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SECURITY AWARENESS OF UNIVERSITY IN NETWORK INFORMATION

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ABSTRACT

Recently network threats encountered by universities are constantly increasing, and the conventional methods of protection have been insufficient to address the current network information security landscape. A data can integrate massive logs data and analyze network security risk in real time, So as to implement function such as network assets management, massive logs management, security events analysis, attack events tracing, dangerous events warning, and security situation awareness, and consequently building up a comprehensive network information security system to provide decision support for network information security in universities.

Keywords: Universities, Security, Network Assets Management, Massive Log Managements, Security Events Analysis, Attack Events Tracing, Dangerous Event Management.

I. INTRODUCTION

The continuous promotion of the construction of Smart campus in colleges and universities, the scale of network and software application in colleges and universities has been continuously expanded. Under the traditional thinking model of "emphasizing construction but neglecting maintenance, and emphasizing operation but neglecting security", the network information security system in college and universities lacks of the overall planning. The security situation is difficult to measure and describe, and it's easy not to easily declare or misjudge. It has become a consensus in the field of information security that transforming "passive security defense of border control" into "active defense of rapid detection and response through the integration of information technology". Thus, it is necessary to build up a comprehensive university network information security situation awareness platform through collection, monitoring, analysis, warning, management and display modules. Through collecting log data from firewall, intrusion detection system, vulnerability scanner system bastion host, server, router, database, middleware, switches and other equipment, it will carry out correlation analysis of network security events, mine intrusion events and security events, and provide rapid alert to help university network operation and maintenance personnel to grasp the overall situation of network information security, effectively realize the active defense, so as to build a sound monitoring and early warning and supervision mechanism of emergency response.

Therefore, this paper proposes an overall framework of master data management and a master data model based on knowledge graph from the perspective of big data application, and make a study of the key technologies.

The goal of the railway data service platform is to provide the services of basic data, shared data, and big data analysis for each business application system, which is mainly composed of data integration, data sharing, big data storage and analysis, and fundamental data management. The data integration module mainly provides functions such as structured data integration, real-time streaming data integration, and unstructured data integration to meet various requirements of data collection. The data sharing module is mainly oriented to the needs of storage, query of full type data (structured, semi-structured, and unstructured), and realizes the storage and calculation of structured data and unstructured data. It can conduct the function of management such as the application and authorization of the data tables. Then generate different data sharing strategies for different users, granularity being controlled to be field level. The module of big data storage and analysis mainly provides statistical analysis, data mining services, visualization services, and other functions. It uses data warehouse and data marts to build statistical analysis functional components for business users. The module of

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basic data management mainly provides the functions of masters data managements, geographic information management and metadata information management, which are used to meet the requirements of unified and centralized management and services of the basic data. The geographic information data management provides public geospatial data for various application system, realizing the sharing of railway geographical information. The metadata management defines and manages data elements and relative information, including data formats, aliases, and information sources, etc.

II. LITERATURE SURVEY

1. TITLE: "A Survey On Cybersecurity Awareness in Higher Educational Institutions"

AUTHOR: Smith J., & Johnson L.

YEAR: 2021

DESCRIPTION: This survey examines the states of cybersecurity awareness programs in universities. It identifies gaps in training and awareness among students and faculty, emphasizing the need of tailored educational initiatives. The study also highlights the effectiveness of interactive training methods over traditional lectures. The demands for information security on Higher Education Institutions (HEIs) are expanding as HEIs are vulnerable because of the involvement of human factors, Hence, maintaining data privacy is paramount, where most individuals interacting with systems and applications are the main stakeholders (Lectures, students, and non-academic staff). In this regard, existing literature and security experts claim that enhancing users' Information Security Awareness (ISA) is one of the most effective protective techniques. Therefore, this study aims to propose a conceptual security awareness framework consisting of devices, application areas, and security practices and their related activities for HEIs. Moreover, five conceptual dimensions are suggested that affect users' ISA and are necessary for HEIs while measuring the ISA of their stakeholders. For investigation and understanding these issues, interviews were conducted with IT security experts working in HEIs.

2. TITLE: "Understanding Phishing Awareness Among University Students: A Comprehensive study"

AUTHOR: Chen Y., & Patel S.

YEAR: 22

DESCRIPTION: The study focuses on phishing awareness among university students, highlighting the prevalence of phishing attacks in academic environments. It provides insights into students' ability to recognize phishing attempts and suggests strategies for enhancing awareness through targeted campaigns.

3. TITLE: "Framework For Enhancing Cybersecurity Awareness In University Networks"

AUTHOR: Patel N., & Singh R.

YEAR: 2023

DESCRIPTION: This paper proposes a comprehensive framework for improving cybersecurity awareness in university networks. It combines elements of policy, training, and technology to create a holistic approach. The authors present case studies demonstrating the framework's effectiveness in various university settings.

III. METHODOLOGY

3.1 Methodologies

3.1.1 Module Overview

The system is organized into key modules, each designed to handle distinct aspect of security awareness of university in network information. The modules are as follows:

- User Interface Design
- Admin
- University
- College
- Data Analysis Model
- Alarm Process Model

