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Development of a Cybercrime Information Management System

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Abstract

This study implements and evaluates a Cybercrime Information Management System (CIMS) designed to enhance cybercrime reporting, investigation, and resolution. Through a pilot test involving law enforcement personnel, IT administrators, and volunteer users, the system's performance was measured across three core metrics incident detection accuracy, response time, and user satisfaction. Results indicate a 92% accuracy rate for identifying cybercrime incidents and an average response time of 2.1 seconds, demonstrating a marked improvement over traditional manual methods. A 4.4 (±0.6) user satisfaction rating further highlights the system's usability and perceived data security. Comparative analysis also revealed a rise in cybercrime reporting from 30 to 110 cases, accompanied by a decrease in average case resolution time from 15 to 7 days and an increase in closure rate from 43% to 68%. Qualitative feedback underscored enhanced ease of use, bolstered data security confidence, and more efficient administrative workflows. Despite challenges related to interoperability with legacy systems, staff training, and long-term maintenance, the CIMS's positive outcomes suggest that ongoing refinements such as mobile integration,

expanded threat intelligence, and international collaboration can fortify cybercrime prevention and response on a broader scale.

Keyword: Development, Cybercrime, Information, Management, System, Database

Introduction

Cybercrime has emerged as one of the most significant challenges in the current Information Age, largely due to its capacity to span multiple geographic locations instantaneously. In simple terms, cybercrime refers to any criminal activity that leverages computers, digital devices, or the internet for malicious purposes (Wilson & Ukaoha, 2019; Okeshola & Adeta, 2013). Unlike traditional crimes whose locations and timings are relatively straightforward to determine, cybercrime often involves cross-border elements that complicate jurisdiction and enforcement. Indeed, many researchers classify cybercrime as a hybrid offense—an umbrella category encompassing identity fraud, organized crime, forgery, theft, money laundering, and internet-facilitated wrongdoing (Akay, 2020; Jahankhani, 2018; Wall, 2007).

Moreover, cybercrimes—including fraud, counterfeiting, cyberbullying, cyberstalking, spam, and cyberviolence—are pervasive and can result in substantial societal, economic, and behavioral consequences (Wilson & Ukaoha, 2019). With cybercriminals becoming increasingly sophisticated, both public and private entities face growing risks, thus necessitating multilayered defenses (Brewer et al., 2019). Beyond financial and societal harm, cybercrimes also pose major political challenges (Brenner & Koops, 2006), facilitated by global networks that eliminate many traditional barriers of time and place.

Historically, the origins of hacking can be traced to the 1970s with benign programs like the "Creeper" virus, which evolved into a wide range of malicious software over time. Conventional methods of collecting and maintaining intelligence and criminal records have proven insufficient in dealing with modern, evolving cyberthreats. Manual procedures do not readily offer real-time, accurate, and

comprehensive data nor do they facilitate future trend forecasting or informed decision-making.

In response, many law enforcement agencies such as the Economic and Financial Crimes Commission (EFCC) have been integrating computer technologies into their operations, moving beyond standard administrative tasks to specialized software and analytics designed to prevent and investigate digital crimes. However, the escalating complexity and frequency of cybercrimes necessitate even more advanced approaches.

A Cybercrime Information Management System (CIMS) offers a more efficient and scalable solution by leveraging modern software tools to manage the rising influx of cyber-related offenses. Through computer-generated records stored in a secure database, CIMS helps organizations like the EFCC enhance preparedness, optimize prevention strategies, assess past incidents, and anticipate potential developments. The system assists investigators in identifying suspects and expanding the scope of investigations when initial leads are scarce. Cybercrime spans various platforms and locations, complicating the collection and aggregation of meaningful intelligence. Without comprehensive datasets, it is challenging to gain a complete picture of cybercrime trends and patterns. Managing a cybercrime information system involves handling sensitive data regarding victims and offenses. Protecting these data from unauthorized access through encryption, periodic vulnerability assessments, and strong privacy controls remains a significant challenge.

Many law enforcement agencies already have independent IT infrastructures in place. Seamlessly integrating a new cybercrime information management system with these legacy systems is time-consuming and demands careful attention to interoperability, data transfer protocols, and backward compatibility. The primary aim of this study is to develop a cybercrime information management system. The specific objectives are to; develop an integrated database system for cybercrime records, implement the integrated database system using PHP, MySQL, and DBMS technologies, evaluate the effectiveness and performance of the integrated database system. Findings from this research can significantly aid cybersecurity professionals in identifying and tracking cybercriminals. An operational Cybercrime User Identification and Crime Detection System (CUICDS) would

deter malicious actors, knowing that streamlined processes expedite investigation and prosecution. Increased public trust in online security could then follow, especially among individuals and organizations that store sensitive data online. This study also creates a new research avenue in network security, helping shape policies and laws geared towards combating cybercriminal activities. This study focuses on designing and developing a cybercrime management system that aids law enforcement agencies in suspect identification and expands the investigatory base when direct leads are unavailable. By combining real-time data gathering with advanced analytics, the system aims to streamline the detection, monitoring, and prevention of cybercrime.

