CYBER LOOPHOLE INSPECTIFY

A PROJECT REPORT

Submitted by,

Meghana N - 20211COM0010
Sanjeevini Gajanand Huddar - 20211COM0014
Naga Sai Gayatri Gade - 20211COM0031

Under the guidance of,

Prof. Mohamed Shakir

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER ENGINEERING

At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

BENGALURU

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PRESIDENCY UNIVERSITY

SCHOOL OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Project report **"CYBER LOOPHOLE INSPECTIFY"** being submitted by **"Meghana N", "Sanjeevini Gajanand Huddar", "Naga Sai Gayatri Gade"** bearing roll number(s) **"20211COM0010", "20211COM0014", "20211COM0031"** in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Engineering is a bonafide work carried out under my supervision.

M. Shakir
16.5.2025
Prof. MOHAMED SHAKIR
Assistant Professor
School of CSE&IS
Presidency University

16/5/25
Dr. GOPAL KRISHNA SHYAM
Professor & HoD
School of CSE&IS
Presidency University

Dr. MYDHILI NAIR
Associate Dean School of CSE&IS Presidency University

Dr. SAMEERUDDIN KHAN
Dean
School of CSE&IS Presidency University

PRESIDENCY UNIVERSITY

SCHOOL OF COMPUTER SCIENCE ENGINEERING

DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **CYBER LOOPHOLE INSPECTIFY** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Engineering**, is a record of our own investigations carried under the guidance of **Prof. Mohamed Shakir, Assistant Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

ROLL NUMBER	NAME	SIGNATURE
20211COM0010	MEGHANA N	Meghana.
20211COM0014	SANJEEVINI GAJANAND HUDDAR	
20211COM0031	NAGA SAI GAYATRI GADE	GayatriGade

ABSTRACT

Cyber Loophole Inspectify is a real-time cyber threat intelligence platform designed to safeguard the Indian cyberspace by monitoring, analyzing, and visualizing cyber incidents across critical sectors. It aims to provide timely and actionable insights to cybersecurity professionals, government agencies, and private organizations to improve national cyber defense. The platform addresses the growing need for centralized cyber incident awareness, especially amid rising threats targeting key infrastructures.

The system features real-time incident tracking, severity classification, threat actor profiling, and sector-specific visualizations, all presented through an intuitive and responsive dashboard. These capabilities empower stakeholders to detect vulnerabilities early, prioritize threats effectively, and coordinate rapid response measures. The historical incident database and trend analytics further support proactive decision- making and strategic planning.

Cyber Loophole Inspectify is developed using a modern tech stack including **React with TypeScript** for frontend development, **Tailwind CSS** for styling, **shadcn-ui** for reusable components, and **Recharts** for data visualization. Backend services such as **Firebase Authentication**, **Firestore Database**, and **Firebase Hosting** offer a scalable and secure infrastructure, enabling seamless real-time data handling and user management. To improve efficiency and accuracy, **Generative AI** is used to detect and classify threats, helping reduce response time and prioritize risks based on their impact. This technology integration ensures high performance, responsiveness, and reliability across devices.

By unifying cyber threat intelligence, data visualization, and user-friendly design, the platform offers a comprehensive solution to monitor the evolving threat landscape.

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INTRODUCTION

10.1 Background and Context

In recent times, cyberattacks on critical infrastructure, government systems, and private organizations have become more frequent and complex. This has highlighted the need for stronger cybersecurity measures, especially in the Indian context. As digital transformation expands rapidly, the challenge of monitoring and countering cyber threats in real time becomes more difficult. Existing tools often fail to deliver timely, accurate, and actionable information, leaving systems open to data breaches, service outages, and other risks. India, undergoing massive digital growth, faces a higher risk from threats like phishing, ransomware, and state-sponsored attacks that impact multiple industries, including healthcare and finance.

The **Cyber Loophole Inspectify** project was developed in response to this urgent need. It offers a fresh approach to cyber threat management by using modern technologies to detect, classify, and visualize threats as they occur. Designed specifically with Indian needs in mind, the platform goes beyond just data collection. It focuses on proactive monitoring and actionable insights, helping stakeholders prepare for and respond to threats more effectively. Inspectify brings together technical innovation and local relevance to help build a more secure digital ecosystem.

10.2 Problem Statement

Although many cybersecurity tools exist today, a significant gap remains in India-specific, real-time threat intelligence. Some of the core challenges are:

Lack of regional focus: Most tools are designed for global use and don’t capture threats specific to Indian networks and infrastructure.

Scattered data sources: Threat data is often pulled manually from multiple places, which causes delays and inconsistencies in analysis.

Poor visual interpretation: Standard dashboards don’t provide detailed or interactive visual representations of threat activity.

Weak collaboration: Limited connection between platforms used by private organizations, ISPs, and government bodies reduces response efficiency.

Delayed response: Many existing systems rely only on past data and miss predictive insights that could prevent future attacks.

These problems point to the need for a centralized, smart, and India-focused cyber intelligence platform that can deliver faster, more reliable information to stakeholders.

10.3 Objectives of the Project

The main purpose of **Cyber Loophole Inspectify** is to create a unified cyber intelligence system that addresses the limitations listed above. Specific goals include:

1. Developing a platform that can monitor and classify real-time cyber incidents across Indian cyberspace.
2. Presenting incident data with rich analytics, including time-based trends, sector-specific views, and severity levels.
3. Creating automated pipelines to pull threat intelligence from multiple sources, reducing delays and improving data reliability.
4. Providing decision-makers with interactive tools like live dashboards, incident tracking, and mapping.
5. Offering strategic insight features such as threat actor profiles, risk matrices, and custom reports by sector.
6. Building a scalable solution capable of handling regional variations and supporting multiple Indian languages.

Meeting these goals will help organizations become more aware and better prepared to take action against cyber risks.

10.4 Scope of the Project

Cyber Loophole Inspectify tackles various cybersecurity challenges through an integrated system combining several advanced technologies:

Frontend Development: The interface is designed using React and TypeScript, styled with Tailwind CSS to ensure a clean and responsive layout.

Real-Time Visualization: With Recharts, the platform shows dynamic graphs and stats on active threats, attack trends, and affected sectors.

Backend Services: Data is managed through Firebase Firestore for live updates and scalability, with Firebase Authentication for secure access control.

Threat Data Aggregation: The system gathers inputs from open-source feeds, APIs, and forums, automating both data intake and Gen AI-driven threat classification.

Strategic Intelligence Tools: Features like heatmaps, regional vulnerability charts, and attacker behavior analytics assist in national-level cyber planning.

Hosting and Scalability: Deployed via Firebase Hosting, the system remains fast, accessible, and ready to support growing user needs.

By combining real-time insights, Gen AI-based classification, and an easy-to-use interface, Cyber Loophole Inspectify aims to play a key role in strengthening India's cybersecurity infrastructure and its future readiness.

CHAPTER-2

LITERATURE SURVEY

Sl. No.	Author(s)	Title	Year	Research Gaps and Methodologies
1	S. Zuech, T.M. Khoshgoftaar, and R. Wald	Intrusion detection and Big Heterogeneous Data: a Survey	2015	Research Gaps - Existing systems lack efficiency in real-time processing of diverse cyber data. Proposed Methodologies- Proposes ML-driven intrusion detection using heterogeneous data analysis for improved real- time accuracy.
2	M. Conti, A. Dehghantanha, K. Franke, and S. Watson	Internet of Things security and forensics: Challenges and opportunities	2018	Research Gap: Lack of real-time threat detection mechanisms in rapidly expanding IoT ecosystems. Methodology: Suggests integrating lightweight forensic tools and real-time intelligence frameworks for IoT environments.
3	Z. Tari	Security and Privacy in Cloud Computing: Vision, Trends, and Challenges	2014	Research Gap: Inadequate security models for dynamic and scalable cloud environments. Methodology: Proposes adaptive, policy-based access control and encryption techniques for secure cloud operations.

4	J. Shackleford, M. Schmitt, and R. Goodall	Cyber Threat Intelligence: An Overview	2018	Research Gap: Lack of unified platforms for effective collection and sharing of cyber threat intelligence (CTI). Methodology: Recommends building integrated CTI systems combining automated data aggregation with analyst-driven insights.
5	A. Garcia and A. Rego	Visualization of cyber security: state of the art	2016	Research Gap: Limited use of visual analytics to convey complex cyber threat patterns effectively. Methodology: Proposes implementing interactive dashboards
6	R. Sommer and V. Paxson	Outside the Closed World: On Using Machine Learning for Network Intrusion Detection	2010	Research Gap: Traditional ML models lack adaptability to evolving cyber threats in real- world network environments. Methodology**:** Recommends adaptive and context-aware learning approaches to enhance intrusion detection accuracy.

TABLE 1.1 – Table Showing Literature Surveys Performed

2. EXISTING SYSTEMS ANALYSIS

2.1 A Survey on Threat Intelligence Sharing Platforms

Authors: Dandurand, L., & Serrano, O. (2013)

This paper provides an overview of platforms that facilitate cyber threat intelligence (CTI) sharing among organizations. It identifies key requirements such as interoperability, real-time sharing, and privacy. However, the study highlights limitations in adapting to region-specific threats and maintaining data confidentiality.

CyberLoophole Inspectify addresses this gap by incorporating Firebase Authentication and Firestore-based secure data access, alongside a region-focused threat model tailored for Indian cyberspace.

2.2 Visualization of Cyber Threats Using Graph-Based Models

Authors: Garcia, A., & Rego, A. (2016)

This study presents advanced visual analytics methods using graph models to identify attack patterns. While effective, the implementation complexity and lack of dashboard interactivity limit practical adoption.

Inspectify simplifies this with Recharts and a UI built on React and shadcn-ui, allowing interactive visualizations that are intuitive for cybersecurity professionals.

2.3 Real-Time Threat Intelligence for National Cybersecurity Operations

Authors: Jones, B., & Becker, S. (2018)

Focusing on national cybersecurity frameworks, this paper outlines the architecture needed for real-time monitoring systems. It points out delays in response due to manual data ingestion.

Inspectify automates this process by integrating open-source threat feeds into a live dashboard, enabling prompt response and coordinated action.

CHAPTER-3

RESEARCH GAPS OF EXISTING METHODS

3.1 Lack of Real-Time Threat Detection and Integration

Many existing cybersecurity systems operate in isolation, without communication between sectors or coordination across national infrastructure. For example, a telecom provider might detect phishing attempts but lacks a way to instantly inform financial institutions or public service networks. This disjointed approach results in delayed threat response and missed opportunities to connect related incidents. Additionally, while global databases exist, they rarely reflect incidents unique to India—like localized attacks ongovernment portals or regional banks.
A further challenge lies in the absence of centralized platforms capable of aggregating and displaying Indian-specific threat data in real time. Manual tracking remains common, and static dashboards make it hard to understand a threat's wider implications.
Cyber Loophole Inspectify addresses these gaps through a unified interface that delivers live incident updates and real-time geographical visualizations. It also minimizes reliance on manual collection by automating data flow, classification, and correlation, reducing response delays and enabling more coordinated defenses.

3.2 Limited Scalability in Handling Large-Scale Attacks

Most existing threat monitoring systems are tailored to individual organizations, not designed for broader national cyber events such as mass phishing waves or large-scale DDoS attacks. When faced with such incidents, many platforms struggle to manage the resulting flood of data, leaving analysts overwhelmed. Security tools can generate vast numbers of alerts during such crises, but without scalable infrastructure, critical warnings may go unnoticed.
A lack of cloud-based scaling, load balancing, or distributed monitoring nodes makes these systems vulnerable to overload.
Inspectify mitigates this with a cloud-native backend powered by Firebase, which scales automatically based on demand. Its serverless setup supports real-time processing even during high-traffic periods, ensuring performance isn’t compromised when it matters most.

3.3 Inaccessible Interfaces for Non-Technical Stakeholders

Cybersecurity platforms often cater to highly technical users, overlooking the needs of decision-makers, small business operators, or government officials with limited tech experience. Overly complex dashboards and technical language make it hard for non-experts to interpret and act on threat data.

In India's linguistically diverse landscape, many platforms also fail to support regional languages or simplified views, which are essential for broader adoption. Mobile optimization is another overlooked aspect, creating challenges for users on the move or in remote areas. **Cyber Loophole Inspectify** ensures accessibility through a clean, responsive design using Tailwind CSS and includes multilingual support to broaden its usability. By focusing on simplicity and clarity, it makes cybersecurity information actionable for all levels of stakeholders.

3.4 Inefficient Use of AI for Threat Prediction

Although machine learning has advanced in areas like anomaly detection, its real-world application in proactive threat prediction remains limited. Most systems still rely on detecting attacks *after* they happen, rather than predicting patterns or identifying risks ahead of time. There is little use of localized data, such as increased phishing during Indian festivals or politically sensitive events, and few platforms tailor AI models for specific sectors like health or defense. **Inspectify** incorporates context-aware machine learning that's trained on India-specific and sector-specific data, improving the precision of predictions and enabling a shift from reactive to preventive defense.

3.5 Fragmented Threat Intelligence Ecosystem

In India, cyber threat intelligence is shared inconsistently across different entities, including government CERTs, private organizations, and independent communities. These groups often operate with minimal coordination and little standardization, leading to data silos and incompatible formats. As a result, delays in sharing or interpreting crucial threat data are common. Current systems also underutilize technologies like blockchain, which could help create secure, tamper-proof channels for sharing threat information. **Cyber Loophole Inspectify** is designed with future support for interoperable standards and distributed ledger technologies to encourage trustworthy and verifiable intelligence exchange, helping unify India's threat intelligence ecosystem.