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System Architecture

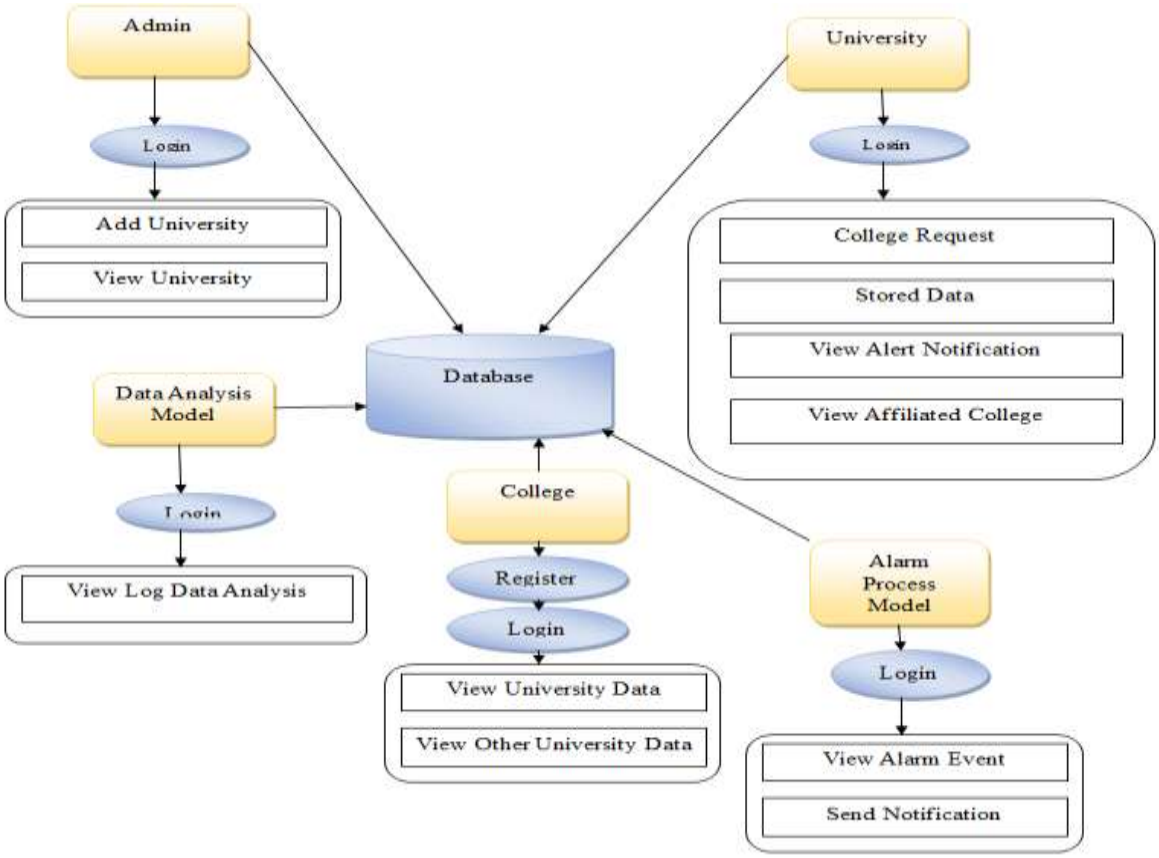

Fig 3.1: System Architecture

3.1.2 Module Descriptions

1. User Interface Design

In this module we design the windows for the project. These windows are used for secure login for all users. To connect with server user must give their username and password then only they can able to connect the server. If the user already exits directly can login into the server else user must register their details such as username, password and email id, into the server. Server will create the account for the entire user to maintain upload and download rate. Name will be set as user id. Logging in is usually used to enter a specific page.

2. Admin

This is the first module of this project and he will be the administrator and has control over all the things. In this module Admin can add university and view university.

3. University

This is the second module of this project. In this module university should login. University can have a college request. University can also a stored a data. University can view alert notification. University can also view affiliated a college.

4. College

This is the third module of this project. In this module college user need to register and then login. College can also a view university data. College can also view other university data.

5. Data Analysis Model

This is the third module of this project. In this module data analysis model login. Data analysis model can view log data analysis.

6. Alarm Process Model

This is the fourth module of this project. In this module alarm process model can do the login. Alarm process model can also have a view alarm event and it also be a send notification in the database.

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3.2 Technique

This paper studies the contents and functions of the network information security situation awareness platform, and plans a set of functional architecture platform suitable for colleges and universities. The network information security situation awareness Platform includes five processes, including data collection, data transmission, data storage, data mining analysis, and data visualization.