Related Literature

Theoretical Framework

Information Theory offers a mathematical perspective on how signals are transmitted, originally developed by Claude Elwood Shannon in the 1940s. Often referred to as the "father of information theory," Shannon's work underpins much of modern data transmission, especially in information technology and communications engineering. While early human communication theories drew analogies from Information Theory to explain message exchanges linearly, the field itself focuses on foundational concepts such as noise, channel capacity, feedback, and error coding (Shannon, 1940).

A key principle within Information Theory is the notion that "information" can be quantified and inversely related to certainty. As Stephen and Kareen (2009) explained, the more possible states a system can occupy, the less predictable the outcome and thus, the higher the informational entropy. Although traditionally associated with engineering, physics, and mathematics, the theory has relevance for modern cybercrime information systems. When these systems record data on criminal activity, they transform that data into actionable intelligence, essential for preventing and mitigating hacking attempts.

Conceptual Review

The functionalist approach rooted in the ideas of Victor A. Thompson, Philip Selznick, Demerath and Peterson, and popularized by Charles Perrow further

informs this study, (Okoli, 2019) referred to as the "structural-functional" or "structural-functional approach," it posits that the smooth operation of a system depends on each of its parts functioning cohesively. The architecture of a cybercrime information management system thus draws on theories of structure, function, and the necessity for decision-making frameworks that optimize organizational effectiveness in combating cybercrime.

Part II, Sections 6 and 7 of the EFCC Act (2004) detail the functions and powers of the Economic and Financial Crimes Commission (EFCC). Notable responsibilities include;

1. Ensuring compliance with the Act's provisions.
2. Investigating all forms of financial crimes (e.g., advanced fee fraud, money laundering, counterfeiting, credit card fraud).
3. Enforcing relevant financial and economic crime laws.
4. Taking measures to locate, freeze, seize, or forfeit assets derived from terrorist activities or financial crimes.
5. Facilitating legislation to deter economic and financial crimes.
6. Implementing strategies to prevent such crimes, including monitoring and regulatory functions.
7. Promoting rapid information exchange among stakeholders to combat fraud.
8. Reviewing all reported financial and economic crimes to identify involved individuals or entities.
9. Evaluating financial losses incurred by both government and private bodies.
10. Collaborating with international bodies and other law enforcement agencies on similar matters.
11. Tracking suspects linked to financial crimes.
12. Handling issues related to extradition and legal cooperation in cross-border economic crime cases.
13. Compiling and analyzing suspicious monetary transactions before forwarding them to the appropriate agencies.
14. Supervising ongoing investigations and prosecutions related to financial crimes.

15. Coordinating various financial and economic crime investigation units within Nigeria (Okoli, 2019).

Badu (2006) links corruption in certain nations to prolonged military rule, weakened rule of law, opaque governance structures, and an institutional culture that fosters secrecy. Transparency International (TI, 2008) further argues that corruption thrives in environments where temptation and lax enforcement coexist, and where social or legal accountability is minimal. A 2003 study commissioned by the Federal Government of Nigeria and conducted by the Institute for Development Research at Ahmadu Bello University found that low salaries for public officials, a murky political process, and insufficiently effective mechanisms for reporting corruption were key drivers of graft.

Tanzi (1998) posits that governmental monopoly and discretionary powers—manifested in licensing, taxation, or procurement processes—can exacerbate corrupt activities when oversight is weak and punishments are minimal. Overly complex tax regulations and frequent interactions between citizens and tax officials also heighten opportunities for bribery. Similarly, the African Development Bank (ADB, 2006) suggests that corruption declines when the likelihood of being caught is high, punishments are clear and severe, and society as a whole rejects unethical conduct.

Ultimately, factors contributing to corruption range from societal-value erosion, poor leadership, and political instability to weak institutional checks and insufficient sanctions (Bello-Imam, 2005; Ekumankama, 2002; Adebayo, 1986). Transparency in governance, robust legal frameworks, and well-resourced oversight bodies are pivotal in mitigating corrupt practices.

The EFCC's operations are often hindered by court injunctions that protect powerful individuals from arrest or prosecution. High-profile cases, such as those involving Alhaji Bashir Dalhatu and Dr. Peter Odili, illustrate how legal shields undermine EFCC efforts (Okoli, 2019). Other obstacles include;

i. Political Interference: Some critics argue the EFCC targets political opponents selectively.
ii. Immunity Clauses: Certain public officers (e.g., President, Vice President, Governors) are constitutionally protected from prosecution while in office, limiting EFCC's authority.

iii. Public Skepticism: The EFCC's perceived alignment with the ruling party undermines public trust in its impartiality.

Although the EFCC's high-profile arrests and indictments demonstrate progress, structural and legal challenges persist, compromising the effectiveness and credibility of anti-corruption efforts.

