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Research Article

Time-Locked Encryption for Exam Question Papers

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Abstract

Question paper leakage is a critical issue affecting the credibility of examinations. This paper presents a Time-Locked Encryption System designed to protect exam question papers from unauthorized access before the scheduled examination time. The system employs Advanced Encryption Standard (AES) for strong data confidentiality combined with a server-side time-lock mechanism that allows decryption only at a predefined release time. Role-based access control ensures secure handling, and all access attempts are logged for auditing.

Keywords: Time-Locked Encryption, AES, Exam Security, Role-Based Access Control

Introduction

Examination systems demand strong security to preserve fairness. Traditional distribution methods such as printed papers or email-based sharing are vulnerable to leaks and early access.

Problem Definition

Existing systems rely heavily on manual control and weak encryption, leading to security risks and lack of accountability.

Proposed System

The proposed system uses AES encryption with server-side time validation. Question papers can be downloaded in advance but decrypted only at the authorized time.

System Architecture

The system follows a centralized client-server model with role-based access and secure key management.

Implementation

Front End: HTML, CSS, JavaScript
Back End: Java, JSP/Servlets
Database: MySQL
Server: Apache Tomcat

Results and Discussion

The system successfully prevents premature decryption and provides transparent audit logs.

Conclusion

The Time-Locked Encryption System enhances exam security and minimizes human intervention. Future work includes blockchain-based audit logs and mobile monitoring.

References

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