3.3 Design and Workflow Modeling

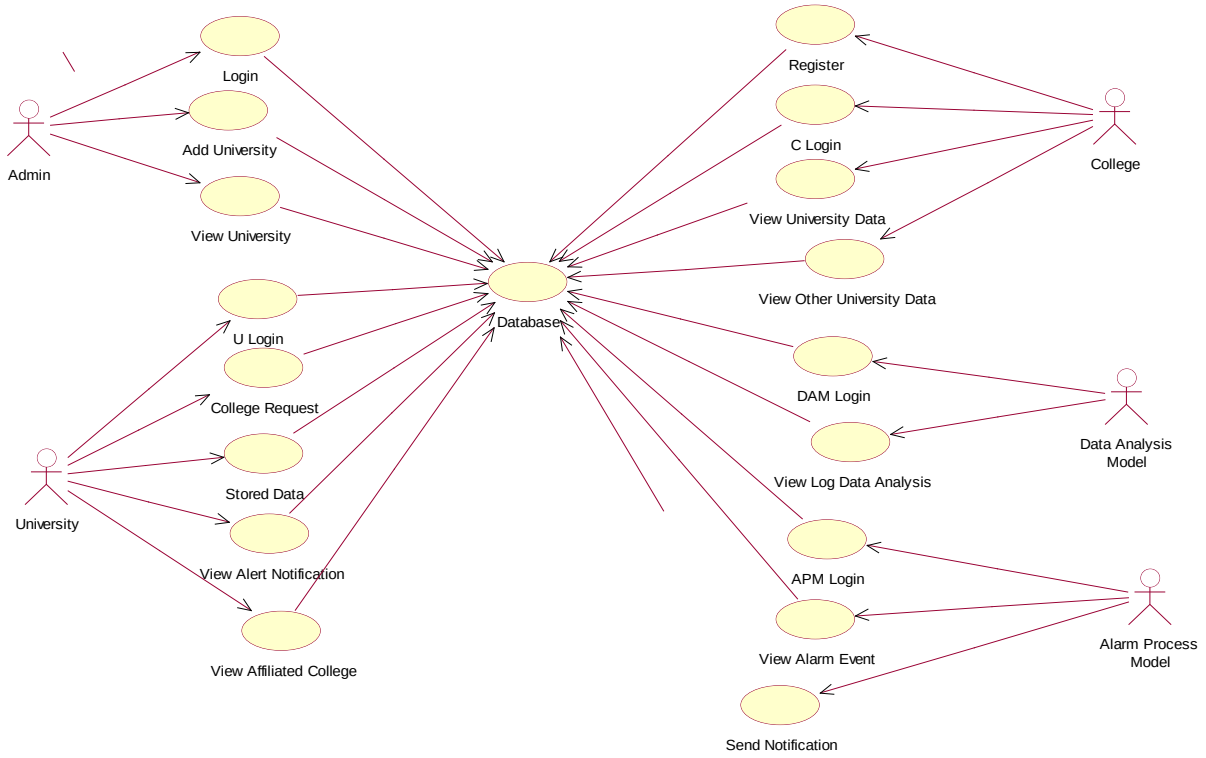

Fig 3.2: Use Case Diagram

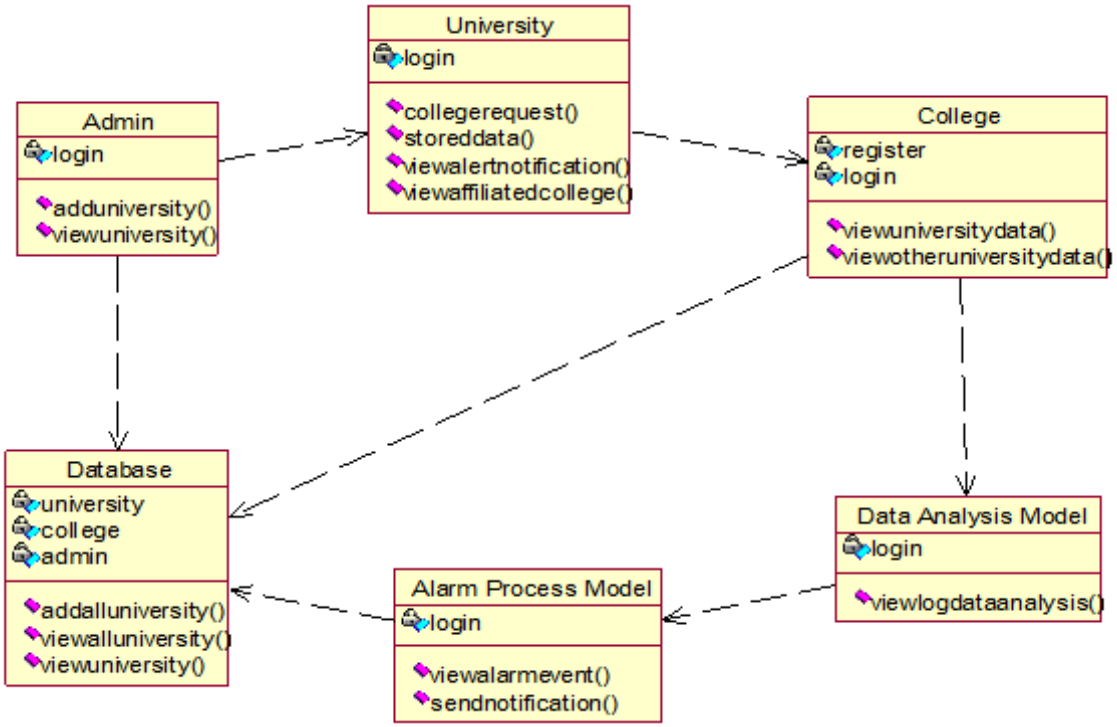

Fig 3.3: Class Diagram

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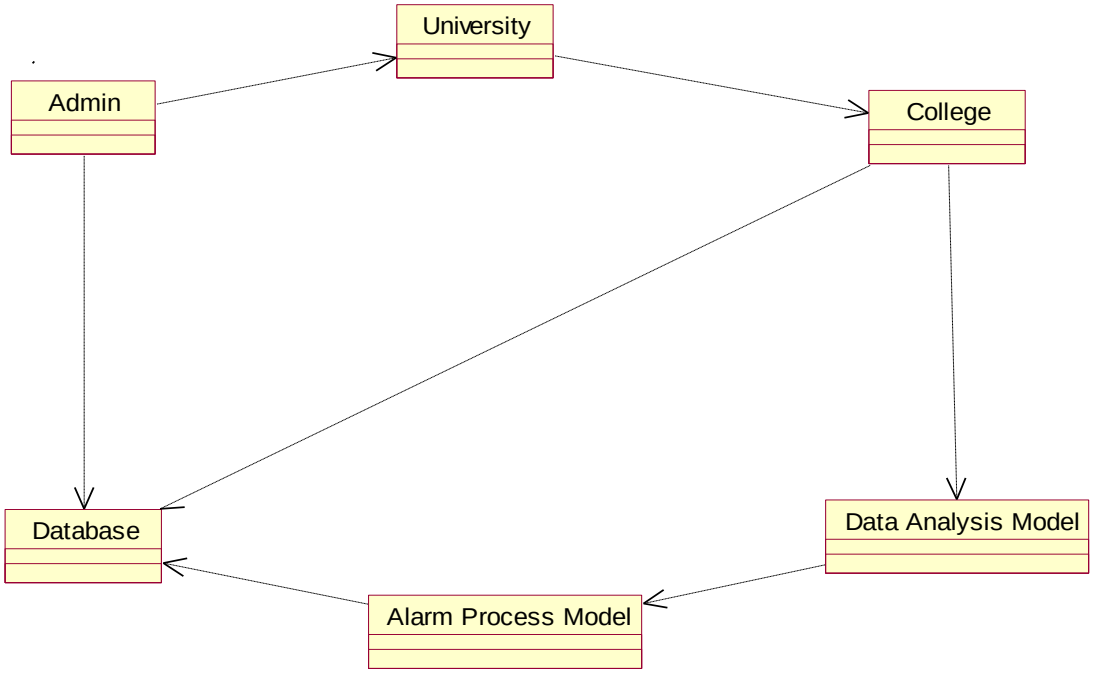

Fig 3.4: Object Diagram

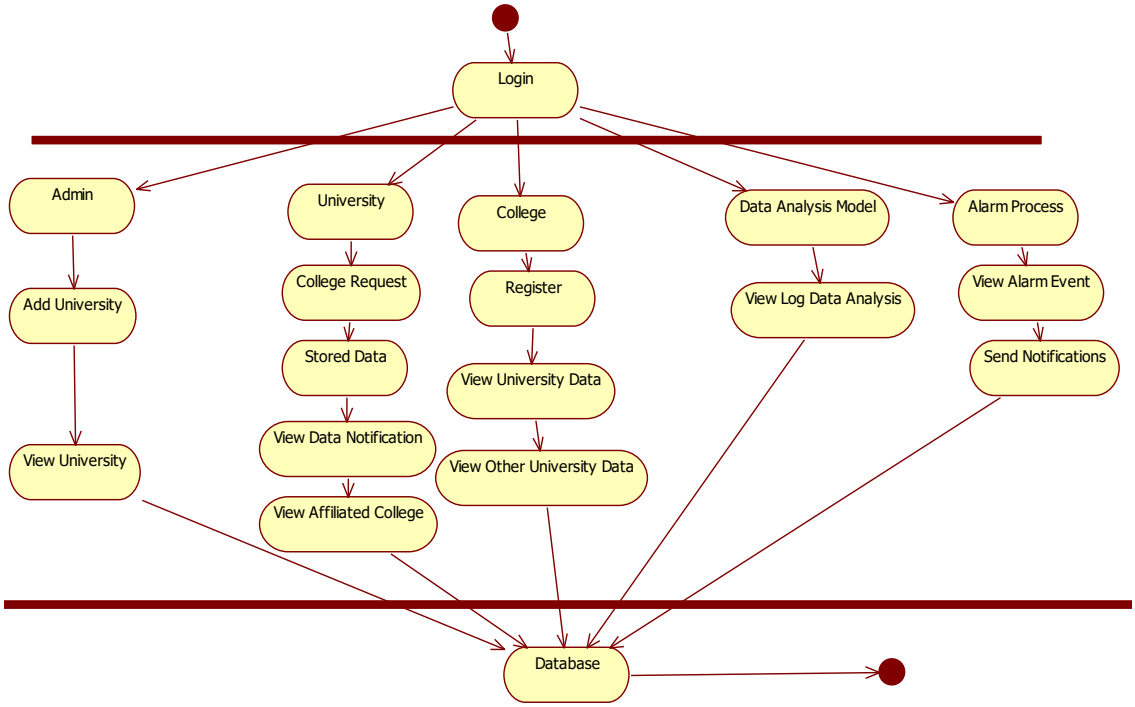

Fig 3.5: Activity Diagram

Design Engineering deals with the various UML (Unified Modeling Language) diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process through which the requirements are translated into representation of the software.

