1.INTRODUCTION

1.1 PROJECT SCOPE

Cyber Supply Chain (CSC) security is critical for reliable service delivery and ensure overall business continuity of Smart CPS. CSC systems by its inherently is complex and vulnerabilities within CSC system environment can cascade from a source node to a number of target nodes of the overall cyber physical system (CPS). There are several examples for successful CSC attacks. For instance, Dragonfly, a Cyber Espionage group, is well known for targeting CSC organization .

1.2 PROJECT PURPOSE

Due to the invincibility nature of cyber attacks on the cyber supply chain (CSC), and the cascading effects of malware infections, we use machine learning to predict attacks. As organizations have become more reliant on CSC systems for business continuity, so are the increase in vulnerabilities and the threat landscapes. Some traditional approach to detecting and defending malware attack has largely been antimalware or antivirus software such as spam filters, firewall, and IDS/IPS. These tools largely succeed, however, as threat actors get more intelligent, they are able to circumvent and affect nodes on systems which then propagates.

1.3 PROJECT FEATURES

In this project, we use ML techniques to learn the dataset and predict which CSC nodes have detection or no detection. The purpose is to predict which modes are venerable to cyberattacks and for predicting future trends. To demonstrate the applicability of our approach, we used a dataset from the Microsoft Malware Prediction website. Further, an ensemble is used to link Logistic Regression, and Decision Tree and SVM algorithms in Majority Voting and run on the training data and then use 10-fold cross validation to test the parameter estimation, accurate results and predictions. The results show that ML algorithms in Decision Trees methods can be used in cyber supply chain predict analytics to detect and predict future cyber attack trends.

1.4 LITERATURE SURVEY

1.4.1 Towards the Prediction of Renewable Energy Unbalance in Smart Grids

AUTHORS: R. D. Labati, A. Genovese, V. Piuri and F. Scotti

The production of renewable energy is increasing worldwide. To integrate renewable sources in electrical smart grids able to adapt to changes in power usage in heterogeneous local zones, it is necessary to accurately predict the power production that can be achieved from renewable energy sources. By using such predictions, it is possible to plan the power production from non-renewable energy plants to properly allocate the produced power and compensate possible unbalances. In particular, it is important to predict the unbalance between the power produced and the actual power intake at a local level (zones). In this paper, we propose a novel method for predicting the sign of the unbalance between the power produced by renewable sources and the power intake at the local level, considering zones composed of multiple power plants and with heterogeneous characteristics. The method uses a set of historical features and is based on Computational Intelligence techniques able to learn the relationship between historical data and the power unbalance in heterogeneous geographical regions. As a case study, we evaluated the proposed method using data collected by a player in the energy market over a period of seven months. In this preliminary study, we evaluated different configurations of the proposed method, achieving results considered as satisfactory by a player in the energy market.

1.4.2 Malware Attack Predictive Analytics in a Cyber Supply Chain Context Using Machine Learning

AUTHORS: A. Yeboah-Ofori and C. Boachie

Due to the invincibility nature of cyber attacks on the cyber supply chain (CSC), and the cascading effects of malware infections, we use machine learning to predict attacks. As organizations have become more reliant on CSC systems for business continuity, so are the increase in vulnerabilities and the threat landscapes. Some traditional approach to detecting and defending malware attack has largely been antimalware or antivirus software such as spam filters, firewall, and IDS/IPS. These tools largely succeed, however, as threat actors get more intelligent, they are able circumvent and affect nodes on systems which then propagates. In our previous work, we characterized threat actor activities, including presumed intent and historically observed behaviour, for the purpose of ascertaining the current threats that could be exploited. In this paper, we use ML techniques to learn the dataset and predict which CSC nodes have detection or no detection. The purpose is to predict which modes are venerable to cyberattacks and for predicting future trends. To demonstrate the applicability of our approach, we used a dataset from the Microsoft Malware Prediction website. Further, an ensemble is used to link Logistic Regression, and Decision Tree and SVM algorithms in Majority Voting and run on the training data and then use 10-fold cross validation to test the parameter estimation, accurate results and predictions. The results show that ML algorithms in Decision Trees methods can be used in cyber supply chain predict analytics to detect and predict future cyber attack trends.