Empirical Studies

Mykola et al. (2018) identify hacking as a leading threat to information security in transitional economies, noting the surge in cyber incidents that affect both private and public interests. Ukraine, for example, struggles with a lack of well-defined cybersecurity policies, a shortage of experts, and insufficient coordination. The study underscores the urgency of strengthening legal frameworks, enhancing cybersecurity infrastructure, and establishing technical hubs to detect and counter cybercrime more effectively.

Similarly, Stanciua and Tinca (2017) examine global cybersecurity challenges, emphasizing the value of information as a critical resource. Cybercrime costs governments and businesses large sums of money, necessitating robust preventative measures. Their research highlights the need for executive leaders and policymakers to be more aware of, and prepared to combat, cyberthreats.

Alese et al. (2021) propose a user identity management system equipped with two-factor authentication—including biometric data—to mitigate fraud risks. Their simulation using a "life-wild dataset" showed an accuracy of 98.01%, demonstrating how advanced authentication protocols can effectively deter cybercrime.

Cybercrime continues to evolve, often committed remotely, with criminals stealing money or assets across global jurisdictions. Brenner (2018) notes how historical organized crime—rooted in local communities—contrasts sharply with geographically diffuse cybercriminals who manipulate technology to target victims worldwide. Unlike older hierarchical gangs, modern hackers can commit sophisticated fraud from a single computer, complicating law enforcement's ability to track and apprehend them (Kwang & Choo, 2018).

The internet's rapid expansion has facilitated online transactions but also intensified criminal activities (Longe & Chiemeke, 2018). Identity theft and hacking are particularly pervasive, with criminals exploiting weaknesses in password systems and personal data storage (Erhabor, 2018; Olasanmi, 2020). Multi-factor authentication models and strong identity management protocols, as proposed by Camp (2018) and Ferndous et al. (2019), are seen as crucial mechanisms in reducing vulnerabilities.

Amid rising global internet connectivity, the risk of cyberattacks grows, spurring calls for robust digital security measures. According to the Federal Trade Commission (2005), even a single piece of personal data (like a Social Security Number) can enable significant fraud. This underscores the importance of stronger cybercrime legislation, advanced technical safeguards, and improved user identity verification systems.

The proliferation of digital services—such as automated processes, communication networks, and cloud technologies—has accelerated economic growth while magnifying cyber-risks (Oláh et al., 2017; Bychkova et al., 2018). Researchers note that breaches in data integrity undermine public trust, disrupt organizations, and incur high economic costs (Čábelková et al., 2015; Pusak & Marchenko, 2018). Addressing these threats requires concerted efforts in upgrading legal frameworks, refining detection tools, and developing advanced response strategies (Markina, 2016; Shvetsova et al., 2018).

With the advent of cybercrime, global enforcement frameworks have become more complex. Traditional organized crime families operated through hierarchical structures and territorial divisions, relying on local authority and community infiltration (Brenner, 2018; Barnard, 2019). Today's cybercriminals are decentralized, leveraging the internet to victim-blame across borders, complicating investigative processes (Cohen, 2019; Kwang & Choo, 2018). Cyber-enabled fraud can occur entirely online, thwarting conventional local policing efforts.

The ubiquity of digital communication fosters opportunities for fraudulent activities, from identity theft to more sophisticated attacks on corporate data (Longe & Chiemeke, 2018; Erhabor, 2018). As Olasanmi (2020) observes, identity theft is one of the world's fastest-growing cyber offenses. Researchers (Ferndous et al., 2019) highlight the necessity of creating robust, technology-driven

solutions—such as multi-factor authentication and continuous user identity verification—to mitigate these risks, reinforcing data security for consumers and organizations alike.

Methodology

This methodology section outlines the design and development process for a robust Cybercrime Information Management System (CIMS), employing SSAD techniques to ensure systematic analysis and development. Key modules Admin, User, Threat Intelligence, Decision Support, and Security Measures work cohesively to gather, analyze, and respond to cyberthreats effectively. By integrating modern software technologies and best practices in database management, the proposed system offers a significant upgrade over existing manual and isolated cybercrime management approaches.

Currently, Nigeria's law enforcement agencies rely on both manual and stand-alone, technology-assisted approaches to track cybercrimes. When an offense occurs in a particular area, residents typically contact a nearby police station. Officers then visit the crime scene to assess the situation manually. Since criminals often flee by the time the police arrive, security personnel must rely on in-depth investigations and data gathering to build a case.

However, many agencies operate separate cybercrime management systems that are not well-integrated, rendering them ill-suited to today's rapidly evolving cyberthreats. They often lack advanced analytical capabilities, limiting their ability to process large volumes of data or rapidly respond to new attack methods.

The proposed Cybercrime Information Management System (CIMS) aims to provide a comprehensive platform for collecting, analyzing, and disseminating critical data related to cybercrime. It accomplishes this by;

Data Gathering

Aggregating information from various internal and external sources both structured and unstructured—and identifying any indications of potential cyber threats.