In the USE CASE DIAGRAM, it shows how the administrator logs into the system. The administrator adds a new university to the system. The administrator views a list of all universities. The administrator edits details of an existing university. The administrator removes a university from the system. The administrator assigns roles and permission to different users. The university user logs into the system. The university user submits a request for new affiliated colleges. The university users store relevant data in the system. The university user views alerts related to its operations. The university user views a list of its affiliated colleges. The university

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user updated its profile information. The college user registers in the system. The college user logs into the system. The college user requests additional information from universities. The data analysis model generates reports based on the analyzed data. The alarm process model sends notifications based on alarm events.

In CLASS DIAGRAM administrator has a one-to-many relationship with university. University has a one-to-many relationship. Data Analysis Modes can analysis multiple Log Data entries.

In OBJECT DIAGRAM admin manages university1.university1 has a relationship with college1(indicating that college1 is affiliated with university1).

ACTIVITY DIAGRAM are graphical representation of workflows of stepwise activities and actions with support for choice, iteration and concurrency. The authentication component interacts with the user interface component to manage roles and user login. The user interface components communicate with the institution's management components on procedures pertaining to the institution. Information concerning college related procedures is shared between the user interface and college management components. The Database component interact with the college management component and the university management component to perform CRUD operations.

IV. RESULTS AND DISCUSSSION

This project is implements like web application using COREJAVA and the server process is maintained using the SOCKET & SERVERSOCKET and the design part is played by cascading style sheet.

Fig 4.1: Home Page

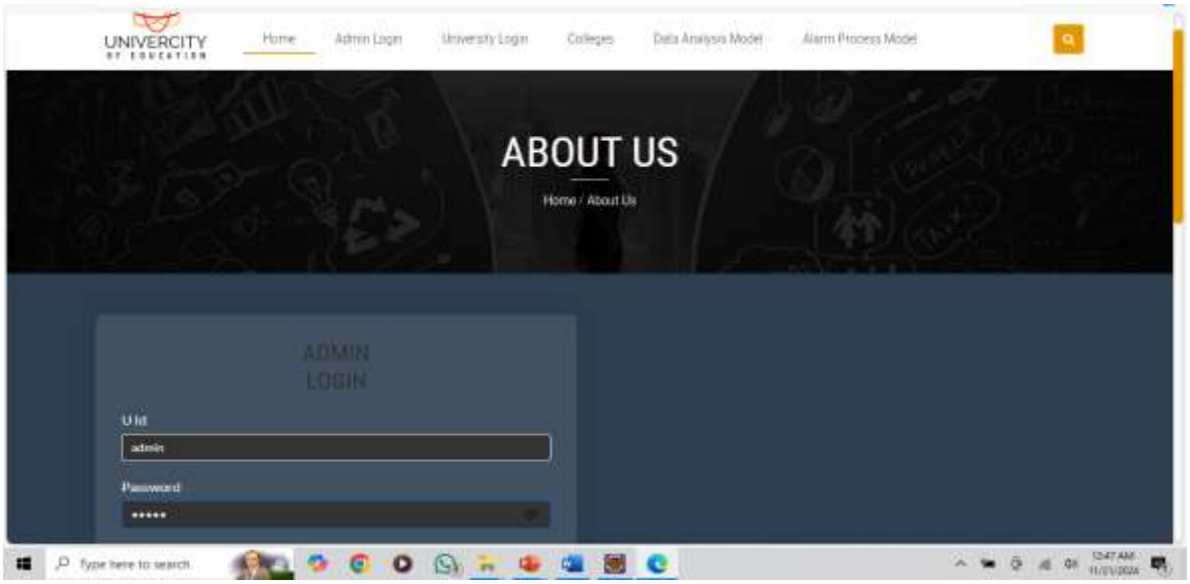

Fig 4.2: Administrator Login page

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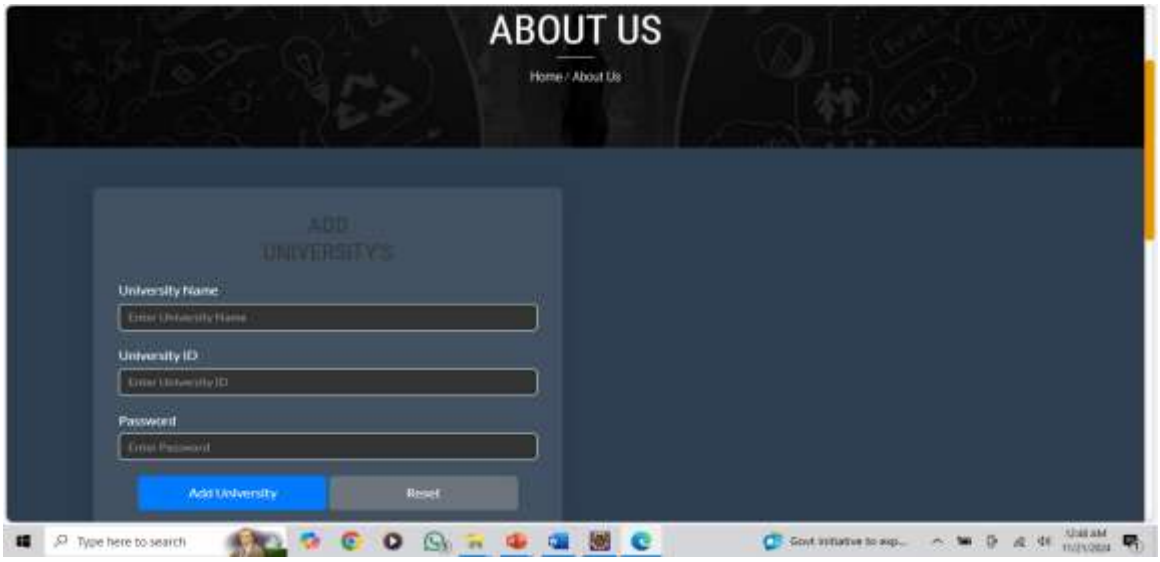