1.4.3 Feasibility of Supervised Machine Learning for Cloud Security

AUTHORS: D. Bhamare, T. Salman, M. Samaka, A. Erba and R. Jain

Cloud computing is gaining significant attention, however, security is the biggest hurdle in its wide acceptance. Users of cloud services are under constant fear of data loss, security threats and availability issues. Recently, learning-based methods for security applications are gaining popularity in the literature with the advents in machine learning techniques. However, the major challenge in these methods is obtaining real-time and unbiased datasets. Many datasets are internal and cannot be shared due to privacy issues or may lack certain statistical characteristics. As a result of this, researchers prefer to generate datasets for training and testing purpose in the simulated or closed experimental environments which may lack comprehensiveness. Machine learning models trained with such a single dataset generally result in a semantic gap between results and their application. There is a dearth of research work which demonstrates the effectiveness of these models across multiple datasets obtained in different environments. We argue that it is necessary to test the robustness of the machine learning models, especially in diversified operating conditions, which are prevalent in cloud scenarios. In this work, we use the UNSW dataset to train the supervised machine learning models. We then test these models with ISOT dataset.

We present our results and argue that more research in the field of machine learning is still required for its applicability to the cloud security.

1.4.4 A Survey of Data Mining and Machine Learning Methods for Cyber Security Intrusion Detection

AUTHORS: A. L. Buczak, and E. Guven.

This survey paper describes a focused literature survey of machine learning (ML) and data mining (DM) methods for cyber analytics in support of intrusion detection. Short tutorial descriptions of each ML/DM method are provided. Based on the number of citations or the relevance of an emerging method, papers representing each method were identified, read, and summarized. Because data are so important in ML/DM approaches, some well-known cyber data sets used in ML/DM are described. The complexity of ML/DM algorithms is addressed, discussion of challenges for using ML/DM for cyber security is presented, and some recommendations on when to use a given method are provided.

1.4.5 A Review of Cyber Security Dataset for Machine Learning Algorithms

AUTHORS: O. Yavanoglu and M. Aydos

It is an undeniable fact that currently information is a pretty significant presence for all companies or organizations. Therefore protecting its security is crucial and the security models driven by real datasets has become quite important. The operations based on military, government, commercial and civilians are linked to the security and availability of computer systems and network. From this point of security, the network security is a significant issue because the capacity of attacks is unceasingly rising over the years and they turn into be more sophisticated and distributed. The objective of this review is to explain and compare the most commonly used datasets. This paper focuses on the datasets used in artificial intelligent and machine learning techniques, which are the primary tools for analyzing network traffic and detecting abnormalities.

2. SYSTEM ANALYSIS

2.1 INTRODUCTION

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.2 EXISTING SYSTEM

A recent NCSC report highlights a list of CSC attacks by exploiting vulnerabilities that exist within the systems. Organizations outsource part of their business and data to the third-party service providers that could lead any potential threat. There are several examples for successful CSC attacks. For instance, Dragonfly, a Cyber Espionage group, is well known for targeting CSC organization. The Saudi Aramco power station attack halted its operation due to a massive cyberattack. There are existing works that consider CSC threats and risks but a lack of focus on threat intelligence properties for the overall cyber security improvement.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

- Those attacks on the cyber physical and cyber digital system components such as distributed denial of service (DDoS) attacks, IP address spoofing, and Software errors.
- The data is loss in the company server due to malware attack.

2.3 PROPOSED SYSTEM

- Firstly, we consider Cyber Threat Intelligence(CTI) for systematic gathering and analysis of information about the threat actor and cyber-attack by using various concepts such as threat actor skill, motivation, IoC, TTP and incidents. The reason for considering CTI is that it provides evidence-based knowledge relating to the known attacks. This information is further used to discover unknown attacks so that threats can be well understood and mitigated. CTI provides intelligence information with the aim of preventing attacks as well as shorten time to discover new attacks.
- Secondly, we applied ML techniques and classification algorithms and mapped with the CTI properties to predict the attacks. We use several classification algorithms such as Logistic Regression (LG), Support Vector Machine (SVM), Random Forest (RF) and Decision Tree (DT) for this purpose. We follow CTI properties such as Indicator of Compromise (IoC) and Tactics, Techniques and Procedure (TTP) for the attack predication.
- Finally, we consider widely used cyberattack dataset to predict the potential attacks [6]. The predication focuses on determining threats relating to Advance Persistent Threat (APT), command and control and industrial espionage which are relevant for CSC. The result shows the integration of CTI and ML techniques can effectively be used to predict cyberattacks and identification of CSC systems vulnerabilities.