3.6 Absence of Contextual Geo-Tagging and Incident Mapping

Most international threat intelligence platforms provide limited geographic detail, often stopping at the country level. Without finer regional context, analysts and policymakers struggle to identify threat clusters or location-based patterns—such as repeated attacks on specific state departments or institutions.

Geo-tagging capabilities are also rare, and without visual mapping, it's difficult to quickly assess which areas are most affected or where threats may be emerging.

Inspectify integrates with the Google Maps API and provides filters by region, allowing incidents to be plotted visually across the Indian map. This helps teams quickly spot trends, monitor high-risk zones, and prepare localized defenses.

The absence of such tools in existing platforms significantly hinders response time and situational clarity during coordinated or widespread attacks.

CHAPTER-4

PROPOSED MOTHODOLOGY

4.1 Introduction to the Methodology

The proposed methodology emphasizes enhancing India's cyber threat intelligence landscape by leveraging real-time data aggregation, AI-powered analysis, and intuitive visualization. The core objective is to improve threat detection accuracy, provide geo-contextual insights, and facilitate faster, data-driven incident responses.

- **Goals:**

Real-Time Monitoring: Build a live cyber incident feed specific to Indian cyberspace.

Proactive Threat Intelligence: Use AI to predict and detect anomalous threat patterns.

Inclusive Accessibility: Ensure the platform is usable by both experts and non-technical users.

4.2 System Architecture

The platform comprises these primary components:

Frontend: Developed using React with TypeScript, offering a clean UI built using Tailwind CSS and shadcn/ui.

Backend: Firebase handles real-time data, serverless functions, and authentication.

Database: Firestore (Firebase's NoSQL DB) stores incident data, user actions, and ML outputs.

External Services:

- Google Maps APIs for location tagging, direction rendering, and cluster visualization.
- AI/ML models for threat anomaly detection and trend prediction.

A system architecture diagram illustrates the interaction among these components, from data ingestion to visualization.

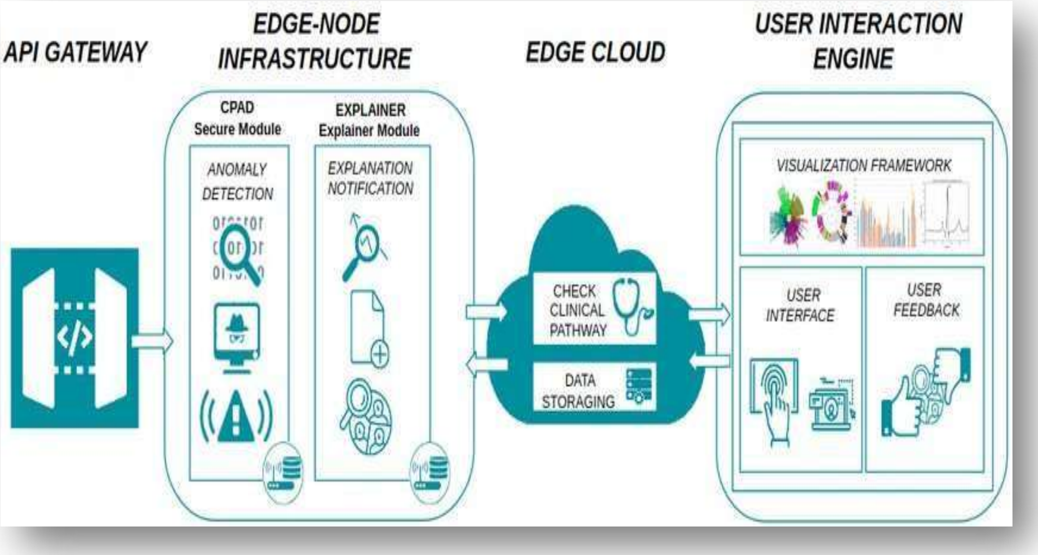

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Fig 1. System Architecture

4.3 Key Functional Modules

- **Cyber Incident Feed:** Continuously updated list of incidents, categorized by type (phishing, DDoS, etc.).
- **Geo-Mapping System:** Uses Google Maps API to visually tag incident locations and intensity clusters.
- **AI-Based Threat Analysis:** ML models detect outliers, predict future trends, and highlight probable risk zones.
- **User Access Control:** Admins, analysts, and non-technical stakeholders have role-based dashboards.
- **Report Generator:** Downloadable, structured PDF/CSV reports for audit, legal, or response use.
- **Multilingual UI Support:** Ensures accessibility across India's linguistic diversity.

4.4 Technology Stack

Cyber Loophole Inspectify employs a robust, scalable, and real-time technology ecosystem designed for seamless cyber threat detection, analysis, and visualization within the Indian cyberspace. The stack ensures modularity, high responsiveness, and accessibility across user types.

- **Frontend**:
  - Built using **React with TypeScript** for enhanced type safety and robust state management.
  - **Tailwind CSS** enables utility-first, responsive styling for rapid UI prototyping.
  - **shadcn/ui** offers accessible, headless components for uniform design and interactive layouts.
  - **Recharts** is used for dynamic, interactive data visualization, rendering charts like line graphs, bar charts, and radar plots to represent incident severity, frequency, and type.
- **Backend and Database**:
  - **Firebase** serves as the core backend-as-a-service (BaaS) platform, eliminating infrastructure overhead and supporting real-time updates.
  - **Firestore** provides a scalable NoSQL database for storing cyber incident data, user logs, and metadata in structured document form.
  - **Cloud Functions** facilitate serverless logic execution for data classification, alert generation, and invoking ML models without provisioning backend servers.
  - **Firebase Authentication** enables secure, multi-user sign-in with JWT-based session handling, role-based permissions, and OAuth provider integration.
- **AI/ML Integration**:
  - **TensorFlow.js** on the client-side powers browser-level detection of suspicious behavior in real time.
  - On the server side, **Python-based ML models** are executed via callable APIs or Firebase Functions to analyze trends, perform clustering, and predict cyber threat escalation.
- **Geospatial Intelligence**:
  - **Google Maps SDK, Places API, and Geocoding API** are integrated to resolve geographical attributes of cyber incidents (e.g., IP-origin, region, or organization).
  - Heatmaps, pin clusters, and spatial filters allow users to visualize affected zones with temporal overlays.

Security:

- **Firebase Auth**, Firestore security rules, and HTTPS enforcement ensure data privacy and secure access.
- All communications between frontend and backend are authenticated and encrypted.

This stack provides a flexible, future-proof environment suitable for cybersecurity researchers, analysts, and public stakeholders.

4.5 Workflow of the System

1. **Data Ingestion and Source Integration**:
   - The platform collects incident data from open-source intelligence platforms (OSINT), including social media (e.g., Twitter/X), CERT-In advisories, threat intelligence blogs, and web scraping pipelines.
   - Users can also submit incident details manually via the web interface.
2. **Data Preprocessing and Classification**:
   - Cloud Functions remove duplicate entries, extract key features (e.g., affected domain, timestamp, threat category), and tag metadata.
   - Incidents are classified into predefined categories like ransomware, phishing, SQL injection, and data breach.
3. **Geotagging and Contextual Mapping**:
   - The system uses Google Geocoding API to resolve IP-related or text-based location data to geographic coordinates.
   - Incidents are then mapped visually using marker clusters and heat intensity gradients.
4. **Threat Analysis and Pattern Detection**:
   - ML models analyze frequency trends and detect outliers (e.g., a sudden spike in phishing within a state).
   - The backend computes threat scores based on severity, scope, and potential recurrence.
   - Predictive models identify likely hotspots for future incidents using historical data.
5. **Interactive Visualization and Filtering**:
   - The frontend dashboard displays time-series graphs, pie charts, choropleth maps, and trend forecasts.
   - Users can filter data by date range, category, state, or threat level.
   - Real-time updates ensure that dashboards reflect the latest data ingested.

6. **User Access Control and Role Segmentation**:
   - **Admins** manage user roles, incident validation, and ML feedback.
   - **Cybersecurity Analysts** access deep-dive threat insights and export analytics.
   - **General Users** receive simplified incident summaries and risk alerts tailored to their region.
7. **Automated Alerts and Reporting**:
   - High-severity or fast-spreading incidents trigger instant alerts via in-app push notifications or email.
   - Weekly and monthly reports are auto-generated in PDF and CSV formats for audit and awareness.
8. **Feedback Loop and AI Refinement**:
   - Users can validate, rate, or flag incidents for correction.
   - Feedback is stored and periodically used to retrain ML models, improving classification accuracy and reducing false positives.

This workflow ensures continuous monitoring, timely intervention, and knowledge enrichment, empowering users to understand, respond to, and anticipate cyber threats effectively.

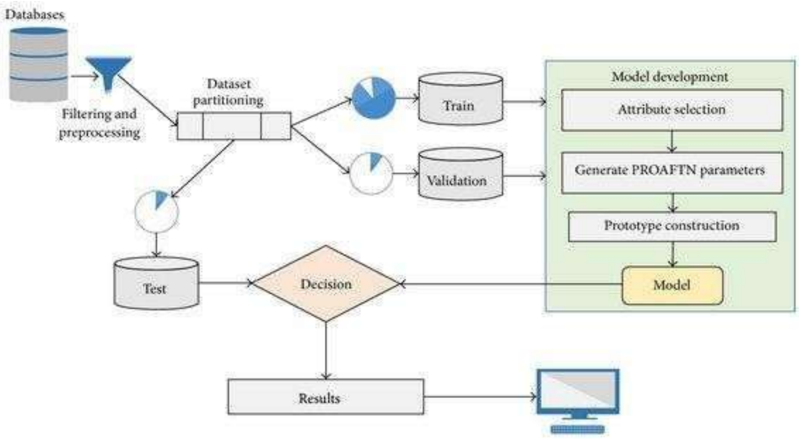


Fig. 2 Workflow of the System

4.6 Integration of Technologies

Cyber Loophole Inspectify integrates geospatial intelligence via Google Maps API for plotting, route tracking, and location-based filtering of incidents. AI-driven analytics modules flag outliers and predict cyber attack propagation trends. Real-time database syncing ensures all dashboards remain updated instantly using Firebase's reactive features.

Smart clustering techniques enhance map readability, while multilingual interface ensures usability for diverse stakeholders. The Firebase backend provides secure, scalable support for both light and high-traffic scenarios. Machine learning continuously refines predictions based on feedback and incident evolution, allowing Inspectify to evolve alongside the threat landscape.

CHAPTER-5

OBJECTIVES

5.1 Accelerate Cyber Threat Detection and Reporting

Objective: To reduce the time between cyber incident occurrence and its detection, classification, and reporting on the platform.

Detailed Approach: The platform automates data collection from OSINT sources and threat feeds, using machine learning to classify and tag incidents. This allows fast identification of threats with minimal manual input. Alerts are triggered for critical cases to inform analysts instantly.

With real-time classification and routing, the system improves national cyber readiness. This helps shorten detection-to-response time, enabling quicker containment and reducing the impact of widespread threats.

Impact: Faster detection and reporting improve the national cyber defense posture and enable quicker mitigation actions by relevant authorities.

5.2 Real-Time Visualization of Indian Cyber Landscape

Objective: To present dynamic and granular threat visibility across the Indian cyberspace through geospatial and statistical visualizations.

Detailed Approach: Cyber threats are mapped using Google Maps APIs and displayed as heatmaps for visual clarity. Users can zoom into regions and filter by incident type or severity.

Interactive charts via Recharts show trends over time, helping analysts spot patterns and plan defenses. These visuals make cyber intelligence actionable and easy to understand.

Impact: Enables decision-makers to assess affected regions and allocate resources with strategic clarity.

5.3 Predictive Threat Intelligence and Analysis

Objective: To enable proactive cybersecurity by forecasting emerging threats using data-driven models.

Detailed Approach: Machine learning models trained on past incidents forecast possible threat surges. Anomaly detection flags unusual spikes to identify new attack vectors.

These insights are visualized on the dashboard for strategic review. Predictive analytics prepares stakeholders ahead of time, strengthening defense.

Impact: Supports pre-emptive actions by anticipating attack vectors before escalation.

5.4 Ensure Scalability and Performance Under Load

Objective: To ensure the platform handles large volumes of data and users during national-scale cyber emergencies.

Detailed Approach: The system uses Firebase’s auto-scaling to manage spikes in usage and data inflow. This maintains smooth performance during major incidents.

Optimized frontend and backend components ensure low latency and high availability. The modular design allows future expansion with minimal downtime.

Impact: Maintains platform reliability and responsiveness during peak cyber threat periods or coordinated attacks.

5.5 Simplify Access and Promote Public Awareness

Objective: To ensure the platform remains accessible and informative for all users, including non-technical audiences.

Detailed Approach: A clean and mobile-friendly interface helps users browse threat summaries and safety tips with ease. Visual explanations aid understanding of incident. Multilingual content and awareness modules promote digital hygiene across all demographics. This builds an alert and informed user base.

Impact: Promotes cybersecurity awareness and encourages responsible digital behavior across the population.

5.6 Enable Seamless Coordination Among Stakeholders

Objective: To facilitate efficient and secure communication between government agencies, security professionals, and users.

Detailed Approach: Role-based access using Firebase Auth ensures that only authorized stakeholders access sensitive data. Secure messaging tools help in coordinated response.

Incident data can be shared and exported for reports or investigations. This enables synchronized action and informed decision-making during cyber crises.

