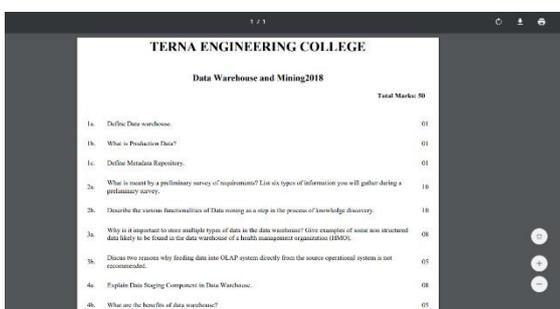
**Set Pattern-** After pattern is approved admin clicks on generate paper button.



**View pattern-** Admin and paper pattern generator can view the pattern which is set by paper pattern generator in PDF file.



**Question Paper Generated-** The question paper for the subject Data warehouse and mining was generated as PDF.



## VI. CONCLUSION

The implemented work narrates an automated system that heads away from the traditional process of paper generation to an automated process, by giving controlled entry to the resources that is attained by involving users and their roles in the colleges. We have also considered the significance of randomization in the process of paper generation Our system has deployed a process which is totally randomized and avoids repetition of questions in consequent question papers, making it difficult to derive any pattern in the papers and also confirms the confidentiality of question papers before examination date and implements data leakage prevention to ensure that data is not leaked. Hence the resultant automated system for Question Paper Generation will yield enhancement in phrase of controlled access to the resources, random creation of question papers and a secure platform.

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