Fig 4.3: Add University page

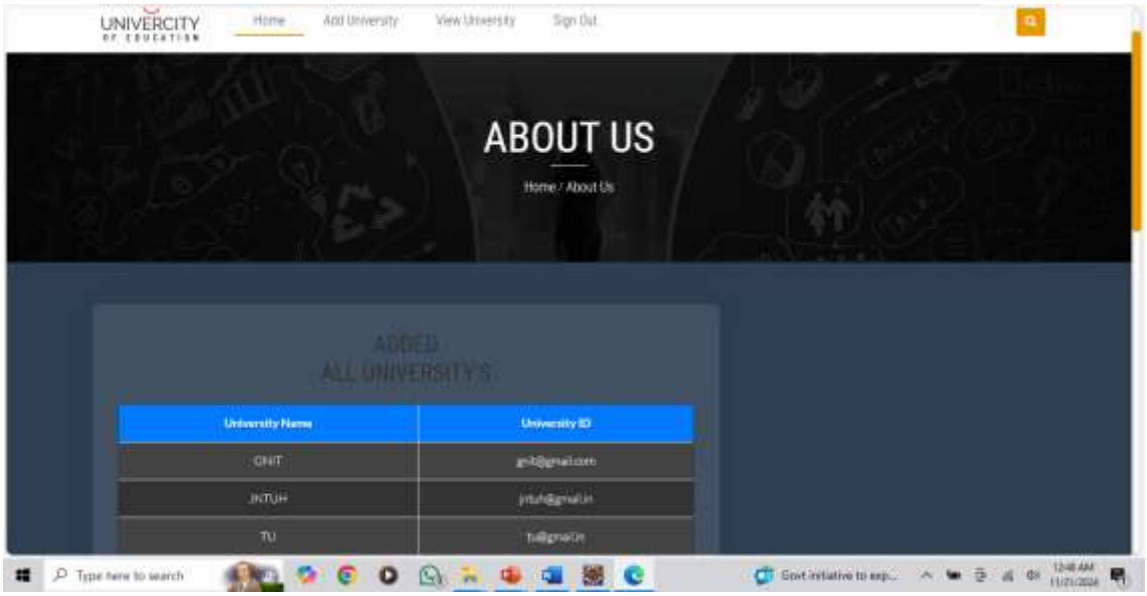

Fig 4.4: Added University page

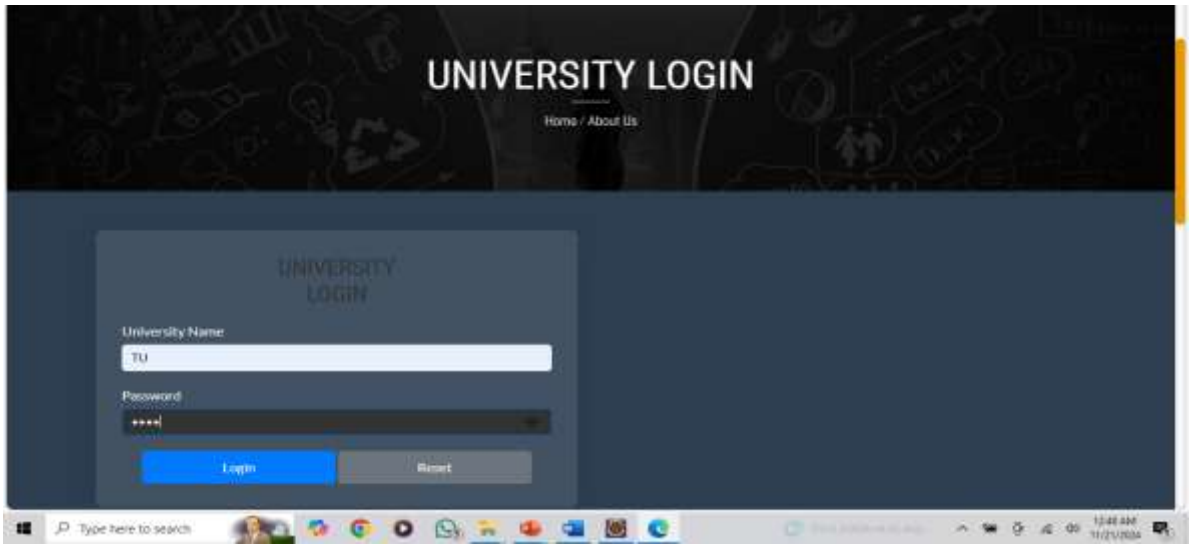

Fig 4.5: University Login page

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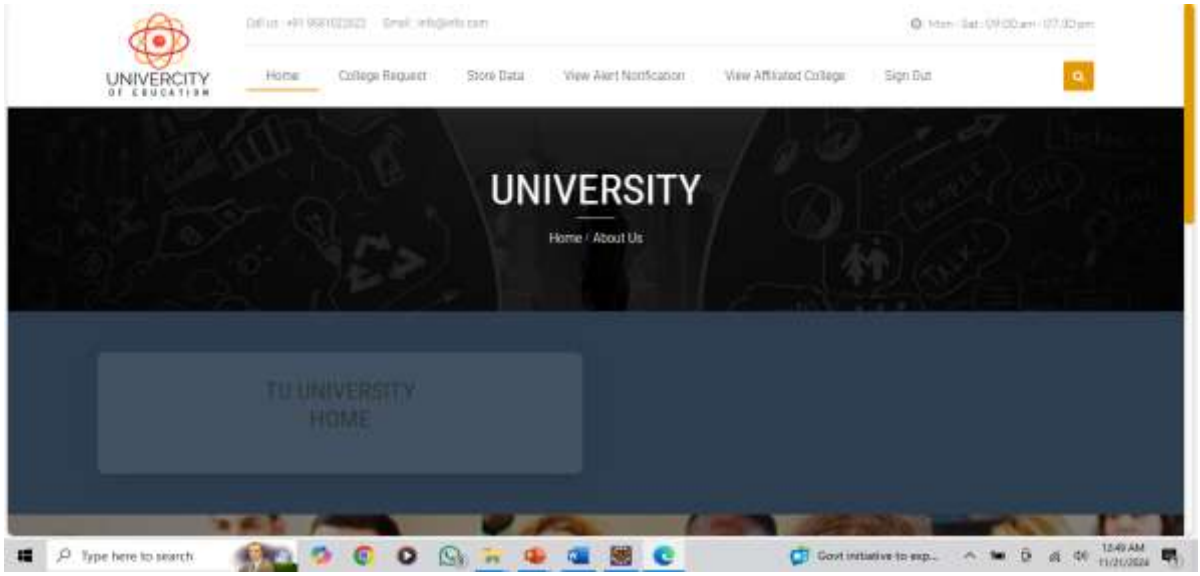