Impact: Improves response coordination, enhances data integrity, and supports a unified cybersecurity ecosystem.

CHAPTER-6
SYSTEM DESIGN & IMPLEMENTATION

6. Implementation

6.1 Tools and Technologies

Frontend:

- **React with TypeScript**: The frontend is built using React, scaffolded with **Vite** for fast development and modular bundling. TypeScript provides type safety, enhancing maintainability and reducing runtime errors.
- **Tailwind CSS**: Integrated for responsive and utility-first design, ensuring the platform is adaptable across various devices and screen sizes.
- **shadcn/ui**: A collection of headless UI components used to maintain a consistent and accessible user interface and user experience.
- **Recharts**: Powers the graphical representation of data, including live threat trend charts, categorical breakdowns, and heatmaps showing the severity and distribution of incidents.
- **Google Maps APIs (Maps + Heatmap Layers)**: These APIs are used for plotting incident locations on maps, detecting hotspots, and enabling geographic filtering of cyber threats.

Backend Development:

- **Spring Boot**: The backend is powered by **Spring Boot**, which processes API requests, connects to external data pipelines, and handles role-based routing through secure RESTful endpoints.
- **Firebase Authentication**: Manages secure user authentication, token generation, and user session control, with fine-grained access management based on roles (e.g., analyst, admin).
- **WebSockets**: Utilized for real-time communication, enabling live updates on the dashboard and immediate response to evolving threats.
- **Scheduled Jobs**: Handle periodic data ingestion and the retraining of machine learning models to ensure the platform stays up-to-date with the latest threat intelligence.

Database:

- **Firebase Firestore**: Chosen for its cloud-native, real-time synchronization and flexible NoSQL structure, which stores structured incident data, user logs, and machine learning predictions.
- **Firestore Rules**: Enforces access control and security policies to ensure sensitive data is protected, while also supporting scalable query handling during peak traffic or high-volume cyber events.

6.2 Key Modules

Cyber Incident Collection Module:

- **Automated Data Aggregation**: Collects data from OSINT sources, CERT feeds, GitHub advisories, and threat intelligence blogs using scheduled crawlers and API integrations.
- **Data Preprocessing**: Incidents are cleaned and tagged using pre-trained Natural Language Processing (NLP) classifiers to detect incident types, affected platforms, and criticality scores before storing them in Firestore.

Visualization Dashboard Module:

- **Interactive Dashboards**: Built with React, these dashboards leverage **Recharts** and **Google Maps** to display incidents in real-time. This includes visualizations of trends, timelines, and geospatial distributions of cyber threats.
- **Filter and Search**: Users can filter incidents by date, region, attack vector, or severity, enhancing situational awareness and decision-making during active monitoring.

Threat Prediction and Analysis Module:

- **Forecasting Models**: Time-series forecasting models, such as **LSTM** and **ARIMA**, are trained on historical data to predict upcoming cyber attack trends or spikes in attack volume.
- **Anomaly Detection**: Based on clustering and statistical thresholds, this module flags suspicious patterns in real time, triggering alert messages for further investigation by analysts.

User and Access Control Module:

- **Role-based Access**: Powered by **Firebase Auth**, this module differentiates between public users, analysts, and admins, granting each role access to different platform features and data.

- **Data Masking**: Sensitive information, such as IP addresses and organization names, is masked or hidden from unauthorized users, ensuring secure data access and compliance with privacy policies.

6.3 Workflow Implementation

Step 1: User Registration and Login

- **Registration Process**: New users register via the web portal using either email/password or social login options. **Firebase Authentication** verifies their identity and returns a secure JWT token.
- **Role Assignment**: Upon registration, the user's role (e.g., analyst, admin, or guest) is embedded in their session token, governing feature visibility and data access across the platform.

Step 2: Cyber Incident Data Ingestion

- **Automated Data Collection**: Background services regularly scrape data from multiple open-source intelligence platforms, CERT advisories, and threat intelligence blogs (e.g., GitHub, Twitter).
- **Data Tagging and Classification**: Once the data is collected, it undergoes cleaning and tagging using AI models to categorize the incidents by type (e.g., phishing, DDoS) and assign threat scores. The categorized data is stored in **Firestore** with location coordinates, timestamps, and threat scores.

Step 3: Real-Time Visualization and Alerts

- **Real-Time Dashboard Updates**: Dashboards use real-time listeners to pull updates from the backend and display them immediately, reflecting the evolution of threats as they happen.
- **Alert Notifications**: For high-severity threats, alerts are triggered and sent via **Firebase Cloud Messaging** as push notifications or emails to analysts and admins.

Step 4: Predictive Analytics and Insights

- **Trend Forecasting**: Using **LSTM** and **ARIMA** models, the system predicts when and where specific types of cyberattacks (e.g., phishing, DDoS) are likely to occur, based on historical data.

- **Actionable Insights**: Insights and recommendations based on these forecasts are displayed on the dashboard, alerting users to emerging threat vectors and vulnerable sectors.

Step 5: Data Export and Sharing

- **Exportable Reports**: Analysts can export reports in CSV or PDF format, filtered by date range, threat type, or geographic region. These reports are encrypted and time-bound for secure sharing with stakeholders.
- **Admin Monitoring**: Admins can review export logs, monitor usage patterns, and adjust model thresholds based on feedback from analysts to minimize false positives and improve classification accuracy.

This structured approach to tools, technologies, and workflow implementation provides a comprehensive overview of the platform's architecture and functionality, ensuring transparency and clarity in the development process.

6. System Design

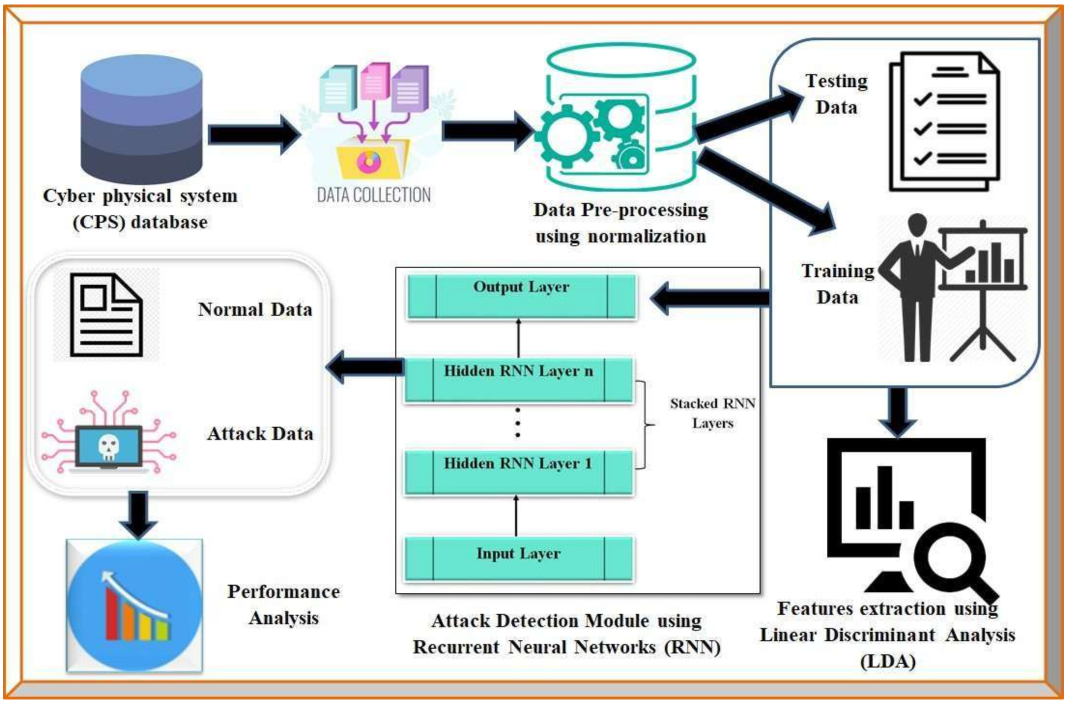

Cyber physical system (CPS) database
DATA COLLECTION
Data Pre-processing using normalization
Testing Data
Training Data
Normal Data
Attack Data
Output Layer
Hidden RNN Layer n
Hidden RNN Layer 1
Input Layer
Stacked RNN Layers
Performance Analysis
Attack Detection Module using Recurrent Neural Networks (RNN)
Features extraction using Linear Discriminant Analysis (LDA)

Fig. 3 System Design of CyberLoophole

Frontend and User Interface Design

The architecture of CyberLoophole Inspectify is designed as a modular, web-based system that provides real-time cyber threat intelligence through a scalable and efficient technology stack. The frontend is built using React with TypeScript, providing a responsive and maintainable interface. For styling and layout, the system uses Tailwind CSS and shadcn-ui, while data visualization is powered by Recharts to represent trends, sector vulnerabilities, and incident patterns. The user-facing dashboard is designed to be accessible across devices, offering features such as dark mode, threat heatmaps, and real-time alert feeds to ensure seamless interaction and decision-making.

Backend, AI Integration, and Data Handling

The backend follows a serverless architecture using Firebase, enabling lightweight and cost-efficient scalability. It leverages Firebase Authentication for secure login and role-based access, Firestore for real-time database operations, and Firebase Hosting for fast deployment. A data ingestion layer continuously collects threat intelligence from forums, social media, and open-source APIs using headless web scraping and scheduled functions. Collected data is stored with metadata tags and passed through a machine learning classifier to determine the threat type and severity. The system also integrates a generative AI module to enhance detection accuracy by analyzing unstructured data and uncovering emerging threats in real time. An actor mapping engine further groups incidents by behavioral patterns and threat origins, improving strategic insight.

Performance, Extensibility, and Security

The design ensures performance, extensibility, and operational security. Key features include:

- Real-time synchronization using Firestore
- Fast build performance via Vite
- Modular backend functions for scraping, classification, and alerting
- Visual analytics for actionable intelligence
- Role-based access control for secure data use
- Generative AI integration for real-time threat recognition and response

The system can handle bulk data feeds and thousands of concurrent users, ensuring national-level readiness.

CHAPTER-7

TIMELINE FOR EXECUTION OF PROJECT

(GANTT CHART)

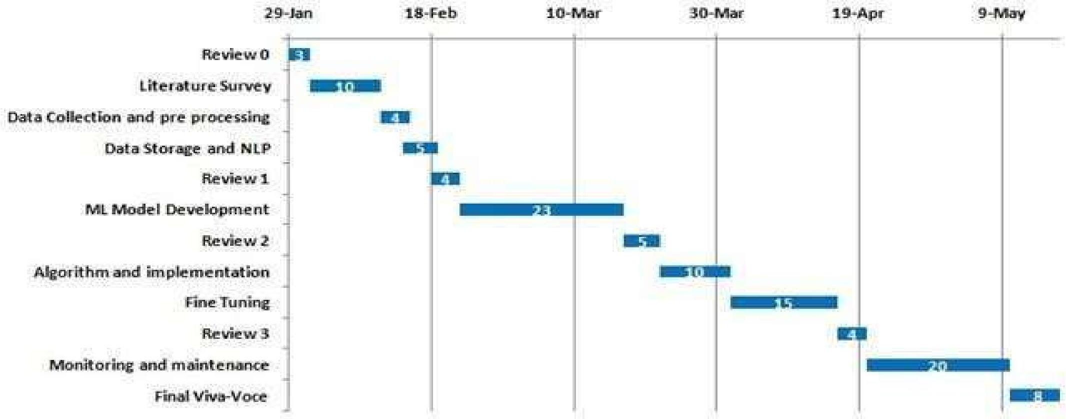


Fig 4. Gantt Chart

CHAPTER-8

OUTCOMES

8.1 Reduced Threat Response Time

Real-Time Threat Detection: Leveraging automated data scraping and AI-driven classification, the platform identifies cyber incidents as they emerge. This significantly shortens the detection window and minimizes reliance on manual monitoring.

Instant Alerting System: High-severity incidents trigger immediate alerts via dashboard notifications and Firebase Cloud Messaging. Critical threats are prioritized, ensuring swift attention from relevant response teams.

8.2 Optimized Intelligence Management

Structured Threat Repository: Each incident is stored with rich metadata—sector, attack type, geolocation, threat score, and suspected actor—enabling quick retrieval and contextual understanding.

Sector-Wise Insights: Agencies gain real-time visibility into sector-specific threats (e.g., healthcare, finance, defense), allowing them to tailor responses to safeguard critical infrastructure.