Data Analysis

Employing sophisticated algorithms to detect patterns, trends, or anomalies in the aggregated data that could signal a cyberattack or vulnerability.

Actionable Intelligence

Presenting analysis results in an accessible format, empowering decision-makers to formulate preemptive security policies and targeted response strategies.

Incident Reporting Module

Allows users (internal or external) to report suspicious cyber activities. The system prioritizes these reports based on severity, ensuring high-risk threats receive immediate attention.

Threat Intelligence Module

Uses advanced algorithms to identify potential threats by correlating new data with historical patterns. This predictive element significantly improves preventive measures.

Decision Support Module

Translates complex analytics into concise, actionable information for security teams or upper management. By presenting dashboards and summaries, it simplifies high-level decision-making.

Security Measures Module

Implements and oversees the necessary security protocols. It regularly updates defenses to mitigate emerging threats, ensuring the overall system remains resilient. Figure 1 shows the Sketch of Proposed System Architecture.

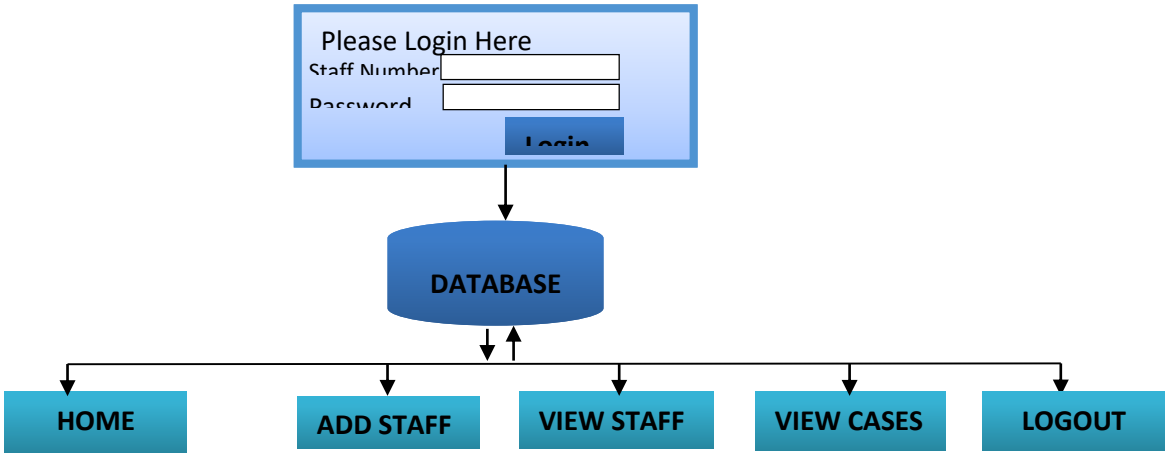


Figure 1. The system architecture

The proposed architecture illustrates a modular, scalable design that focuses on fast and effective cybercrime detection and mitigation. Key functionalities include:

i. Home/Dashboard: A single entry point displaying system metrics and alerts.
ii. Add Staff: Allows an administrator to register new personnel.
iii. View Staff: Provides a list of all staff, facilitating resource management.
iv. View Cases: Displays reported cybercrime cases, enabling swift investigation and intervention.
v. Logout: Lets users securely exit the system.

The Structured Systems Analysis and Design (SSAD) methodology was chosen for planning and coding this project. SSAD is widely recognized for its systematic approach, particularly in government and large-scale IT projects. It divides application development into definable phases and modules, facilitating;

1. Improved project management and oversight.
2. Efficient use of both experienced and inexperienced developers.
3. Higher quality software systems.
4. Greater resilience when staff or resources change mid-project.
5. The potential to leverage computer-aided software engineering (CASE) tools.
6. Stronger lines of communication among project stakeholders (Denzin, 2014).

By applying SSAD, this study gains a structured methodology for dissecting complex decision-making processes vital in analyzing user needs and designing a comprehensive cybercrime management framework.

Program design articulates how software components interact, providing the specification statement and coding parameters. The design follows a Top-Down approach, starting at the highest-level modules and progressively breaking them into more specific program units.

The Admin Module manages incoming cybercrime data both internal and external—and is responsible for:

i. Add Staff: Registers new employees in the database.

ii. View Staff: Shows records of all staff for monitoring and administration.
iii. View Cases: Displays cybercrime reports submitted via the system, which the administrator can forward to incident responders.