Fig 4.6: University Home page

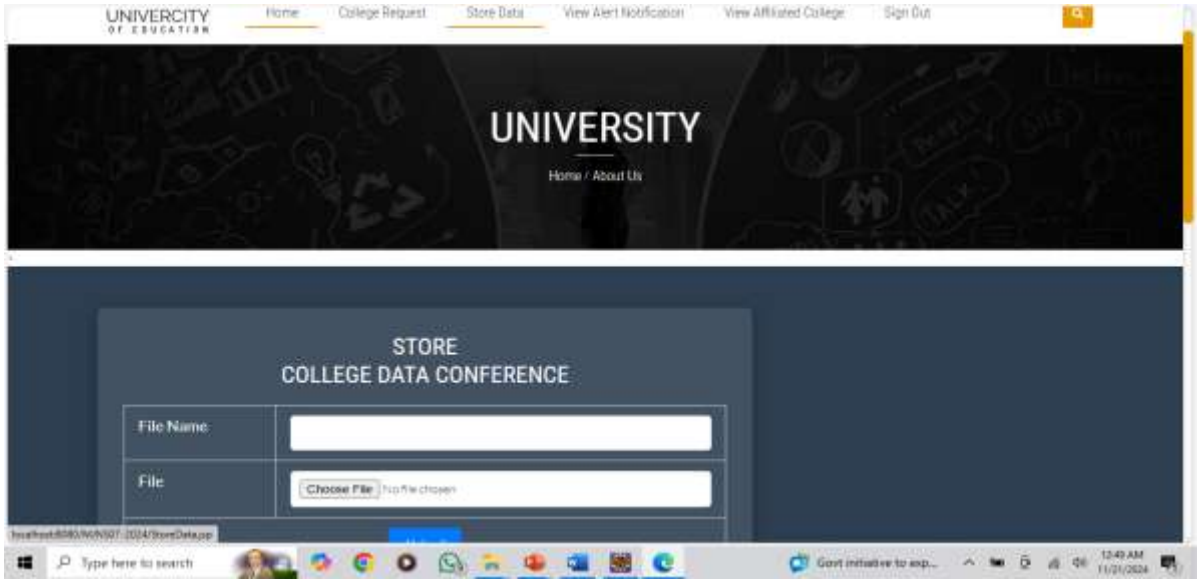

Fig 4.7: University store college data page

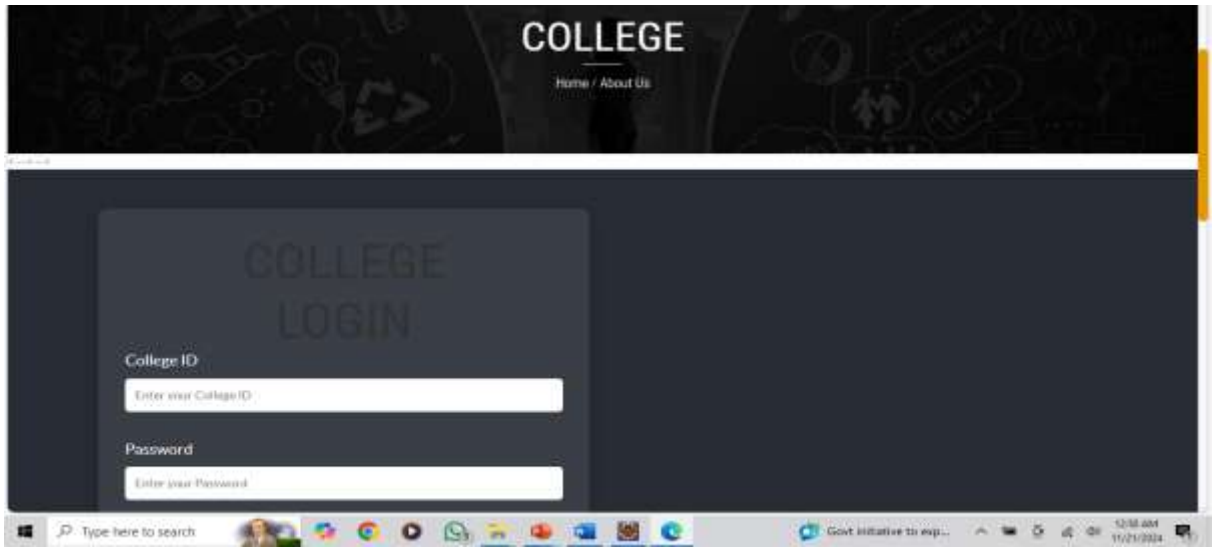

Fig 4.8: College Login page

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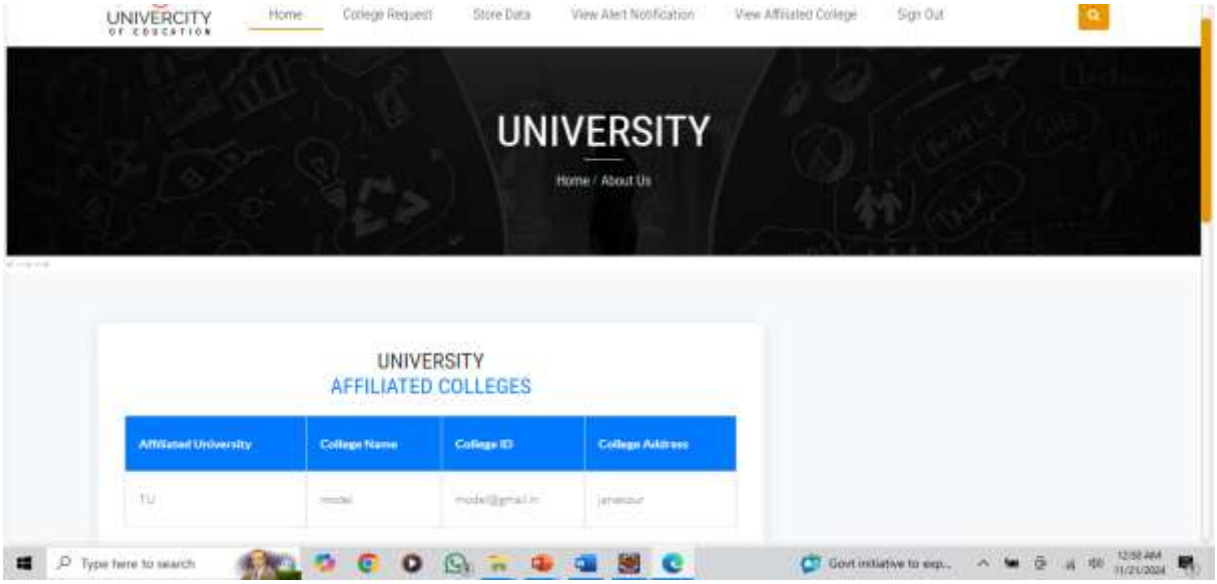