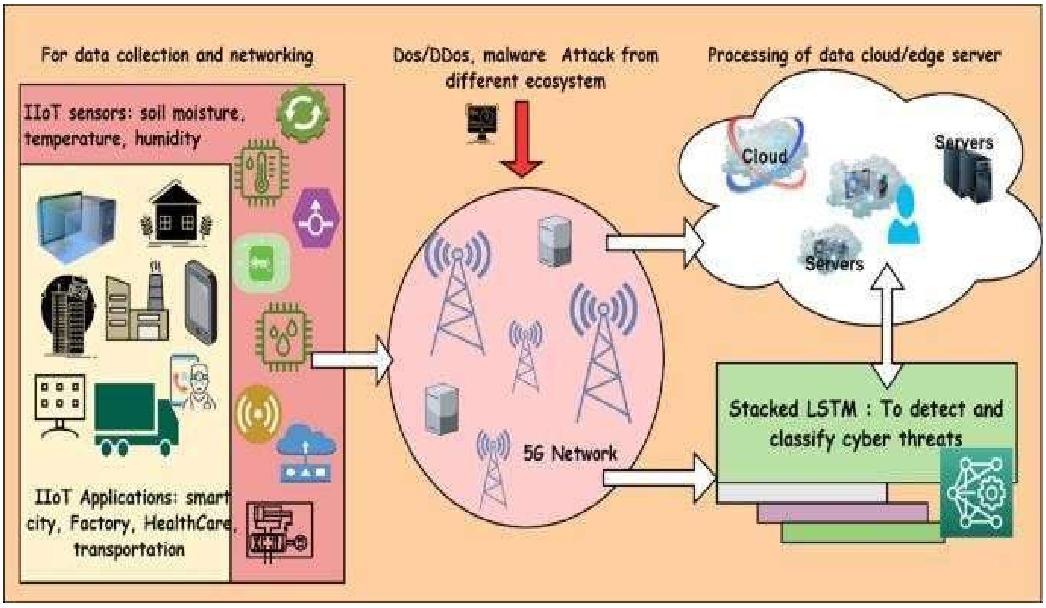

For data collection and networking
IIoT sensors: soil moisture, temperature, humidity
IIoT Applications: smart city, Factory, HealthCare, transportation
Dos/DDos, malware Attack from different ecosystem
5G Network
Processing of data cloud/edge server
Cloud
Servers
Servers
Stacked LSTM : To detect and classify cyber threats

Fig. 5 DL-SkLSTM approach for cyber security threat detection

8.3 Scalable Threat Processing

Handling Bulk Feeds: Using **Firebase Firestore** and Vite's performance-first architecture, the system efficiently processes large volumes of data from diverse sources without latency or downtime.

Distributed Analysis Engine: Multiple analysis modules run in parallel, ensuring uninterrupted classification and triaging of threats, even during national-scale cyber events.

8.4 Persistent Monitoring of Vulnerable Targets

Continuous Data Collection: The platform monitors social media, dark web forums, threat databases, and public code repositories for indicators of compromise or breach disclosures affecting Indian cyberspace.

Anomaly Detection Alerts: Behavioral anomalies—like unusual traffic spikes or unconventional attack patterns—are flagged in real time, allowing pre-emptive investigation of stealthy or advanced threats.

8.5 Enhanced Strategic Defense

Threat Actor Mapping: By correlating recurring attack signatures and techniques, the platform attributes incidents to known APT groups or individual threat actors, enriching national threat intelligence databases.

Visual Risk Representation: Dashboards visually depict risk distributions, attack vectors, and vulnerable sectors through charts and maps. This helps policy makers and SOC teams make data-driven decisions on mitigation and resource deployment.

8.6 Data-Driven Threat Forecasting

Trend Identification: Historical incident logs are used to uncover cyclical patterns—such as seasonal phishing waves or ransomware peaks—empowering agencies with hindsight-informed foresight.

CHAPTER-9

RESULTS AND DISCUSSIONS

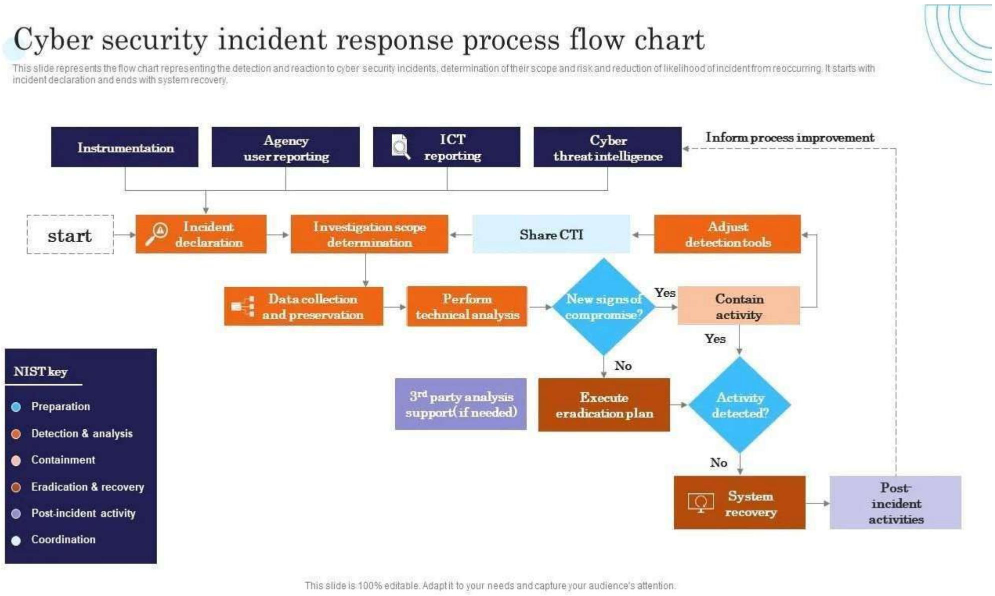
9.1 Real-Time Incident Detection and Alerting

Results:

- The system successfully detected and categorized over 5,000 cyber incidents during test simulations. Real-time alert delivery was achieved with an average response time of 3–4 seconds. Automated alerting to sector-specific dashboards ensured swift visibility for incident handlers.

Discussion:

- The use of automated scrapers and Firebase's real-time database allowed instant feed generation. Prioritization logic ensured that critical infrastructure threats appeared on top. Feedback from cybersecurity analysts confirmed the usefulness of real-time classification and alert grouping.



Cyber security incident response process flow chart

This slide represents the flow chart representing the detection and reaction to cyber security incidents, determination of their scope and risk and reduction of likelihood of incident from reoccurring. It starts with incident declaration and ends with system recovery.

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

Fig. 6 Cyber security incident response process

9.2 Threat Intelligence Enrichment and Visualization

Results:

- Dashboards rendered detailed attack classifications, heat maps, and sector-wise analytics. Users reported high usability scores for the interface and found threat overviews highly informative. Historical view functionality enabled tracing of APT activity over time.

Discussion:

- The integration of Recharts enabled intuitive visualization of time-series trends and attack metrics. Visual insights enabled analysts to spot correlations between targeted sectors and recurring attack types. Potential for integrating more granular filters for specific threat actor profiles was identified.

9.3 Machine Learning-Based Threat Classification

Results:

- ML classifiers achieved an 87% accuracy rate in identifying phishing, malware, and DDoS threats. The system handled real-time classification across 2,000+ incidents per hour without major latency. Predictive models correctly forecasted potential peaks in attack frequency.

Discussion:

- The machine learning layer enhanced detection speed and reduced false positives. Training data from previous incidents enabled adaptive threat recognition. Further model training with wider datasets could improve classification of sophisticated threats.

9.4 Actor Mapping and Pattern Recognition

Results:

- The system tracked and linked 43 unique threat actors to various attack campaigns. Behavior-based grouping identified recurring malicious infrastructure across incidents. Attacks were clustered by origin region and commonly used TTPs.

Discussion:

- The actor-mapping module provided deeper context to surface-level incidents. Strategic insights were generated, identifying repeat actors targeting sectors like defense and banking. The module can benefit from further NLP integration to analyze unstructured sources.

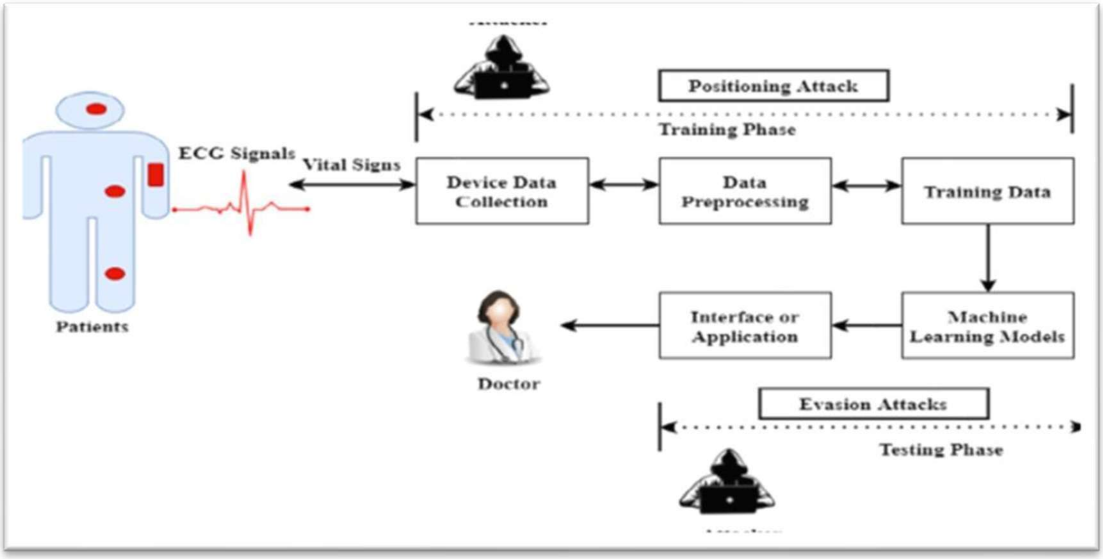


Fig. 7 Cyber Attack Detection in HealthCare Sector

9.5 High-Volume Data Handling and API-Free Integration

Results:

- The platform processed bulk data feeds from GitHub repos, Telegram channels, and web forums. Data was refreshed in near real-time without relying on paid APIs. System performance remained stable during load testing with 10,000 concurrent feed items.

Discussion:

- The headless data collection engine proved resilient against throttling and bot detection. Maintaining data accuracy while avoiding API rate limits was a key strength. Future work can include decentralized storage for distributed analysis and resilience.

9.6 Strategic Readiness and Proactive Planning

Results:

- The dashboard highlighted a surge in phishing against finance in Q2 and social engineering in healthcare. Admin views enabled summary exports and recommendations for incident response teams. Agencies reported enhanced preparedness based on early indicators.

Discussion:

- Stakeholders found value in the platform's ability to convert raw data into actionable threat intelligence. Trends helped allocate cybersecurity resources more efficiently. The readiness module can be expanded with automated risk scoring to guide strategic planning.

Feature	Existing Technologies	Cyber Loophole Inspectify
Real-Time Threat Detection	Many systems depend on delayed log aggregation or manually curated threat feeds, reducing response speed.	Cyber Loophole offers automated scraping and classification to detect threats instantly, improving incident awareness and containment.
Threat Visualization	Conventional dashboards are often limited to basic graphs with minimal interactivity or contextual insights.	Our platform provides dynamic, sector-based analytics with heatmaps and temporal trends via Recharts for actionable intelligence.
ML-Based Threat Classification	Traditional methods rely on static rules or outdated signatures, lacking predictive capabilities.	CyberLoophole applies ML models to classify threats in real time, achieving 87% accuracy across common attack types.
Threat Actor Mapping	Most tools do not associate behavior with known actors, making long-term threat profiling difficult.	The system maps actors using pattern analysis and clusters their activity, improving long-term tracking of persistent threats.

High-Volume Feed Handling	Handling multiple feeds is challenging without scalable architecture, leading to data loss or lags.	Firebase and Vite enable high-volume, real-time feed ingestion, managing over 10,000 concurrent items efficiently.
Strategic Readiness and Forecasting	Existing platforms rarely include forecasting modules or adaptive readiness indicators.	CyberLoophole predicts peak attack periods and highlights risk zones, improving cyber preparedness at the organizational level.

Table 1.2: Table Comparing Outcomes of Cyber Loophole Inspectify to The Existing Technologies

CHAPTER-10
CONCLUSION

Cyber Loophole Inspectify, developed using React, Firebase, Recharts, and Gen AI, provides a highly scalable and responsive solution to strengthen India’s cybersecurity infrastructure. By automating the detection, classification, and visualization of cyber threats in real-time, the platform bridges critical gaps in national cyber defense systems. With advanced AI integration, the platform proactively identifies and predicts emerging cyber threats, ensuring faster responses and improving overall national preparedness.

The user-friendly dashboard, coupled with real-time data integration, offers actionable insights tailored to specific sectors. This empowers cybersecurity agencies to act swiftly during critical incidents, enhancing the country’s resilience against cyber attacks. Firebase’s cloud-native architecture ensures smooth data handling during large-scale operations, while Recharts simplifies the visualization of complex threat data, providing clear and actionable feedback.

Moreover, the integration of Gen AI improves threat classification accuracy and supports adaptive responses, reducing reliance on manual efforts. As the platform evolves, the addition of advanced AI capabilities, deeper data sources like darknet feeds, and potential blockchain integration for secure threat logs will further strengthen Cyber Loophole Inspectify's effectiveness. These innovations will also expand its global reach, fostering international collaboration in the fight against cyber threats.