2.4 ADVANTAGES OF THE PROPOSED SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features

- Our prediction reveals a total accuracy of 85% for the TPR and FPR.
- The results also indicate that LG and SVM produced the highest accuracy in terms of threat predication.
- Greater efficiency.

2.5 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.5.1 ECONOMIC FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

2.5.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.5.3 SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

2.6 HARDWARE & SOFTWARE REQUIREMENTS

2.6.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- Operating system : windows, linux
- Processor : minimum intel i3
- Ram : minimum 4 gb
- Hard disk : minimum 250gb

2.6.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements

- Python idel 3.7 version (or)
- Anaconda 3.7 (or)
- Jupiter (or)
- Google colab

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

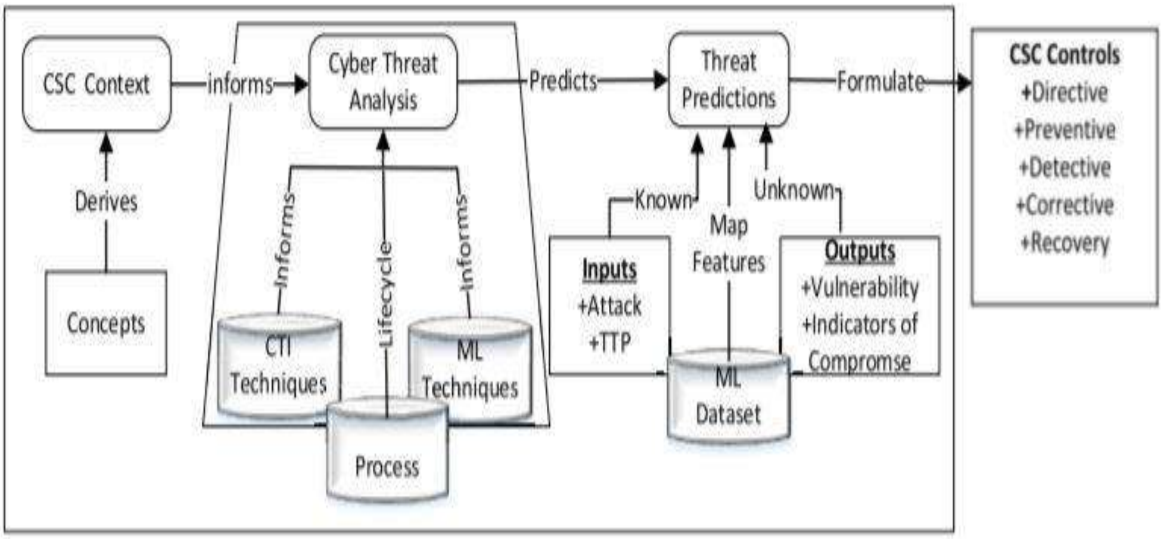


Figure 3.1: Project Architecture

3.2 DESCRIPTION

PHASE 1: DETERMINE STRATEGY

CSC security strategy combines CTI and cybersecurity risk strategy including mechanisms, resources and plans to determine how security goals and controls will be formulated, implemented and achieved in line with organization goal and objectives. It includes identifying, analyzing, reviewing and evaluating organizational assets including infrastructures, resources and implementation procedures. CSC security strategy combines, CTI and cybersecurity risk assessment strategy to gather intelligence and formulate policies. Strategic, tactical and operational management roles and responsibilities are recursive and support each other to ensure security goals are achieved. Strategic management uses intelligence decision to support plans that determine security goals and assign responsibility including executive authorization of blueprints and budget allocation. It includes risk assessment, CSC requirements capturing and business function.

The risk strategy also considered implementation strategies and procurement policies for OT and IT acquisitions and integrations of assets.

PHASE 2: THREAT ANALYSIS

This threat analysis phase follows the CTI techniques to determine and analyse the threats of the CSC context. It requires the CSC strategy information for his purpose and includes three activities

- Identify and Gather Information:

This step identifies all vulnerable spots on the supply inbound and outbound chains on the meta-model that is used as indicators for an attack. For instance, in case of a malware attack, this activity looks for the relevant information such as the source of the attack, the tools, patterns and the attack vectors from the analysis of the malware attack that used as our indicator.

- Risk Assessments

The risk assessment activity includes the process to mitigate CSC risks by determining the probability and impact of CSC attacks and threats as well as the vulnerable spots that could be exploited within the cyber supply inbound and outbound chains and third-party organizations. It identifies all threats that may pose a risk on the system. Risk assesses the CSC security domain and analyse risks access spots that are capture captured. Develop mitigating techniques to control the risks by identifying risks posed by auditing the thirdparty organizations. Classify them based on their service provisions and levels of integration to the various supply chain network system.