Fig 4.9: University Affiliated colleges page

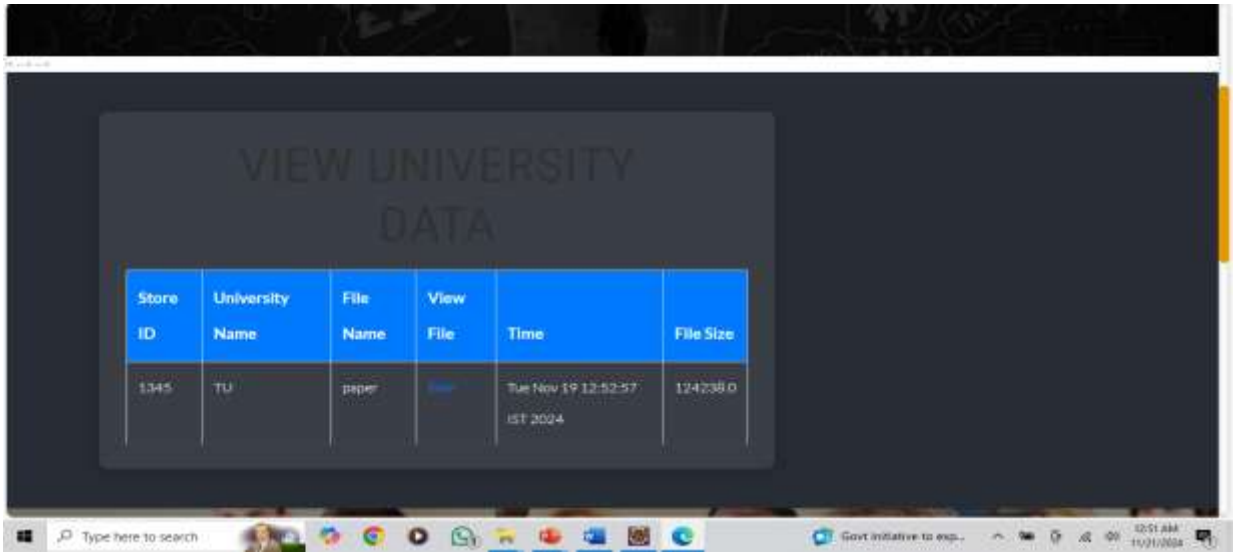

Fig 4.10: View University Data page

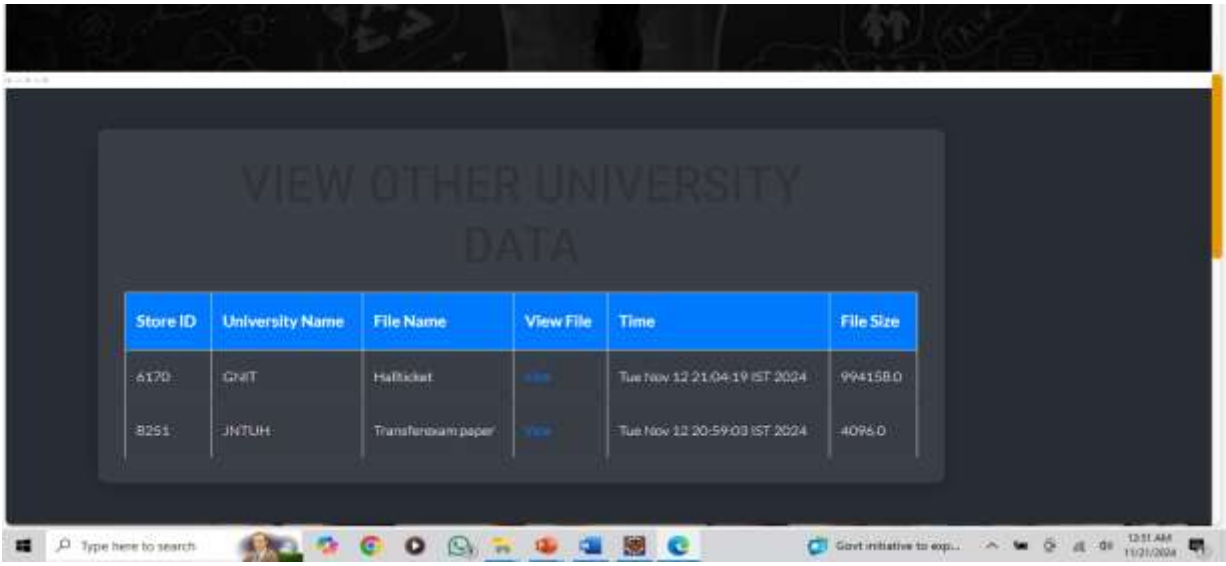

Fig 4.11: View other university data page

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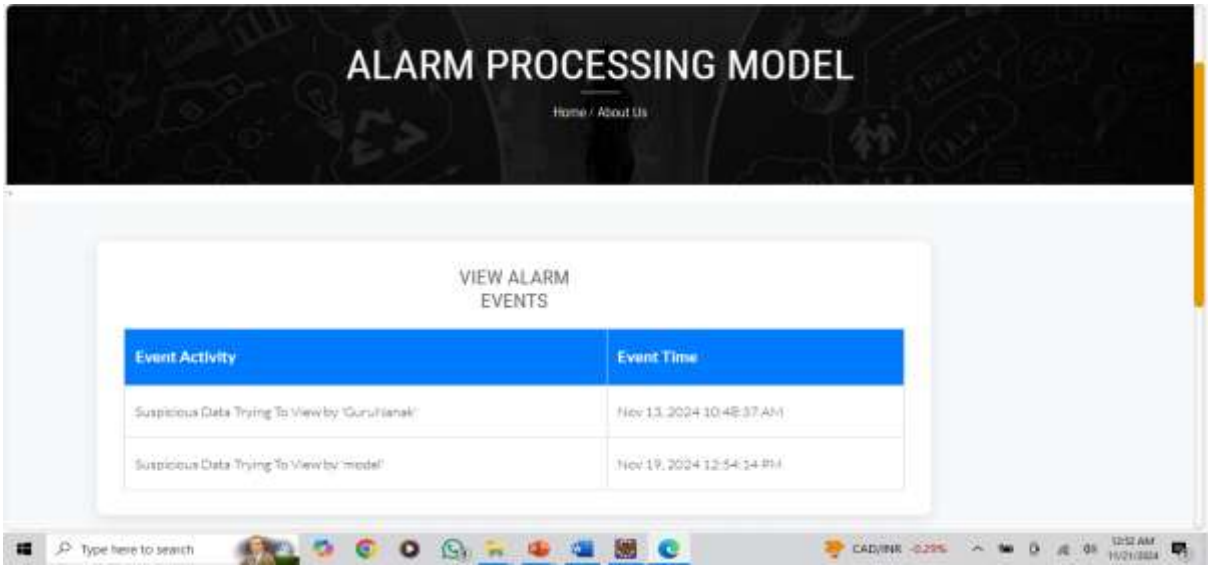