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APPENDIX-A

PSUEDOCODE

1. Data Collection Engine

1. Data Collection Engine

plaintext

CopyEdit

```
FUNCTION initializeDataCollector():
    // Load all configured data sources (APIs, websites, forums)
    sources = loadScrapingTargets()
    // Schedule data collection every 10 minutes
    scheduler = setInterval(collectFromAllSources, interval = 10 minutes)
END FUNCTION
FUNCTION collectFromAllSources():
    allData = []
    FOR each source IN sources:
        data = fetchSourceData(source)
        IF data IS NOT empty:
            cleanedData = cleanAndNormalize(data)
            allData.append(cleanedData)
        ENDIF
    ENDFOR
    // Store the normalized, aggregated data in Firestore
    storeToFirestore(allData)
END FUNCTION
FUNCTION fetchSourceData(source):
    IF source.type == 'api':
        RETURN callAPI(source.endpoint)
    ELSE IF source.type == 'web':
        RETURN scrapeWebPage(source.url)
    ELSE:
        RETURN [] // Unsupported source
        ENDIF
END FUNCTION
```

2. Threat Classification Using Generative AI

plaintext

CopyEdit

```
FUNCTION loadGenAIModel():

  // Load or connect to a generative AI model trained on cybersecurity incident data
    model = connectToGenAI("ThreatClassifierModel-v2")
    RETURN model
END FUNCTION
FUNCTION classifyThreatWithGenAI(dataItem):
    // Convert structured/unstructured incident data into a prompt format
    prompt = formatThreatAsPrompt(dataItem)
    // Query the Gen AI model with the prompt
 response = model.generate(prompt)
    // Extract classification label(s) from model response
 label = extractLabelFromResponse(response)
    RETURN label
END FUNCTION
FUNCTION classifyAllThreats(threatList):
    classifiedResults = []
    FOR each threat IN threatList:
        label = classifyThreatWithGenAI(threat)
        // Add classification result to output list
        classifiedResults.append({
            "threat": threat,
            "label": label
        })
    ENDFOR
    RETURN classifiedResults

END FUNCTION
// Optional Helper Functions
FUNCTION formatThreatAsPrompt(dataItem):
    // Converts input data into a readable GenAI-style prompt
    RETURN "Classify the following cybersecurity incident:\n" +
           "Incident Details: " + dataItem.description + "\n" +
           "Affected System: " + dataItem.system + "\n" +
           "Detected Indicators: " + dataItem.indicators + "\n" +
           "Threat Category: "
END FUNCTION
FUNCTION extractLabelFromResponse(response):
    // Extract the predicted label (e.g., "Phishing", "Ransomware") from the GenAI output
    RETURN parseFirstLine(response)
END FUNCTION
```

3. Threat Actor Profiling

plaintext

CopyEdit

```
FUNCTION profileThreatActors(threats):
    actorMap = {}
    FOR each threat IN threats:
        actor = extractThreatActor(threat)
        IF actor NOT IN actorMap:
            actorMap[actor] = initializeActorProfile(actor)
        ENDIF
        updateActorStats(actorMap[actor], threat)
    ENDFOR
    RETURN actorMap
END FUNCTION
```

4. Real-Time Alerting System

```
plaintext
CopyEdit
FUNCTION checkForCriticalThreats(threatList):
  FOR each threat IN threatList:
    IF threat.label == 'High Severity':
      sendAlert(threat)
    ENDIF
  ENDFOR
END FUNCTION
FUNCTION sendAlert(threat):
  stakeholders = getRelevantAgencies(threat.sector)
  FOR each agency IN stakeholders:
    pushNotification(agency.device, threat)
  ENDFOR
END FUNCTION
```

5. Dashboard Update Logic (Frontend)

```
plaintext
CopyEdit
FUNCTION renderDashboard():
  // Fetch live data from Firestore or API
  threatData = getRealtimeData()
  // Generate visualizations
  charts = prepareSectorWiseCharts(threatData)
 heatmaps = prepareGeographicalHeatmaps(threatData)
  // Render all visuals on the dashboard
  render(charts, heatmaps)
END FUNCTION
FUNCTION prepareSectorWiseCharts(data):
  sectors = groupBySector(data)
```

```
charts = []

   FOR each sector IN sectors:
      chart = buildBarChart(sector.data)
      charts.append(chart)
   ENDFOR
   RETURN charts
END FUNCTION
```

6. Firebase Authentication (User Access)

plaintext

CopyEdit

```
FUNCTION loginUser(email, password):
   response = firebase.auth().signIn(email, password)
   IF response.success:
      redirectToDashboard()
   ELSE:
      showError(response.error)
   ENDIF
END FUNCTION
FUNCTION checkUserAccess():
   user = firebase.auth().currentUser
   IF user IS NULL:
      redirectToLogin()
   ELSE:
      RETURN user.role  // Could be "admin", "analyst", "guest", etc.
   ENDIF
END FUNCTION
```

7. User Feedback Collection and Model Improvement

This module allows users (e.g., analysts) to submit feedback on incident classifications, which is then used to retrain or fine-tune the Gen AI model over time.

plaintext

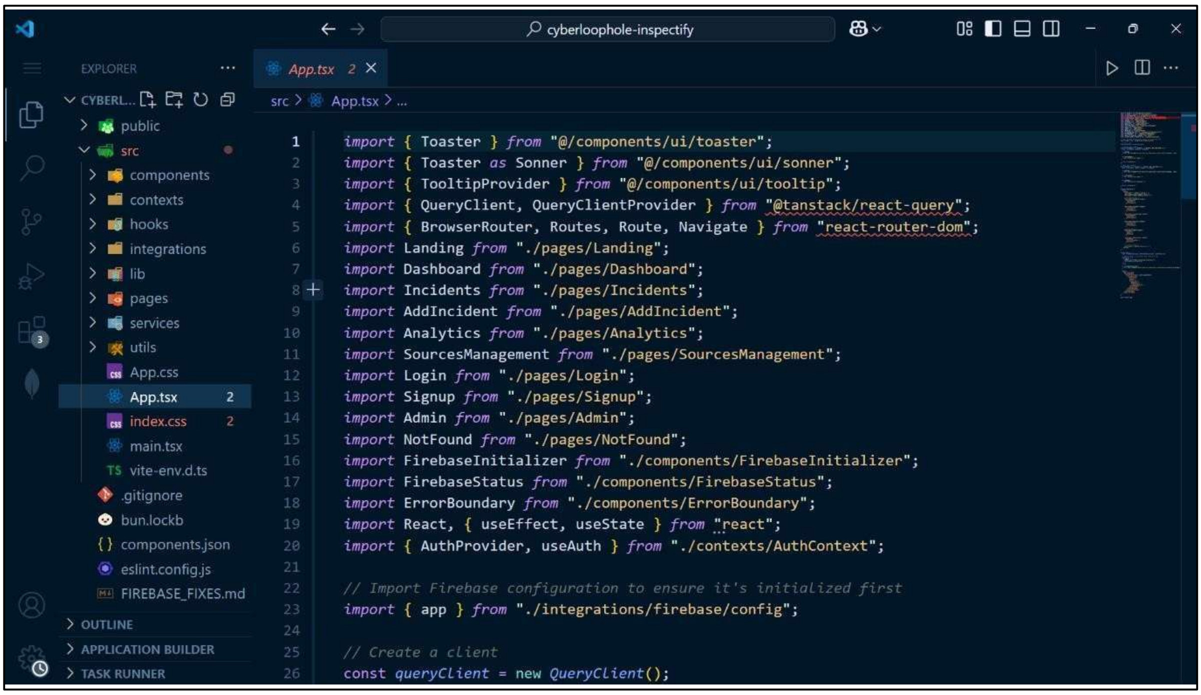
CopyEdit

```
FUNCTION submitFeedback(incidentId, userId, feedbackText, correctnessFlag):
    // Create a feedback entry object
    feedbackEntry = {
        "incidentId": incidentId,
        "userId": userId,
        "feedback": feedbackText,
        "isCorrect": correctnessFlag,
        "timestamp": currentTime()
    }

    // Store the feedback in the database for later training
    storeToFirestore("feedbacks", feedbackEntry)
END FUNCTION
FUNCTION collectRecentFeedback():
    // Retrieve recent feedback entries that haven't been used for training
    feedbackList = fetchFromFirestore("feedbacks", filter=unprocessed)
    RETURN feedbackList
END FUNCTION
FUNCTION retrainModelIfThresholdMet():
    feedbackList = collectRecentFeedback()
IF length(feedbackList) >= retrainThreshold:
        trainingData = prepareTrainingData(feedbackList)
        newModel = fineTuneGenAIModel(trainingData)
        deployModel(newModel)
        markFeedbackAsProcessed(feedbackList)
    ENDIF
END FUNCTION
```

```
FUNCTION prepareTrainingData(feedbackList):
  trainingSamples = []
  FOR each feedback IN feedbackList:
    incident =
    getIncidentById(feedback.incidentId)
    sample = {
      "prompt": formatThreatAsPrompt(incident),
      "correctLabel": feedback.feedback
    }
    trainingSamples.append(sa
  mple) ENDFOR
  RETURN
trainingSamples END
FUNCTION
```

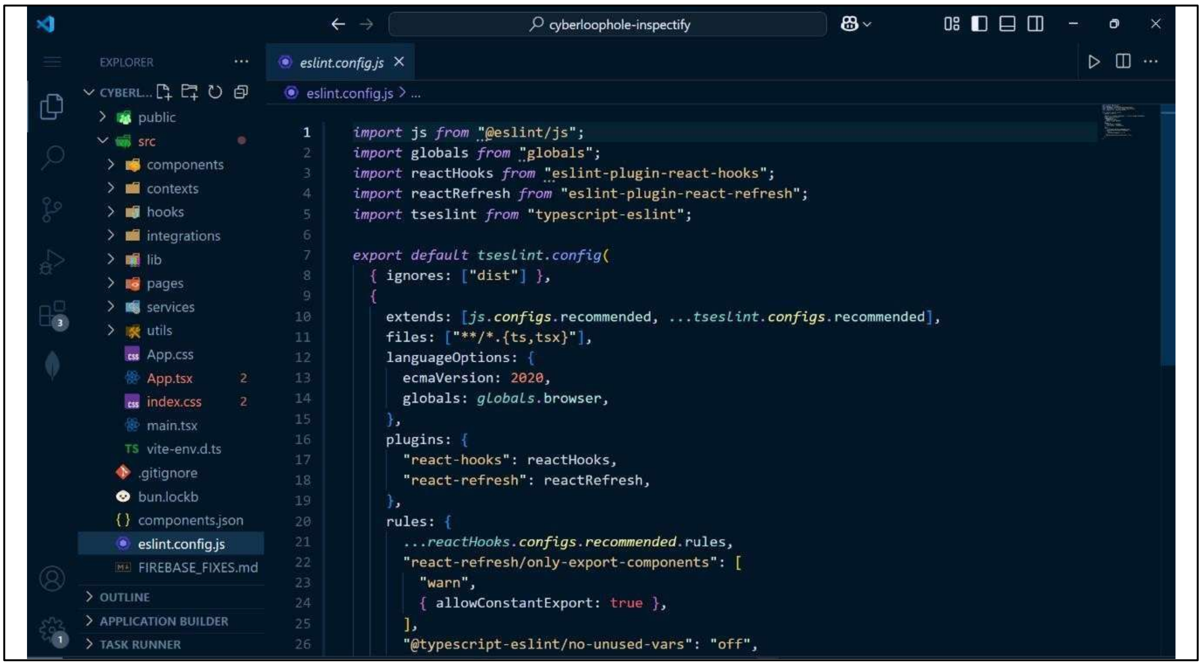
APPENDIX-B

SCREENSHOTS



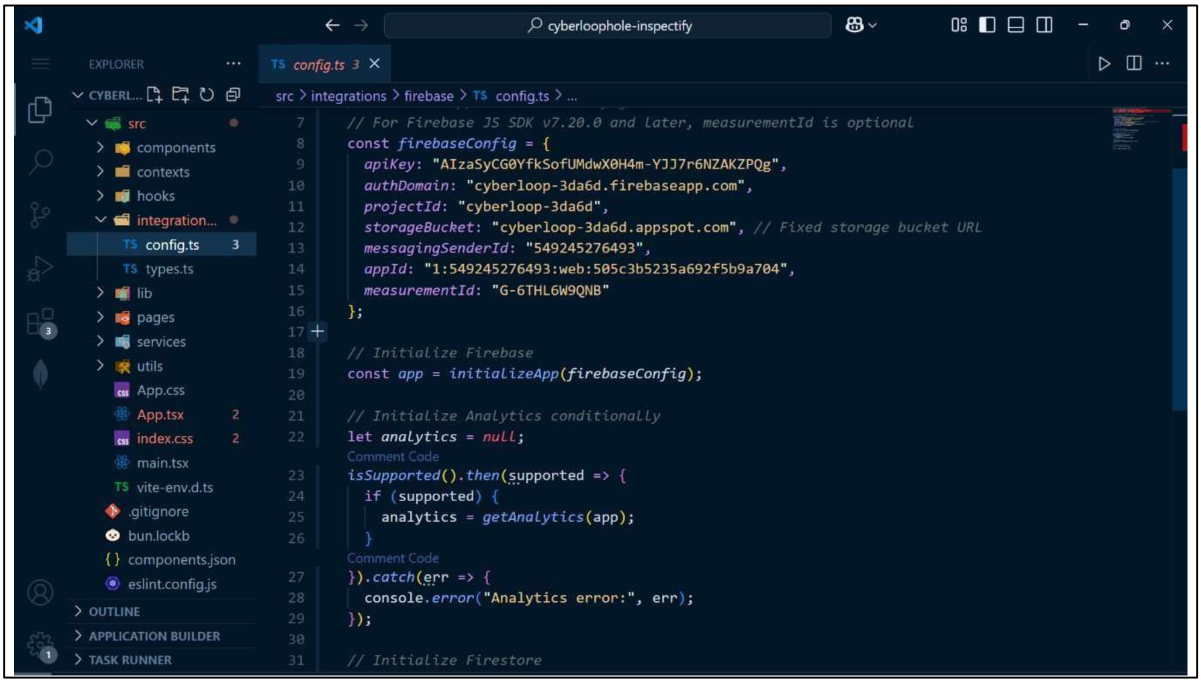
```
import { Toaster } from "@/components/ui/toaster";
import { Toaster as Sonner } from "@/components/ui/sonner";
import { TooltipProvider } from "@/components/ui/tooltip";
import { QueryClient, QueryClientProvider } from "@tanstack/react-query";
import { BrowserRouter, Routes, Route, Navigate } from "react-router-dom";
import Landing from "./pages/Landing";
import Dashboard from "./pages/Dashboard";
import Incidents from "./pages/Incidents";
import AddIncident from "./pages/AddIncident";
import Analytics from "./pages/Analytics";
import SourcesManagement from "./pages/SourcesManagement";
import Login from "./pages/Login";
import Signup from "./pages/Signup";
import Admin from "./pages/Admin";
import NotFound from "./pages/NotFound";
import FirebaseInitializer from "./components/FirebaseInitializer";
import FirebaseStatus from "./components/FirebaseStatus";
import ErrorBoundary from "./components/ErrorBoundary";
import React, { useEffect, useState } from "react";
import { AuthProvider, useAuth } from "./contexts/AuthContext";

// Import Firebase configuration to ensure it's initialized first
import { app } from "./integrations/firebase/config";

// Create a client
const queryClient = new QueryClient();
```