- Analysis

This activity focuses on analysis of the threats to determine the actual source of the attack, the type of attack, the attack pattern, the TTP and attack vectors. This will assist to assign the IoC required and what controls are needed.

PHASE 3: THREAT PREDICATION

The phase considers CSC system nodes that are vulnerable to cyberattacks by integrating CTI and ML to obtain attack predictions of known and unknown attacks using three sequential activities: Determine Input Parameters, Predict Threats and Performance Evaluation

PHASE 4: CONTROL

This final phase aims to identify a list of controls that are to tackle the threat. The controls should ensure that the required security strategic and mechanism are put in place to mitigate the threats. This includes identifying security requirements, internal and external audit as well as threat monitoring and reporting. The process includes identification and review of existing controls, third-party audit and finally information sharing.

3.3 USE CASE DIAGRAM

In the use case diagram we have basically two actors who are the user and the administrator. The user has the rights to login, access to resources and to view thecrime details. Whereas the administrator has the login, access to resources of the users and also the right to update and remove the crime details, and he can also view the user files.

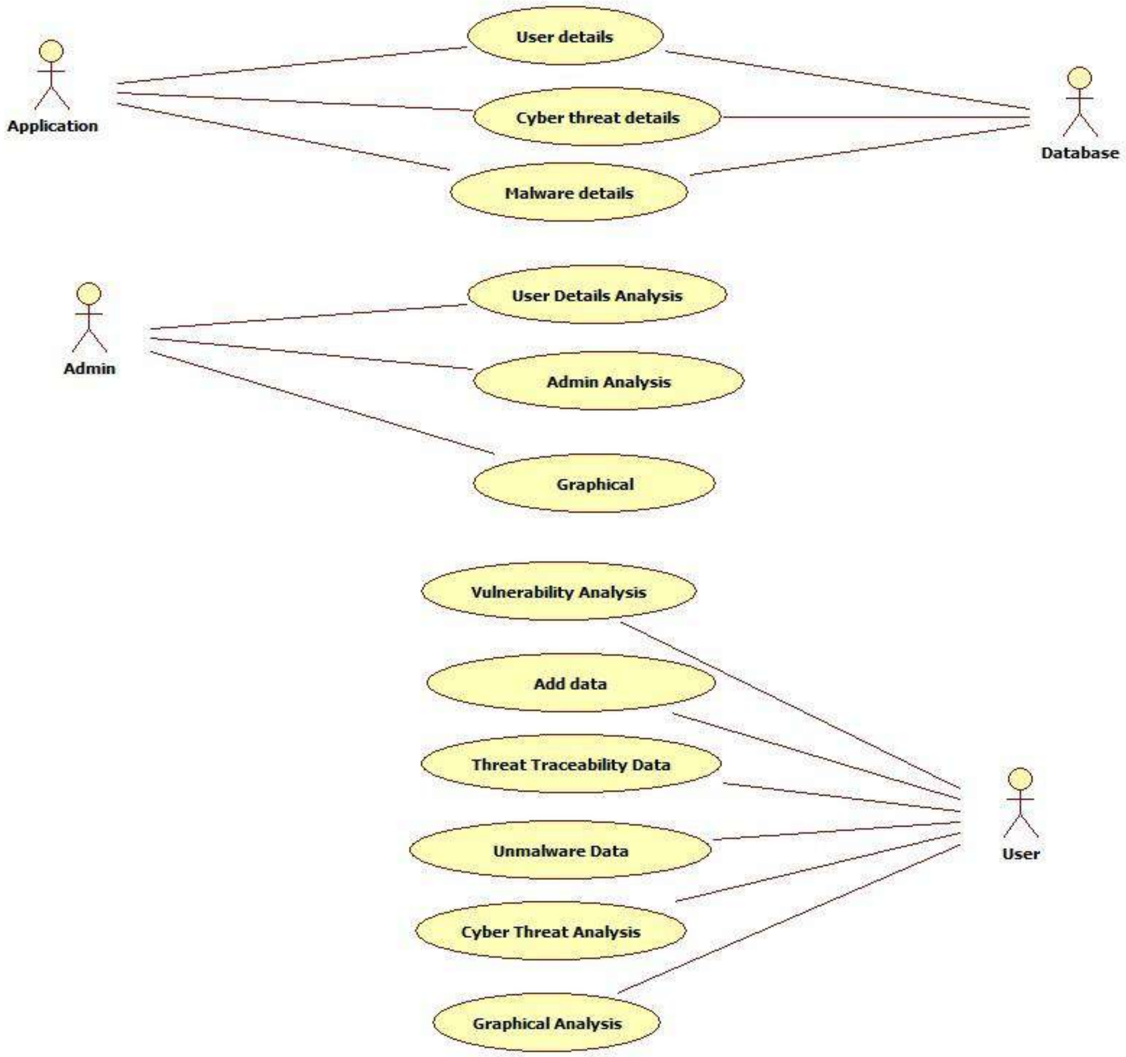


Figure 3.2: Use Case Diagram

3.4 CLASS DIAGRAM

The class diagram is used to refine the use case diagram and define a detailed design of the system. The class diagram classifies the actors defined in the use case diagram into a set of interrelated classes. The relationship or association between the classes can be either an "is-a" or "has-a" relationship. Each class in the class diagram may be capable of providing certain functionalities. These functionalities provided by the class are termed "methods" of the class. Apart from this, each class may have certain "attributes" that uniquely identify the class.

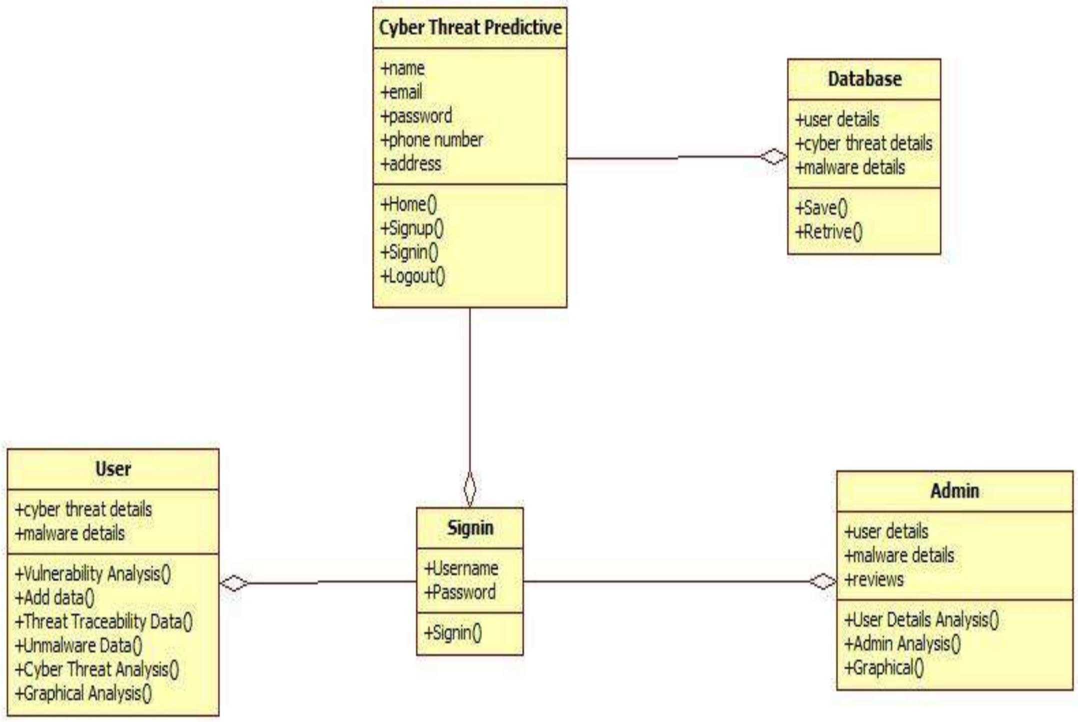


Figure 3.3: Class Diagram

3.5 SEQUENCE DIAGRAM

A sequence diagram represents the interaction between different objects in the system. The important aspect of a sequence diagram is that it is time-ordered. This means that the exact sequence of the interactions between the objects is represented step by step. Different objects in the sequence diagram interact with each other by passing "messages".