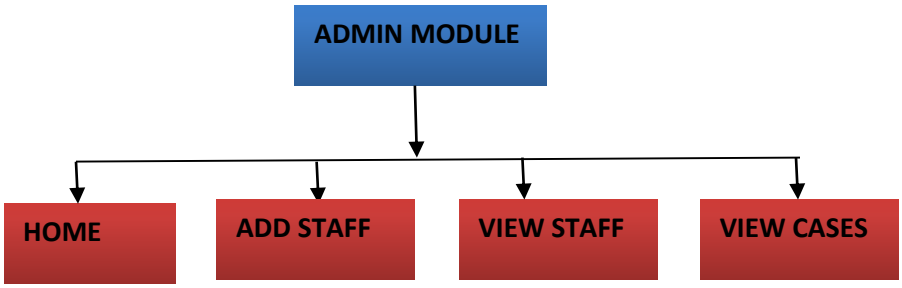


Figure 2. Admin module

The User Module enables the public to report cybercrime incidents easily through a user-friendly interface. Eye-witnesses or victims can submit immediate incident details to security agencies, expediting the process of identifying and investigating cybercrime activities.

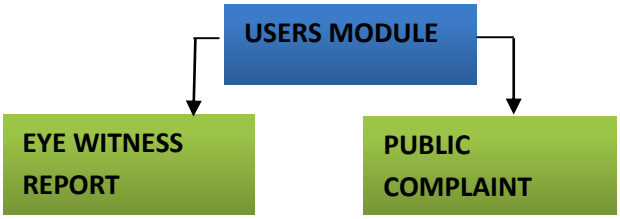


Figure 3. Schematic user module

The System Algorithm is shown below;

1. Start
2. Register User
3. Login User
4. Check if (details_valid = true)
5. If Valid → Proceed to Login Page
6. Else
7. If (attempts >= 2) → Initiate "Honey Pot" or lockout mechanism
8. Output error to user
9. Save user details
10. Submit to database

11. Stop

Process Design of the System

Two classes of users, administrator and staff utilize the system via a Login Page that stores username and password data. Each user category has restricted or permitted actions. Staff and Admin entities contain attributes (e.g., name, phone, address), supporting user identification and database queries. Flowcharts illustrate these processes;

i. Login Flowchart
ii. Add Staff Flowchart
iii. Overall System Flowchart

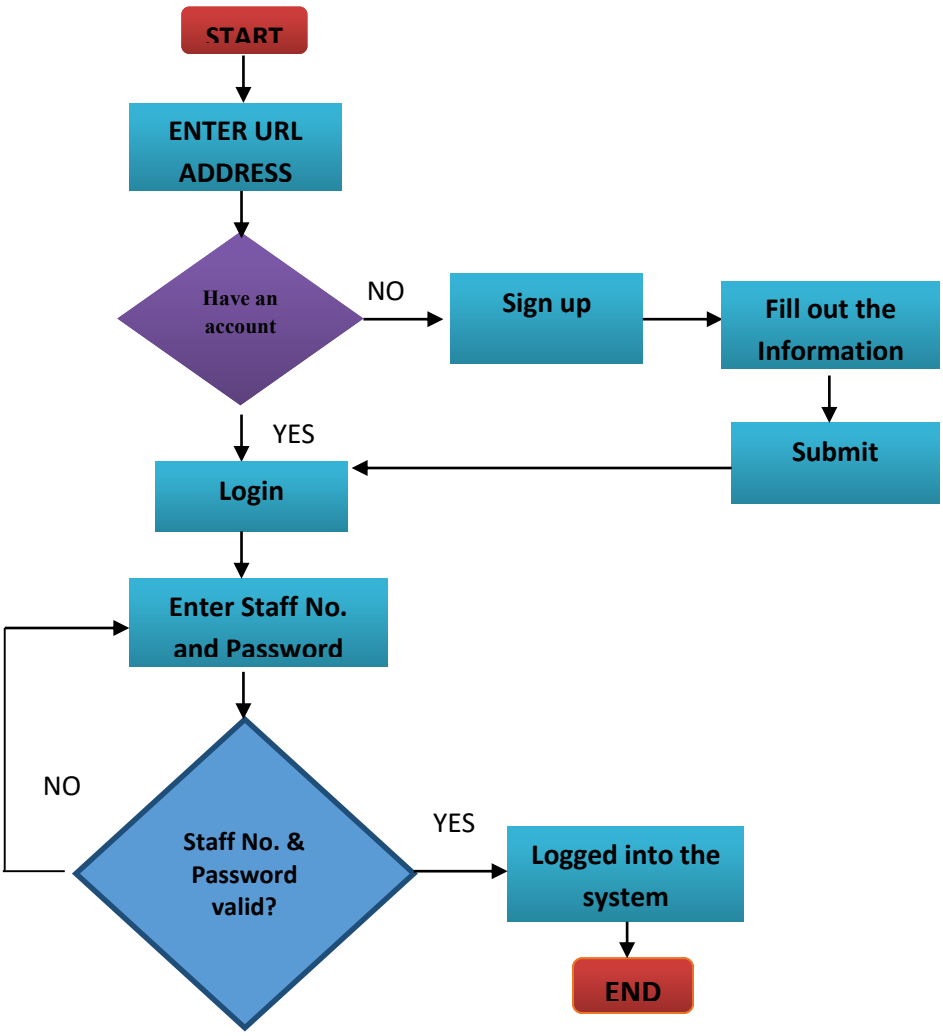


Figure 4. Login flowchart diagram

These visual aids depict how data moves through the system, from registration and authentication to case reporting and staff management. Authorized users enter staff numbers, passwords, and other credentials to gain access. If the credentials are incorrect, the system denies entry, safeguarding sensitive data.