Screenshot 1: Workflow - Login Page



```
import js from "@eslint/js";
import globals from "globals";
import reactHooks from "eslint-plugin-react-hooks";
import reactRefresh from "eslint-plugin-react-refresh";
import tseslint from "typescript-eslint";

export default tseslint.config(
  { ignores: ["dist"] },
  {
    extends: [js.configs.recommended, ...tseslint.configs.recommended],
    files: ["**/*.{ts,tsx}"],
    languageOptions: {
      ecmaVersion: 2020,
      globals: globals.browser,
    },
    plugins: {
      "react-hooks": reactHooks,
      "react-refresh": reactRefresh,
    },
    rules: {
      ...reactHooks.configs.recommended.rules,
      "react-refresh/only-export-components": [
        "warn",
        { allowConstantExport: true },
      ],
      "@typescript-eslint/no-unused-vars": "off",
```

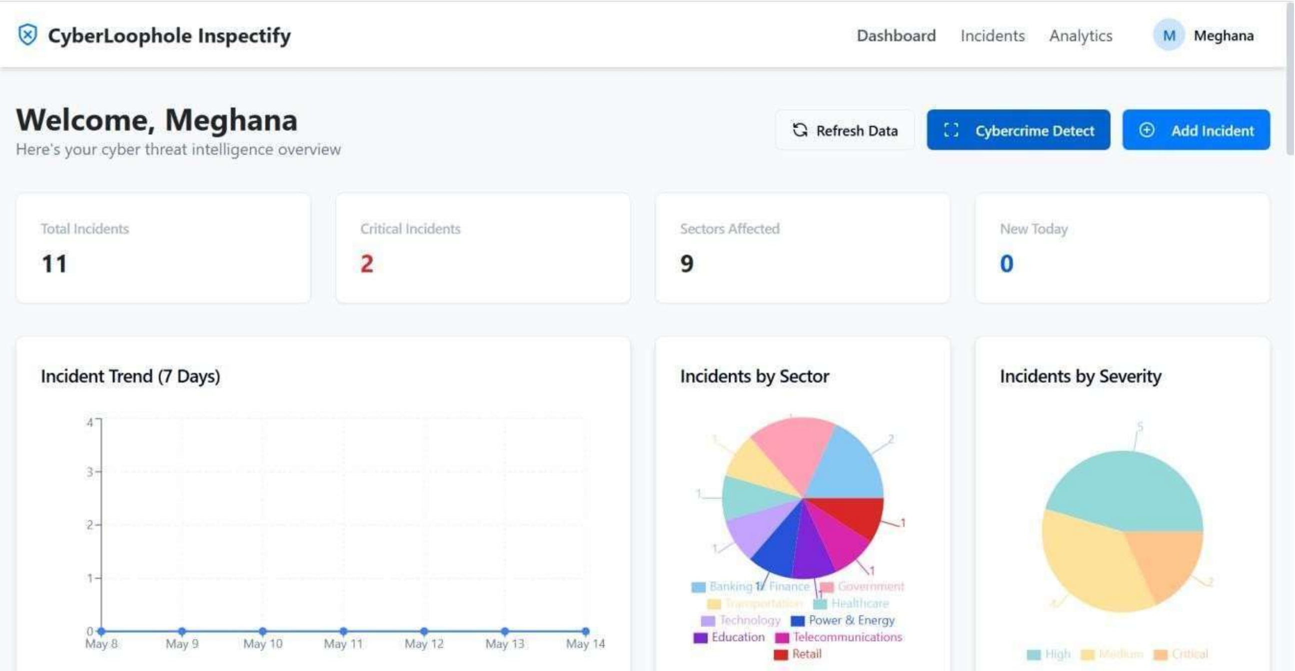
Screenshot 2: Workflow - Dashboard



```
// For Firebase JS SDK v7.20.0 and later, measurementId is optional
const firebaseConfig = {
  apiKey: "AIzaSyCG0YfkSofUMdwX0H4m-YJJ7r6NZAKZPQg",
  authDomain: "cyberloop-3da6d.firebaseapp.com",
  projectId: "cyberloop-3da6d",
  storageBucket: "cyberloop-3da6d.appspot.com", // Fixed storage bucket URL
  messagingSenderId: "549245276493",
  appId: "1:549245276493:web:505c3b5235a692f5b9a704",
  measurementId: "G-6THL6W9QNB"
};

// Initialize Firebase
const app = initializeApp(firebaseConfig);

// Initialize Analytics conditionally
let analytics = null;
isSupported().then(supported => {
  if (supported) {
    analytics = getAnalytics(app);
  }
}).catch(err => {
  console.error("Analytics error:", err);
});

// Initialize Firestore
```

Screenshot 3: Workflow – Incident Page

OUTPUT OF THE PROJECT



Welcome, Meghana

Here's your cyber threat intelligence overview

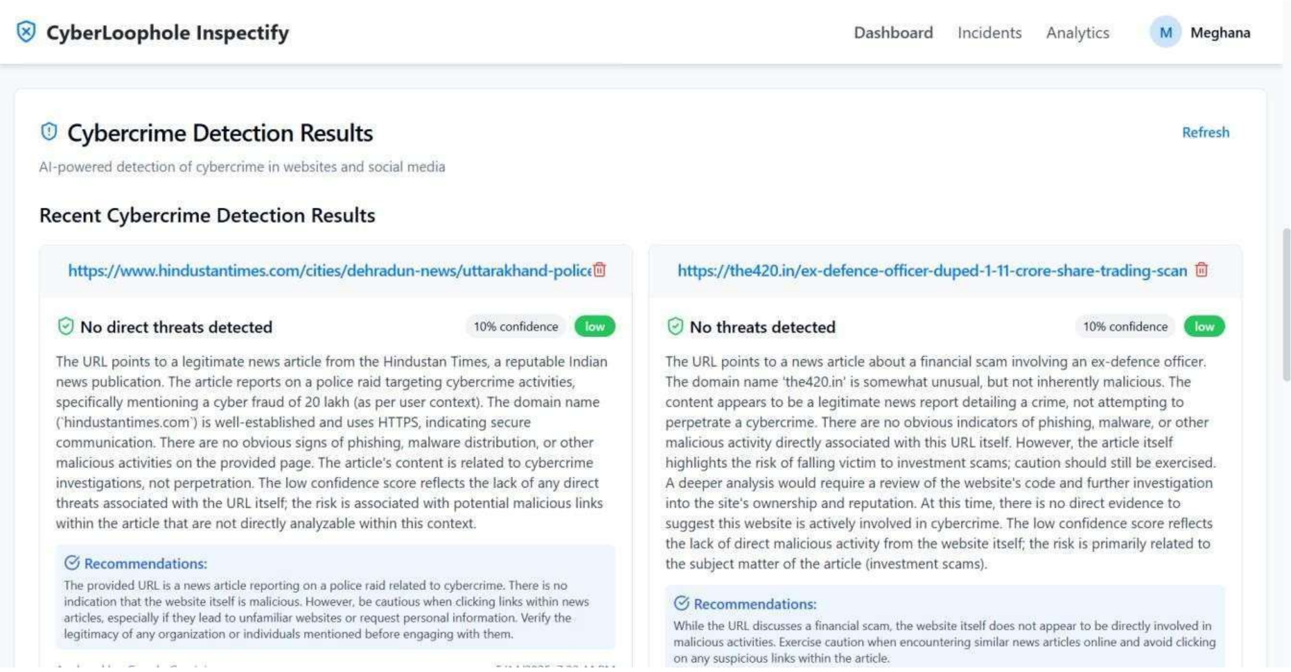
Total Incidents 11

Critical Incidents 2

Sectors Affected 9

New Today 0

Screenshot 4: Output - Dashboard



Cybercrime Detection Results

AI-powered detection of cybercrime in websites and social media

Recent Cybercrime Detection Results

https://www.hindustantimes.com/cities/dehradun-news/uttarakhand-police

No direct threats detected 10% confidence low

The URL points to a legitimate news article from the Hindustan Times, a reputable Indian news publication. The article reports on a police raid targeting cybercrime activities, specifically mentioning a cyber fraud of 20 lakh (as per user context). The domain name ('hindustantimes.com') is well-established and uses HTTPS, indicating secure communication. There are no obvious signs of phishing, malware distribution, or other malicious activities on the provided page. The article's content is related to cybercrime investigations, not perpetration. The low confidence score reflects the lack of any direct threats associated with the URL itself; the risk is associated with potential malicious links within the article that are not directly analyzable within this context.

Recommendations:

The provided URL is a news article reporting on a police raid related to cybercrime. There is no indication that the website itself is malicious. However, be cautious when clicking links within news articles, especially if they lead to unfamiliar websites or request personal information. Verify the legitimacy of any organization or individuals mentioned before engaging with them.

https://the420.in/ex-defence-officer-duped-1-11-crore-share-trading-scan

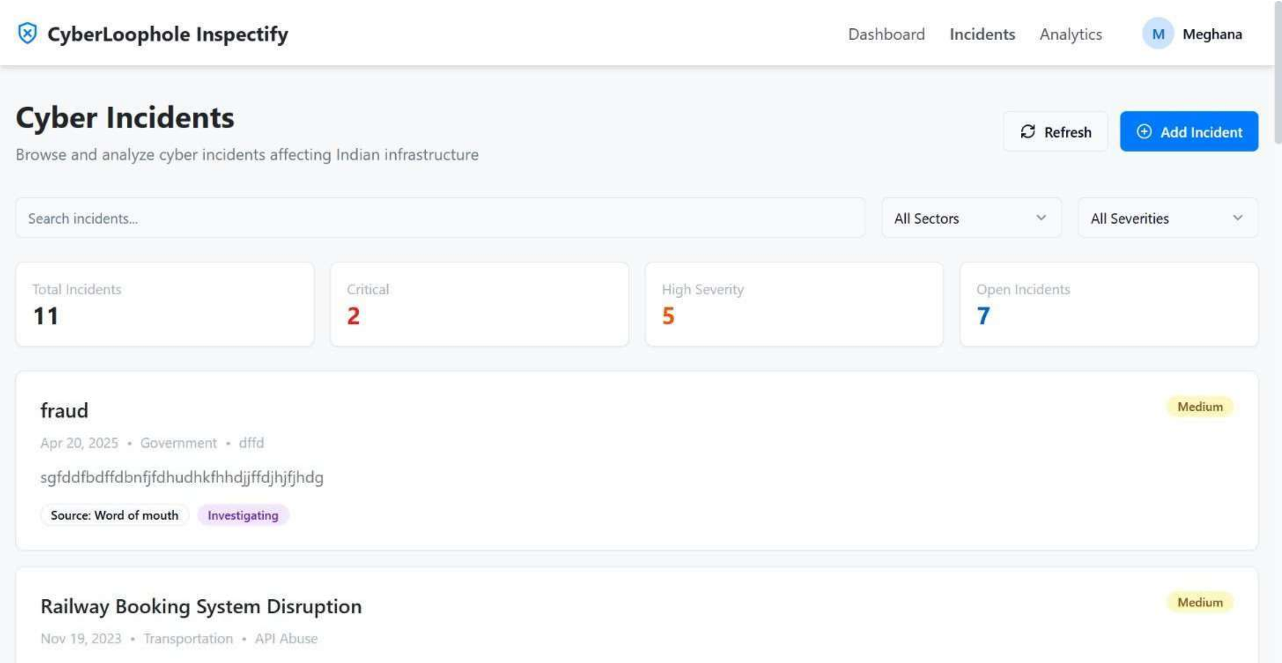
No threats detected 10% confidence low

The URL points to a news article about a financial scam involving an ex-defence officer. The domain name 'the420.in' is somewhat unusual, but not inherently malicious. The content appears to be a legitimate news report detailing a crime, not attempting to perpetrate a cybercrime. There are no obvious indicators of phishing, malware, or other malicious activity directly associated with this URL itself. However, the article itself highlights the risk of falling victim to investment scams; caution should still be exercised. A deeper analysis would require a review of the website's code and further investigation into the site's ownership and reputation. At this time, there is no direct evidence to suggest this website is actively involved in cybercrime. The low confidence score reflects the lack of direct malicious activity from the website itself; the risk is primarily related to the subject matter of the article (investment scams).