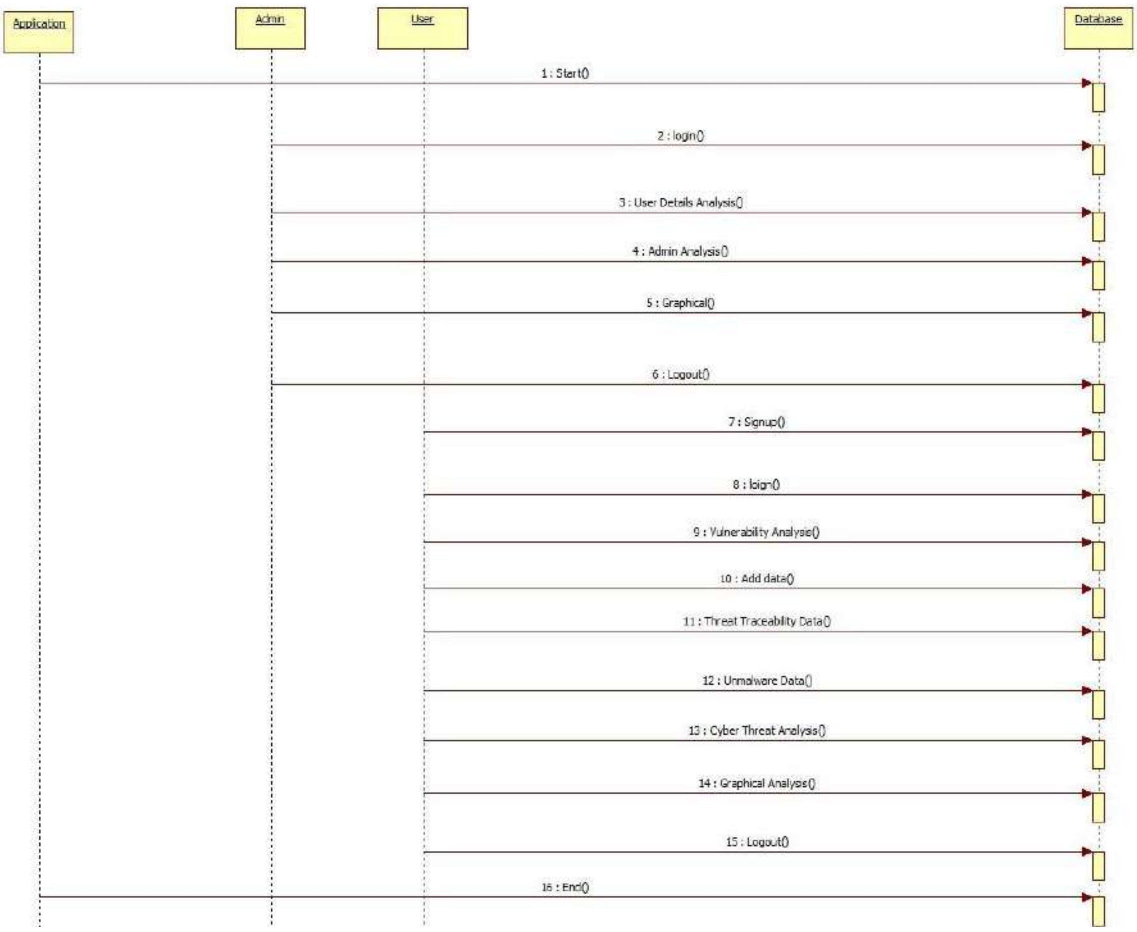


Figure 3.4: Sequence Diagram

3.6 ACTIVITY DIAGRAM

The process flows in the system are captured in the activity diagram. Similar to a state diagram, an activity diagram also consists of activities, actions, transitions, initial and final states, and guard conditions.