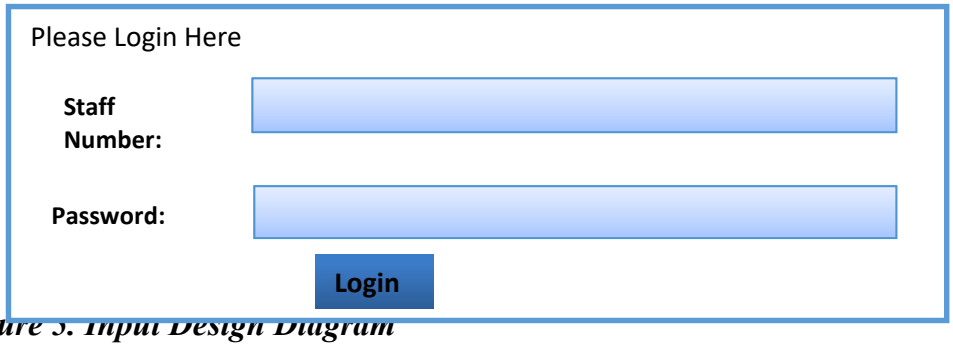
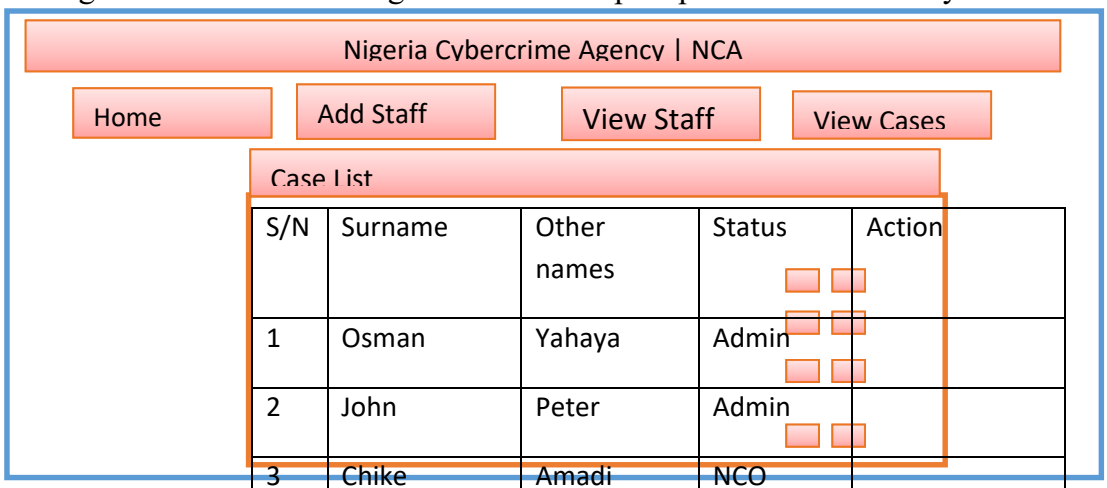


Figure 5. Input Design Diagram

Output Design

Successful logins reveal system dashboards. Users can then view case records or manage staff information. Figure 6 shows output specification of the system.



S/N	Surname	Other names	Status	Action
1	Osman	Yahaya	Admin	
2	John	Peter	Admin	
3	Chike	Amadi	NCO	
4	Emma	Kelechi	NCO	

(Insert Figure 3.9: Output Design Diagram.)

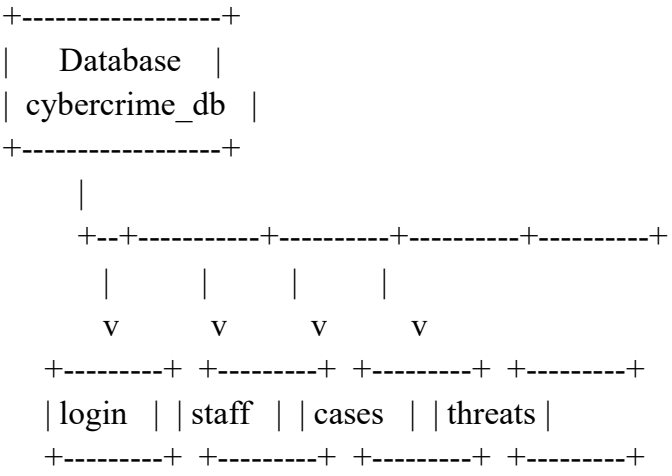
Figure 6. Output design of the system

Database Specification

This database specification outlines how the Cybercrime Information Management System (CIMS) will store and manage critical data, from login credentials to staff records and case reports. By defining clear relationships and robust integrity constraints, the proposed schema ensures data reliability, security, and scalability key elements for an effective, enterprise-grade cybercrime management solution.