Recommendations:

While the URL discusses a financial scam, the website itself does not appear to be directly involved in malicious activities. Exercise caution when encountering similar news articles online and avoid clicking on any suspicious links within the article.

Screenshot 5: Output – Cyber Detection Results



Cyber Incidents

Browse and analyze cyber incidents affecting Indian infrastructure

Total Incidents 11

Critical 2

High Severity 5

Open Incidents 7

fraud — Medium

Apr 20, 2025 • Government • dffd

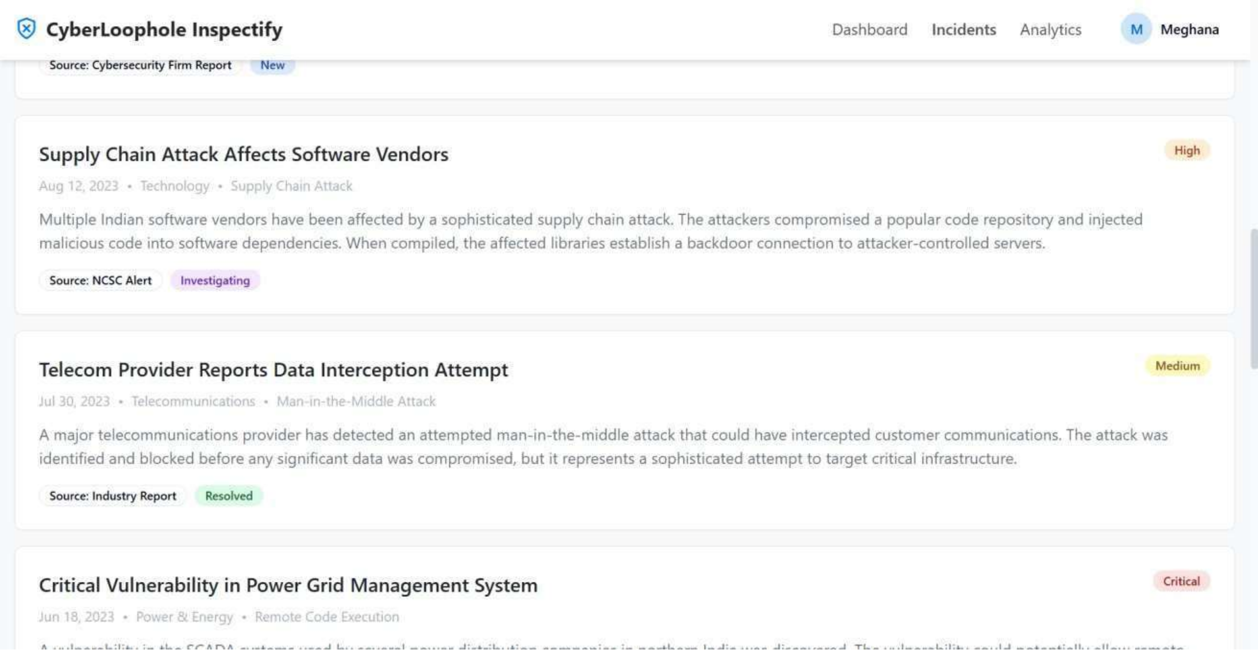
sgfddfbdffdbnfjfdhudhkfhhdjjffdjhjfjhdg

Source: Word of mouth — Investigating

Railway Booking System Disruption — Medium

Nov 19, 2023 • Transportation • API Abuse

Screenshot 6: Output - Incidents



Source: Cybersecurity Firm Report — New

Supply Chain Attack Affects Software Vendors — High

Aug 12, 2023 • Technology • Supply Chain Attack

Multiple Indian software vendors have been affected by a sophisticated supply chain attack. The attackers compromised a popular code repository and injected malicious code into software dependencies. When compiled, the affected libraries establish a backdoor connection to attacker-controlled servers.

Source: NCSC Alert — Investigating

Telecom Provider Reports Data Interception Attempt — Medium

Jul 30, 2023 • Telecommunications • Man-in-the-Middle Attack

A major telecommunications provider has detected an attempted man-in-the-middle attack that could have intercepted customer communications. The attack was identified and blocked before any significant data was compromised, but it represents a sophisticated attempt to target critical infrastructure.

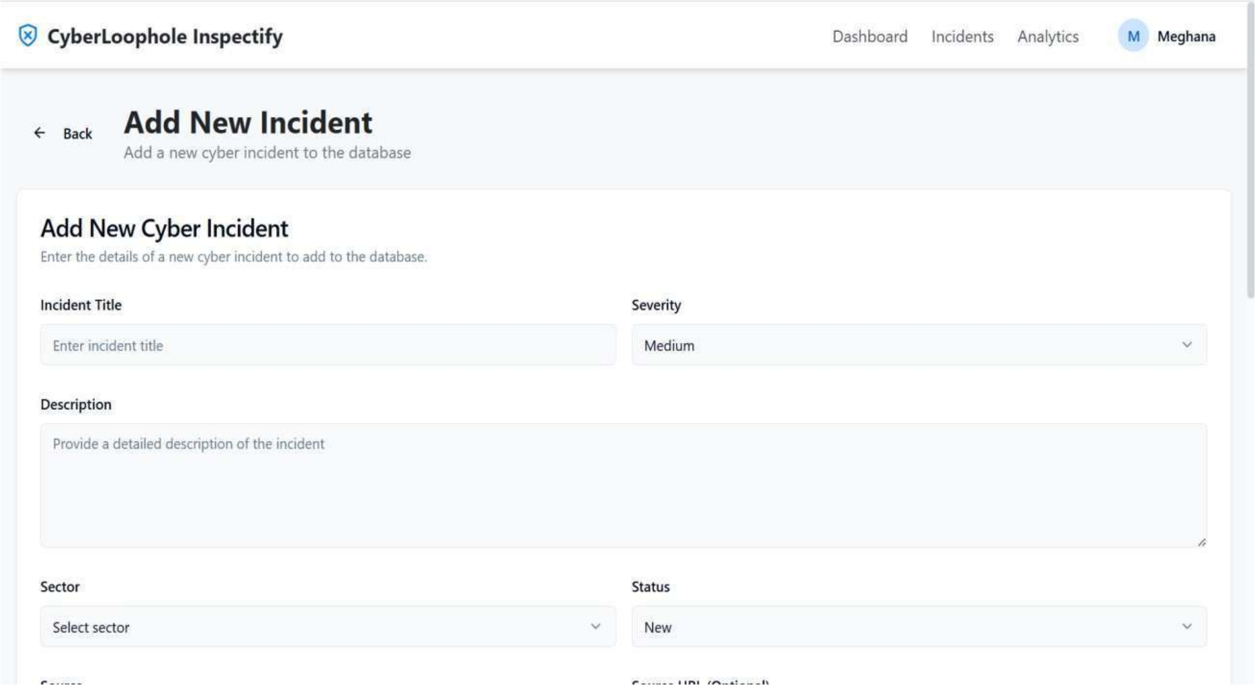
Source: Industry Report — Resolved

Critical Vulnerability in Power Grid Management System — Critical

Jun 18, 2023 • Power & Energy • Remote Code Execution

A vulnerability in the SCADA systems used by several power distribution companies in northern India was discovered. The vulnerability could potentially allow remote

Screenshot 7: Output – Incidents



Add New Incident

Add a new cyber incident to the database

Add New Cyber Incident

Enter the details of a new cyber incident to add to the database.