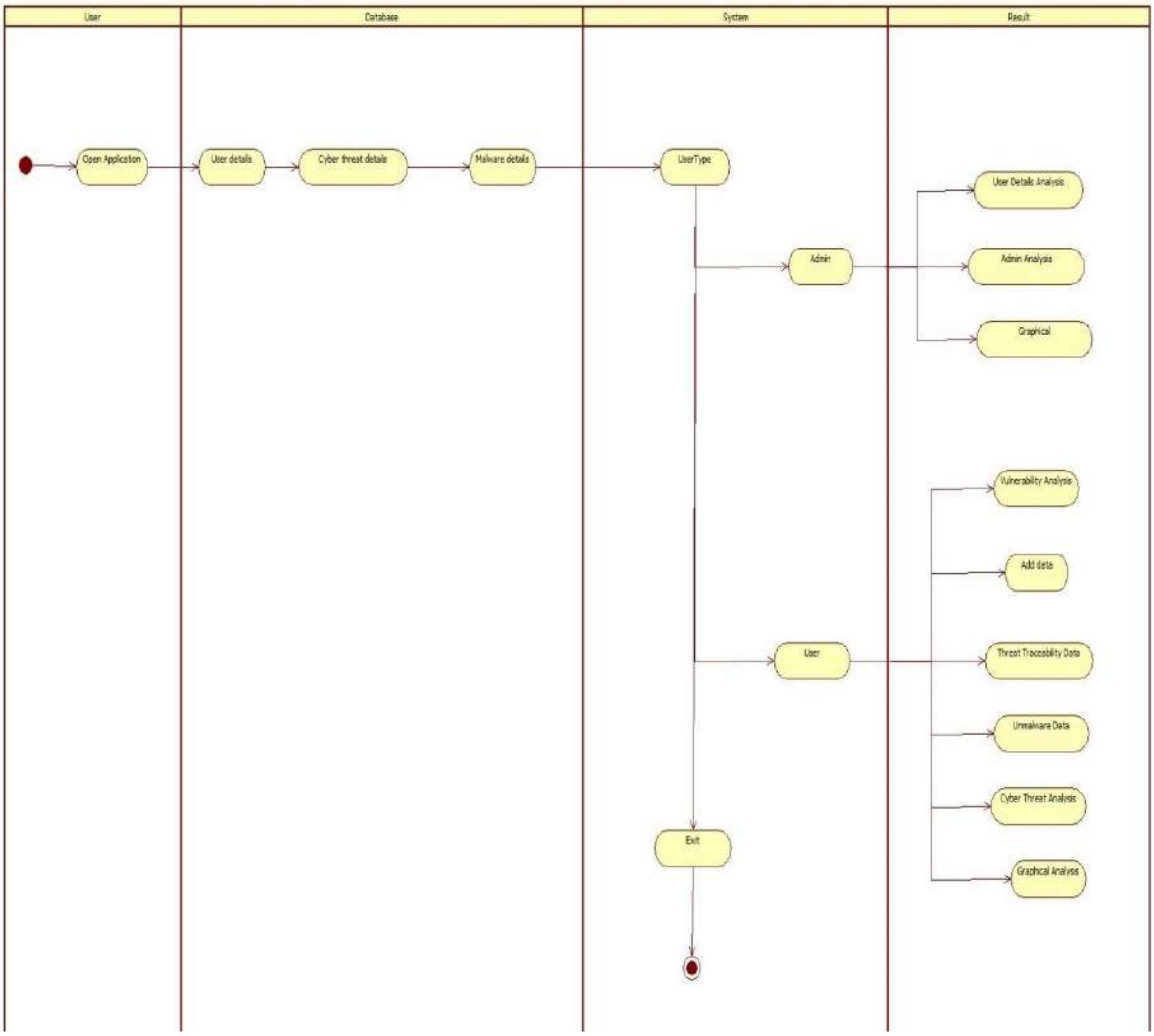


Figure 3.5: Activity Diagram

4. IMPLEMENTATION

4.1 SAMPLE CODE

```
#!/usr/bin/env python
import os
import sys

if __name__ == "__main__":
    os.environ.setdefault("DJANGO_SETTINGS_MODULE",
"Cyber_Hacking_Breaches.settings")
    try:
        from django.core.management import execute_from_command_line
    except ImportError as exc:
        raise ImportError(
            "Couldn't import Django. Are you sure it's installed and "
            "available on your PYTHONPATH environment variable? Did you "
            "forget to activate a virtual environment?"
        ) from exc
    execute_from_command_line(sys.argv)
```

```
import win32gui
import win32ui
from ctypes import windll
import Image

hwnd = win32gui.FindWindow(None, 'Calculator')

# Change the line below depending on whether you want the whole window
# or just the client area.
#left, top, right, bot = win32gui.GetClientRect(hwnd)
left, top, right, bot = win32gui.GetWindowRect(hwnd)
w = right - left
h = bot - top

hwndDC = win32gui.GetWindowDC(hwnd)
mfcDC  = win32ui.CreateDCFromHandle(hwndDC)
saveDC = mfcDC.CreateCompatibleDC()

saveBitMap = win32ui.CreateBitmap()
saveBitMap.CreateCompatibleBitmap(mfcDC, w, h)

saveDC.SelectObject(saveBitMap)

# Change the line below depending on whether you want the whole window
# or just the client area.
```

```
#result = windll.user32.PrintWindow(hwnd, saveDC.GetSafeHdc(), 1)
result = windll.user32.PrintWindow(hwnd, saveDC.GetSafeHdc(), 0)
print result

bmpinfo = saveBitMap.GetInfo()
bmpstr = saveBitMap.GetBitmapBits(True)

im = Image.frombuffer(
    'RGB',
    (bmpinfo['bmWidth'], bmpinfo['bmHeight']),
    bmpstr, 'raw', 'BGRX', 0, 1)

win32gui.DeleteObject(saveBitMap.GetHandle())
saveDC.DeleteDC()
mfcDC.DeleteDC()
win32gui.ReleaseDC(hwnd, hwndDC)

if result == 1:
    #PrintWindow Succeeded
    im.save("test.png")
```