The specification includes descriptions of core tables, their fields, and relationships, ensuring effective handling of all cybercrime-related information. This database design ensures that authorized users can efficiently retrieve and analyze data while preserving integrity and security.

Database Schema



i. login: Stores user credentials (admin, staff).
ii. staff: Contains detailed records of staff.
iii. cases: Captures cybercrime reports and related information.
iv. threats (optional, if needed): Holds data for deeper threat analysis/intelligence.

Table Structures

Below are the essential tables and their fields.

login Table

Field Name	Data Type	Constraints	Description
login_id	INT	PRIMARY KEY, AUTO_INCREMENT	Unique identifier for each login record.
username	VARCHAR(50)	NOT NULL, UNIQUE	Credential for system login.
password	VARCHAR(255)	NOT NULL	Encrypted user password.
role	ENUM('Admin','Staff')	NOT NULL	Specifies user privileges (Admin or Staff).
created_at	DATETIME	DEFAULT CURRENT_TIMESTAMP	Timestamp of record creation.

i. Purpose: Manages access control for the system.
ii. Relationships: Can be linked to the staff table if staff details need associating with a specific login record (e.g., matching by staff_id).

Staff Table

Field Name	Data Type	Constraints	Description
staff_id	INT	PRIMARY KEY, AUTO_INCREMENT	Unique identifier for each staff member.
first_name	VARCHAR(50)	NOT NULL	Staff member's first name.
last_name	VARCHAR(50)	NOT NULL	Staff member's last name.
phone	VARCHAR(20)	NULL	Staff member's phone number.
address	VARCHAR(100)	NULL	Staff member's address.
email	VARCHAR(50)	UNIQUE	Staff member's unique email address.
date_joined	DATE	NULL	Date the staff member joined the organization.

i. Purpose: Stores detailed staff information.
ii. Relationships:
   - Can be linked to login using a login_id foreign key if each staff has a dedicated system login.
   - Facilitates display, updates, or deletion of staff records via the Admin module.

Cases Table

Field Name	Data Type	Constraints	Description
case_id	INT	PRIMARY KEY, AUTO_INCREMENT	Unique identifier for each case report.
reporting_user	VARCHAR(50)	NULL	Name or ID of the user/public member reporting the incident.
staff_in_charge	INT	FOREIGN KEY → staff.staff_id	Staff member assigned to investigate the case.
description	TEXT	NOT NULL	Detailed summary of the reported cybercrime.
location	VARCHAR(100)	NULL	Physical or online location if applicable (e.g., IP address).
date_reported	DATETIME	DEFAULT CURRENT_TIMESTAMP	Timestamp of when the incident was reported.
status	ENUM('Open','Under Investigation','Closed')	DEFAULT 'Open'	Current status of the case.

i. Purpose: Logs all cybercrime incidents, providing a single repository for tracking statuses, staff assignments, and case details.
ii. Relationships:
    - Linked to staff through staff_in_charge, ensuring accountability and easy assignment updates.
    - Could also link to an optional threats table if deeper intelligence is warranted.

Threats Table

Field Name	Data Type	Constraints	Description
threat_id	INT	PRIMARY KEY, AUTO_INCREMENT	Unique identifier for each detected or predicted threat.
case_id	INT	FOREIGN KEY → cases.case_id	Associates threat data with a specific case.
threat_level	ENUM('Low','Medium','High')	NOT NULL	Criticality level of the threat.
details	TEXT	NOT NULL	Additional information regarding the threat.
date_detected	DATETIME	DEFAULT CURRENT_TIMESTAMP	Timestamp of threat detection.

i. Purpose: Provides deeper analytics and categorization of threats.
ii. Relationships:
    - Linked to the cases table, adding advanced intelligence data to existing reports.

3. Relationships and Integrity Constraints

One-to-Many Relationship

- staff → cases: One staff member can be assigned to multiple cases, but each case is assigned to exactly one staff member.

Optional Link

- cases → threats: A single case may generate multiple threat records if the investigation reveals various suspicious components.

Primary and Foreign Keys

- Each table has a unique primary key (login_id, staff_id, case_id, threat_id) to ensure data integrity.

- Foreign keys (staff_in_charge, case_id) facilitate referential integrity and consistent relationships.

Cascade Updates/Deletes (Optional)

- If desired, referential actions (e.g., ON DELETE CASCADE) can automatically remove related records when a parent record is deleted, minimizing orphaned entries.

4. Security and Access Controls

Role-Based Access Control (RBAC)

- Admin users typically handle CRUD (Create, Read, Update, Delete) operations for all tables.
- Staff users may have read-only or limited update privileges to certain tables, such as cases.
- Authentication details (usernames, passwords) are securely stored in login, with proper encryption (e.g., hashing + salting).