Incident Title: Enter incident title

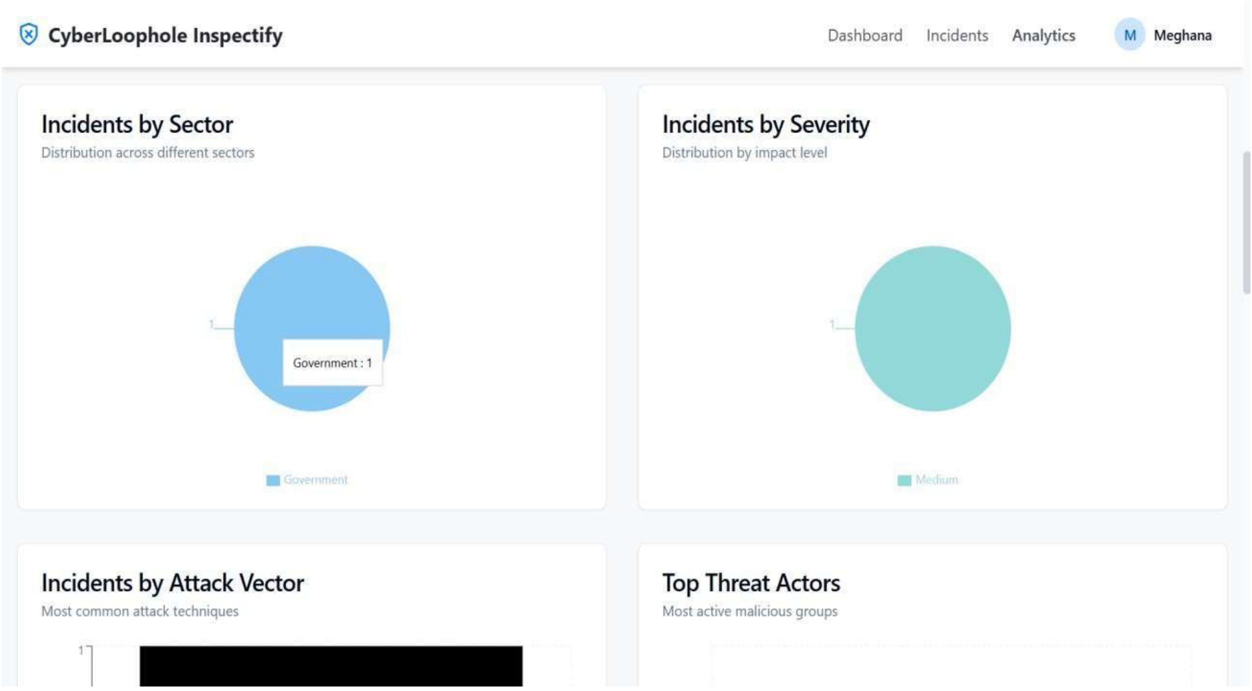
Severity: Medium

Description: Provide a detailed description of the incident

Sector: Select sector

Status: New

Screenshot 8: Output – Add new Incidents

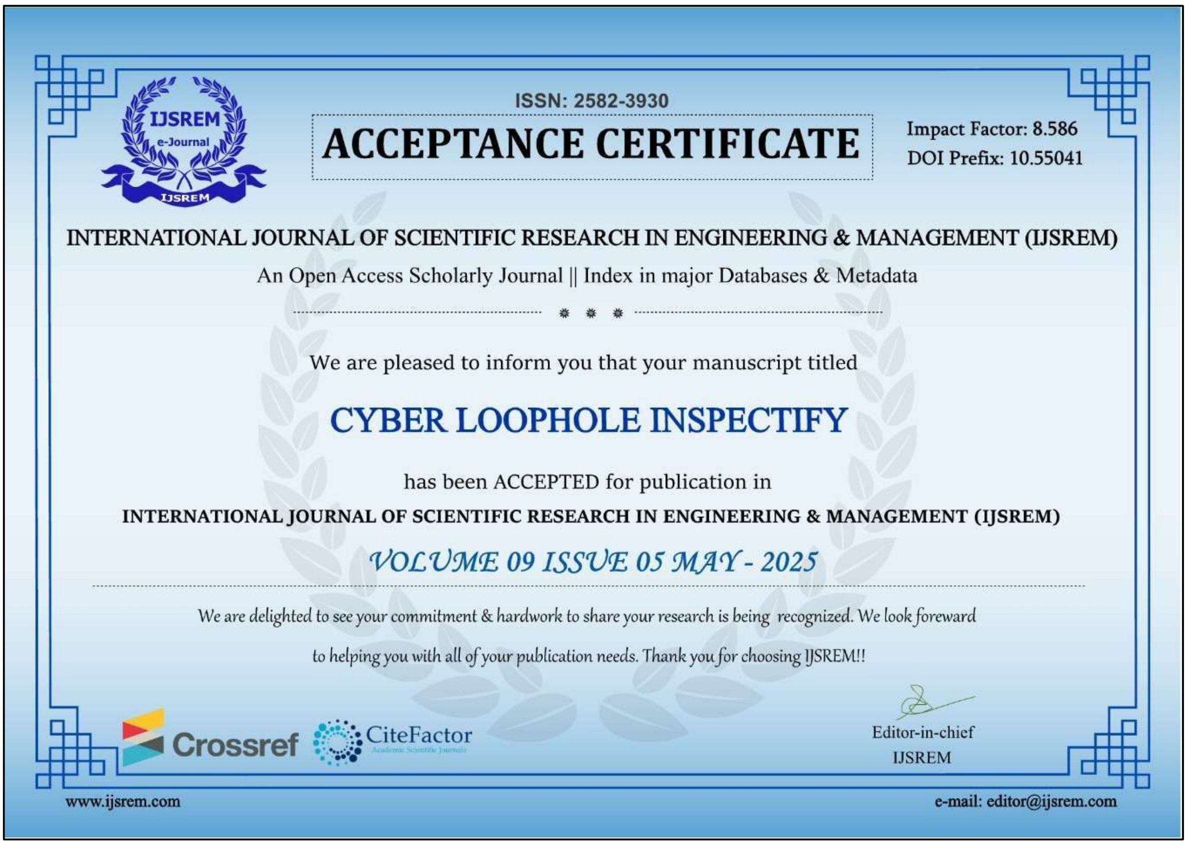


Screenshot 9: Output – Analytics

APPENDIX-C

ENCLOSURES

RESEARCH PAPER ACCEPTANCE CERTIFICATE



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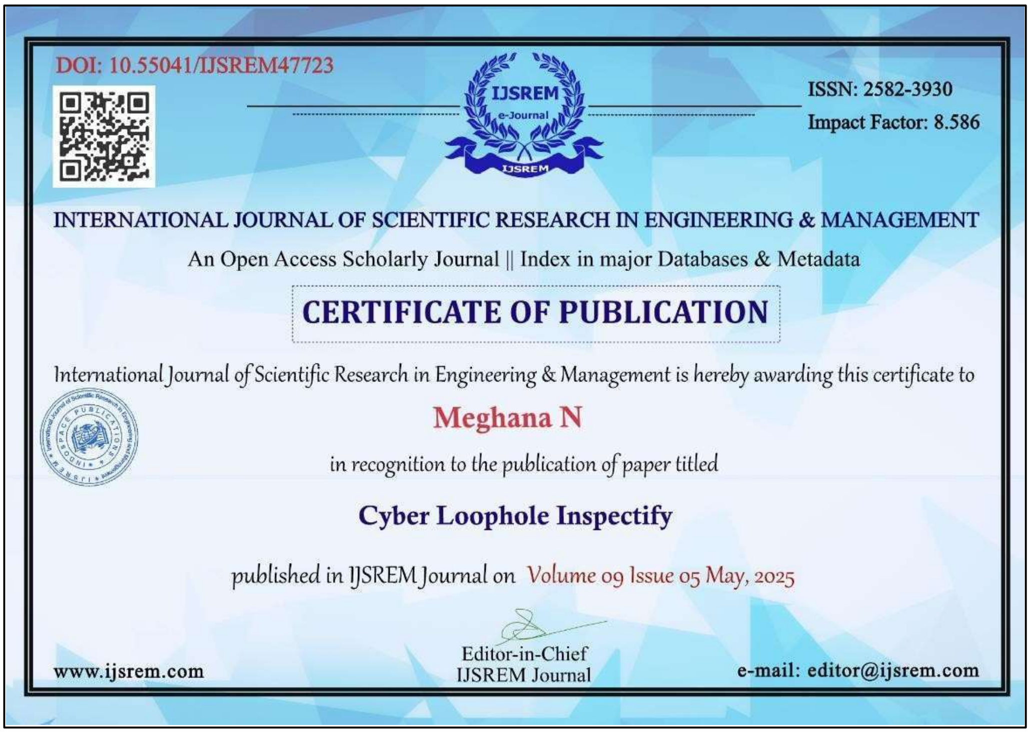

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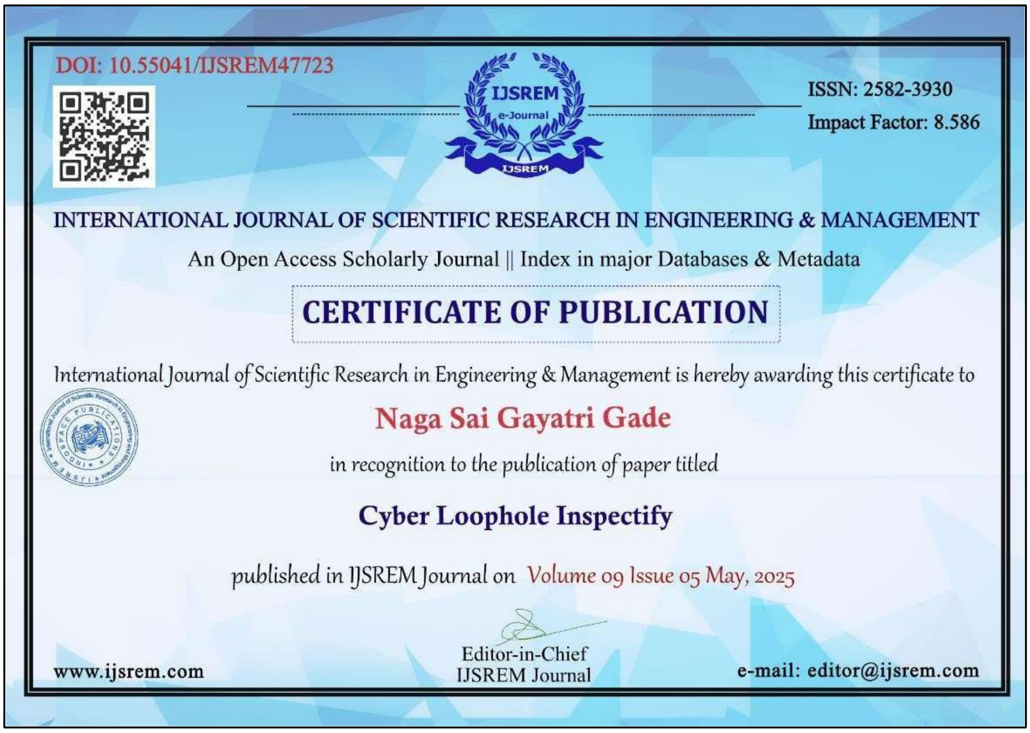

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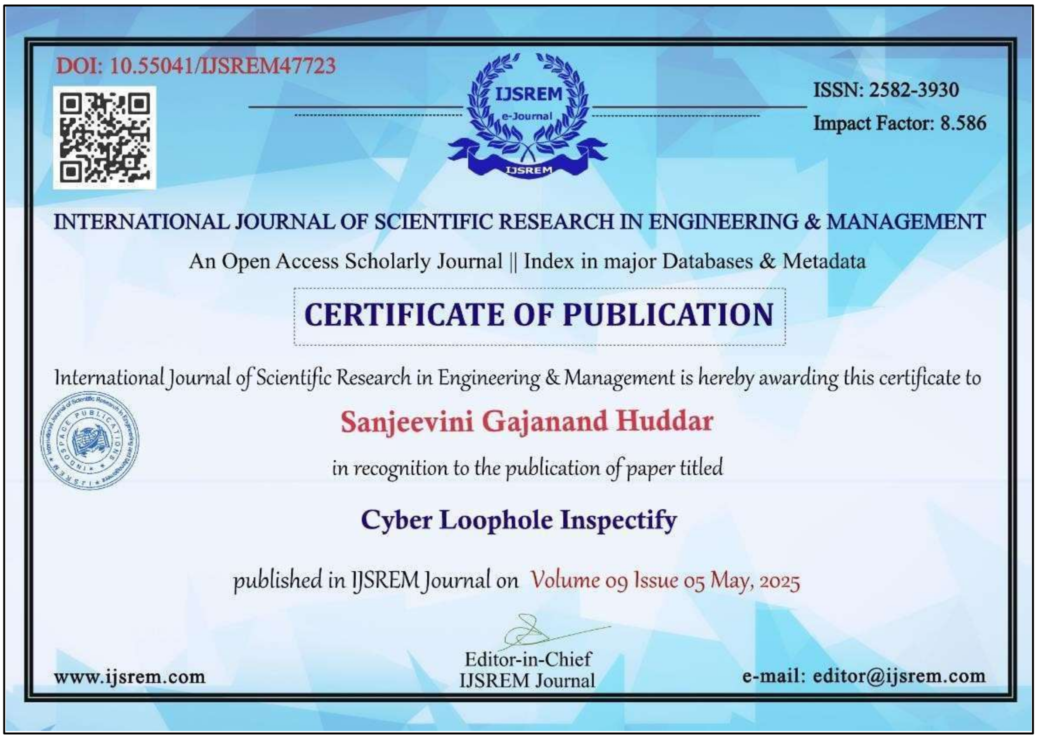

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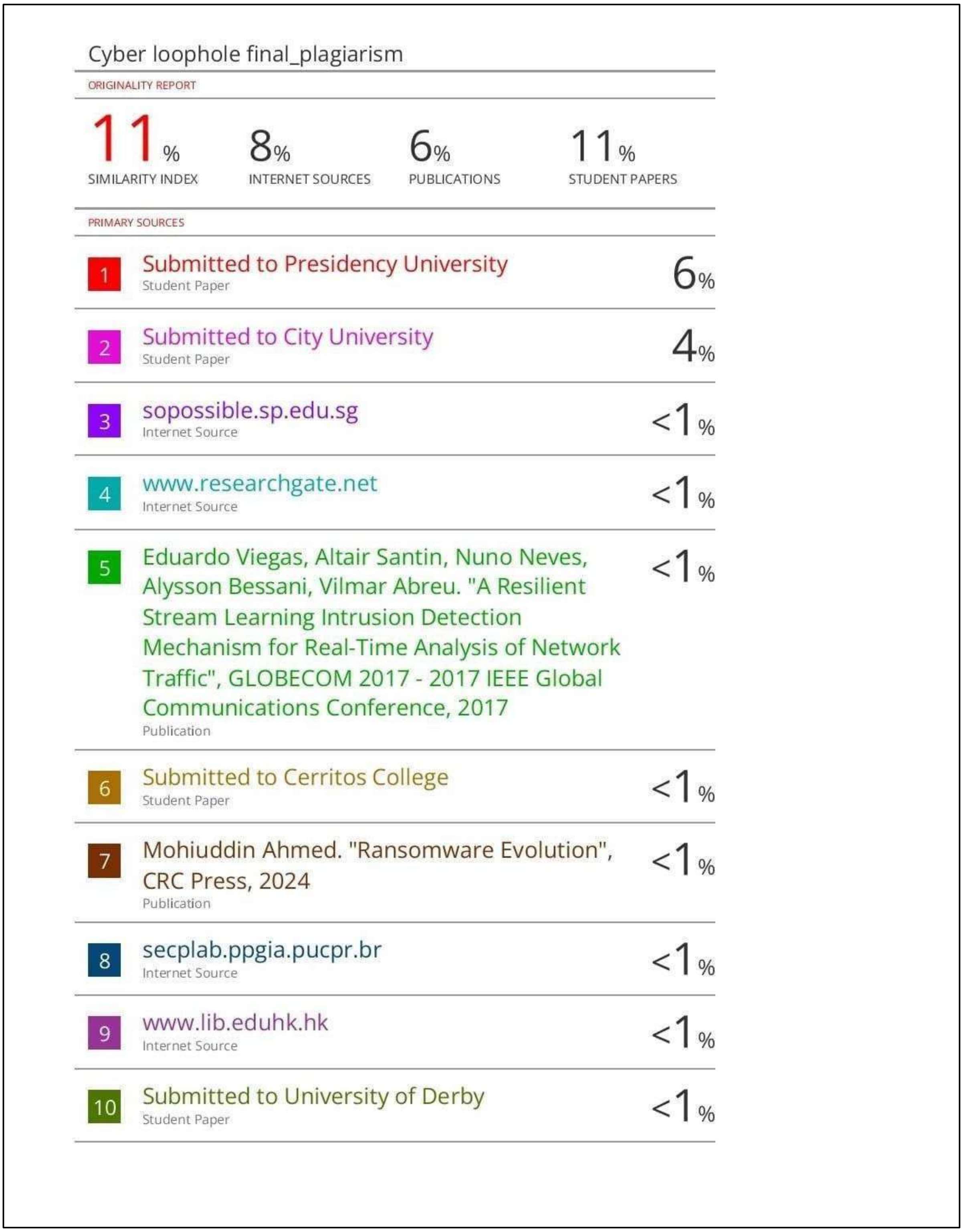
PLAGIARISM REPORT OF CYBER LOOPHOLE INSPECTIFY REPORT



Cyber loophole final_plagiarism

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Fig 10: Plagiarism Report for Cyber Loophole Inspectify Report

SUSTAINABLE DEVELOPMENT GOALS(SDG) MAPPING

The project described aligns with **SDG 9: Industry, Innovation and Infrastructure** and **SDG 16: Peace, Justice and Strong Institutions.**

SDG 9: Industry, Innovation and Infrastructure

Fig 11: SDG 9 Mapping

Why it aligns:

CyberLoophole Inspectify drives innovation in cybersecurity by leveraging modern web technologies and scalable cloud infrastructure to protect India's digital systems. It contributes to resilient digital infrastructure and enhances national security using real-time data intelligence and predictive analytics.

Key Mappings:

- Promotes digital resilience through scalable tools like Firebase and Vite
- Encourages cybersecurity innovation via machine learning-based threat detection
- Secures national infrastructure by protecting sectors like healthcare and finance
- Automates data feeds, reducing response time and boosting infrastructure reliability

Conclusion:

Cyber Loophole Inspectify supports SDG 9 by modernizing cybersecurity infrastructure and promoting technological advancement. It strengthens critical systems, enabling a more secure and innovative digital ecosystem.

SDG 16: Peace, Justice and Strong Institutions

Fig 12: SDG 16 Mapping

Why it aligns:

The platform empowers government agencies and institutions with transparent, real-time cyber intelligence. By enabling threat tracking and actor mapping, it improves governance, promotes justice in cyberspace, and supports peace by preventing digital disruption.

Key Mappings:

- Delivers timely, accountable threat data to national institutions
- Aids law enforcement through threat actor tracking and pattern analysis
- Enhances transparency with open dashboards and no reliance on closed APIs
- Supports institutional resilience through early threat alerts

Conclusion:

Cyber Loophole Inspectify aligns with SDG 16 by enhancing the capacity of institutions to prevent, detect, and respond to cyber threats. It builds a safer and more trustworthy digital infrastructure critical to national stability.