Fig 4.12: view Alarm event page

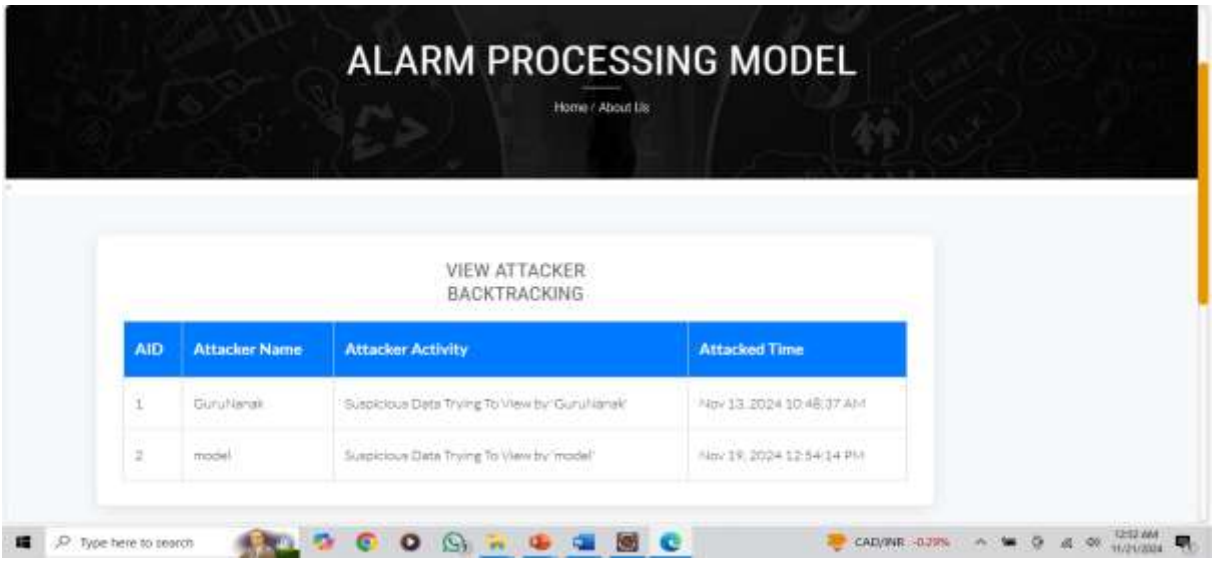

Fig 4.13: View attacker backtracking page

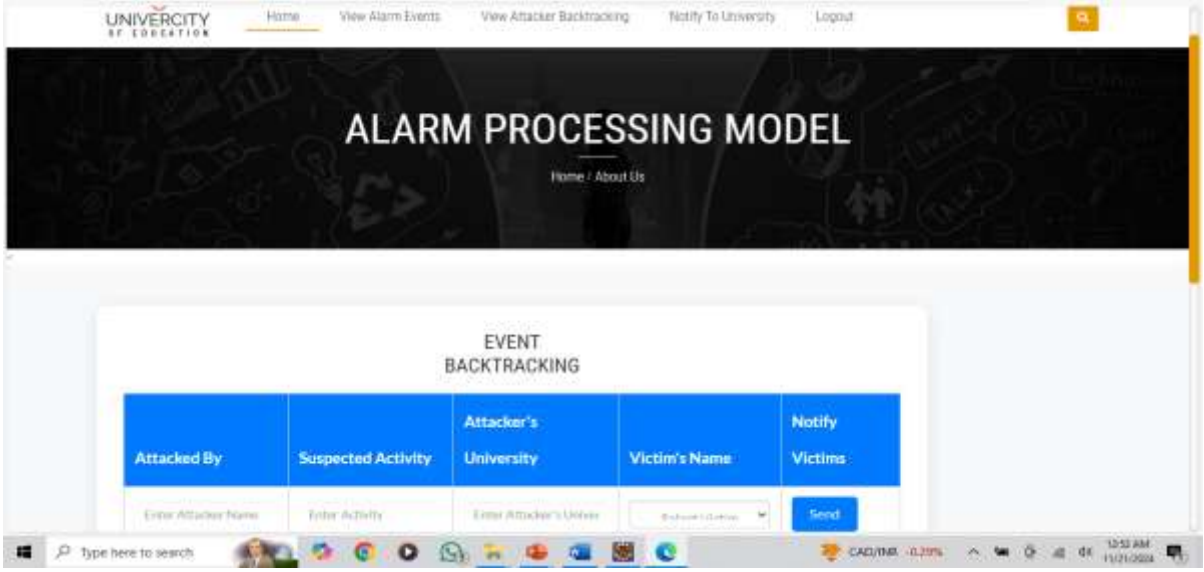

Fig 4.14: Event backtracking page

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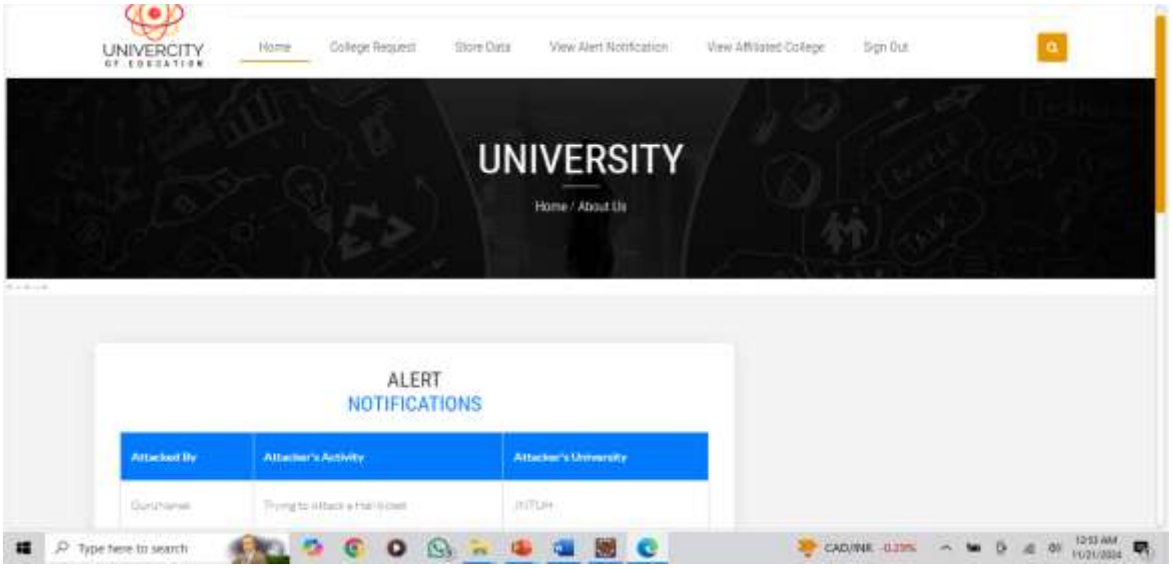

Fig 4.17: Alert Notification

V. CONCLUSION

Aiming at the requirements of network information security management in colleges and universities, this paper studies the contents and functions of the network information security situation awareness platform, and plans a set of functional architecture of network information security situation awareness platform suitable for colleges and universities. According to the author's years of experiences in the operation and maintenance of network information security, in the process of implementing network information security situation awareness platform on the market, from subjective stance, there are problems like function too is formidable, operation is cumbersome, and application scenarios are in consistent with actual problems. Also, objectively speaking, there are problems like log data collection is incomplete, traceability analysis difficulties. It is hoped that this paper can provide some references for network information security situation awareness providers.

As a future work, we plan to explore and develop a protocol that allows multiple users to shares data across different cloud servers, with the motivation of enhancing the efficiency of data sharing among multiple users.

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