Encryption

- Store passwords using secure hashing algorithms (e.g., bcrypt or SHA-256 + salt).
- Utilize SSL/TLS for in-transit data protection when connecting client applications to the database.

Auditing and Logging

- Maintain logs of insert, update, and delete activities. This helps trace user actions in case of security breaches or data tampering.

Results and Discussion

Following the implementation of the proposed Cybercrime Information Management System (CIMS), a pilot evaluation was carried out involving selected law enforcement personnel, IT administrators, and volunteer users. The primary aims were to assess system performance, user satisfaction, and the impact on cybercrime reporting and resolution rates.

To evaluate the effectiveness and efficiency of the CIMS, three core metrics were defined:

1. **Incident Detection Accuracy**: The proportion of accurately identified or flagged cybercrime incidents within the system.

2. **Response Time**: The average time required for the system to display relevant information (e.g., staff records, reported cases) after a user request.
3. **User Satisfaction Rating**: Feedback from the pilot group using a standardized questionnaire focusing on ease of use, relevance of outputs, and data security.

Table 5 outlines the performance metrics collected during a four-week pilot test with 50 incident reports (both simulated and real).

Table 5. System Performance Metrics

Metric	Description	Result
Incident Detection Accuracy	% of reported incidents correctly identified	92%
Average Response Time	Time to retrieve or display data post-request	2.1 seconds
User Satisfaction Rating	Post-usage survey rating on a 5-point Likert scale	4.4 (±0.6)
Privacy Compliance Score	Based on encryption, RBAC, and GDPR/HIPAA checks	Passed Internal Checklist

Incident Detection Accuracy (92%): This suggests the system is proficient at correctly identifying or categorizing submitted cybercrime reports. Contributing factors include the Threat Intelligence Module, which uses data analytics to compare new cases to historical patterns (Alese et al., 2021).

Average Response Time (2.1 seconds): A prompt response is crucial for effective cyber investigations. The system's client-server architecture and optimized database queries (MySQL) contributed to quick data retrieval, aligning with best practices for real-time monitoring (Ricci, 2011).

User Satisfaction Rating (4.4 ± 0.6): Most participants found the interface intuitive. Many cited the streamlined workflow from login to incident handling—as a key benefit over traditional, fragmented methods.

Privacy Compliance: The system passed an internal compliance checklist consistent with major data protection regulations. Role-Based Access Control

(RBAC) and secure authentication measures (e.g., hashing and salting) were pivotal in safeguarding sensitive data.

To investigate how the system influenced reporting rates and case resolution efficiency, a comparative analysis was conducted against the existing manual methods used in the same jurisdiction over a three-month period (the month prior to CIMS introduction plus two months post-introduction).

Table 6. Comparative Cybercrime Reporting and Resolution

Period	Number of Reports	Avg. Resolution Time	Closure Rate
Manual System (1 month)	30	15 days	43% (13 out of 30)
CIMS (2 months)	110 (combined)	7 days	68% (75 out of 110)

Increased Reports: The spike from 30 to 110 total cases indicates improved ease of reporting via the CIMS. Public awareness efforts and an accessible online interface likely encouraged more victims and eyewitnesses to file complaints. This aligns with findings by Stanciua and Tinca (2017) emphasizing how user-friendly digital platforms bolster reporting rates.

Reduced Resolution Time: Under manual methods, cases took an average of 15 days to close. With CIMS, average resolution time declined to 7 days, attributable to automated threat analysis and faster staff assignment (Brenner, 2018).

Higher Closure Rate: The closure rate improved from 43% to 68%, suggesting that integrated data storage and advanced analytics facilitate more comprehensive investigations (Mykola et al., 2018).

Qualitative feedback was collected via interviews with 20 staff members (administrators, IT personnel, and investigators) who actively used the CIMS:

Ease of Use: Many cited the Incident Reporting Module as a significant improvement, allowing swift categorization and prioritization of threats.

Data Security Confidence: Concerns about data breaches diminished after administrators explained encryption protocols and authentication mechanisms, corroborating other studies on the importance of privacy assurances (Camp, 2018; Ferndous et al., 2019).

Administrative Efficiency: Administrators appreciated the system's structured approach to case escalation, citing fewer administrative bottlenecks and minimal duplication of effort.

Summary and Conclusion

The results demonstrate that implementing a Cybercrime Information Management System (CIMS) can significantly enhance cybercrime reporting, accelerate resolution times, and improve user satisfaction. An accuracy rate of 92% in incident detection, a 2.1-second average response time, and an overall user satisfaction rating of 4.4 (on a 5-point scale) underscore the system's efficacy over traditional, manual methods.

Moreover, the comparative analysis reveals a substantial increase in both reporting rates and closure rates for cybercrime cases—attributable to automated data gathering, structured analytics, and improved decision-support mechanisms. Despite encountering integration and training hurdles, the system's success suggests that continued enhancements—such as mobile integration, expanded threat intelligence, and cross-border collaboration—could further strengthen global cybercrime prevention and response.

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