5. TESTING

5.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type address the specific testing requirement.

5.2 TYPES OF TESTING

5.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

5.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfied, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

5.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as system specified by the business and technical requirements, documentation, and user and manuals.

Valid Input :identified classes of valid input must be accepted.

Invalid Input :identified classes of invalid input must be rejected.

Functions :identified functions must be exercised.

Output :identified classes of application outputs must be exercised.

Systems/Procedures :interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

5.2.4 WHITE BOX TESTING

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

5.2.5 BLACK BOX TESTING

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

5.2.6 ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

5.3 TESTCASES

5.3.1 USER REQUIREMENTS:

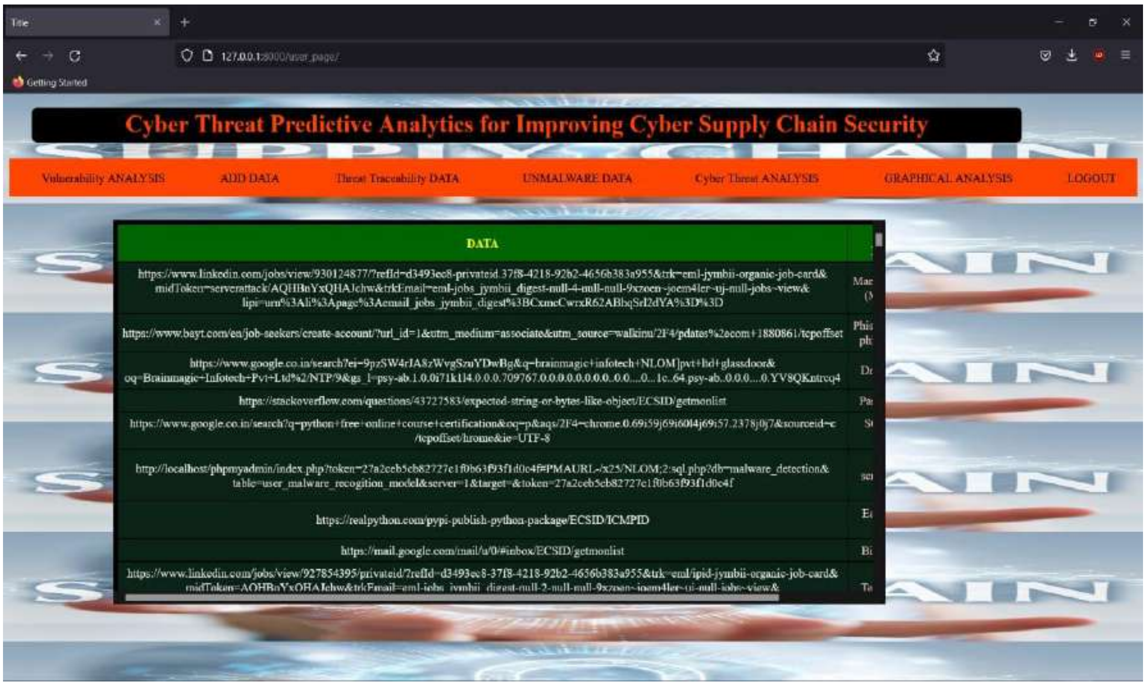
1. Home

Use case ID	Cyber Threat Predictive Analytics for Improving Cyber Supply Chain Security
Use case Name	Home button
Description	Display home page of application
Primary actor	User
Precondition	User must open application
Post condition	Display the Home Page of an application
Frequency of Use case	Many times
Alternative use case	N/A
Use case Diagrams	
Attachments	N/A

6. SCREENSHOTS

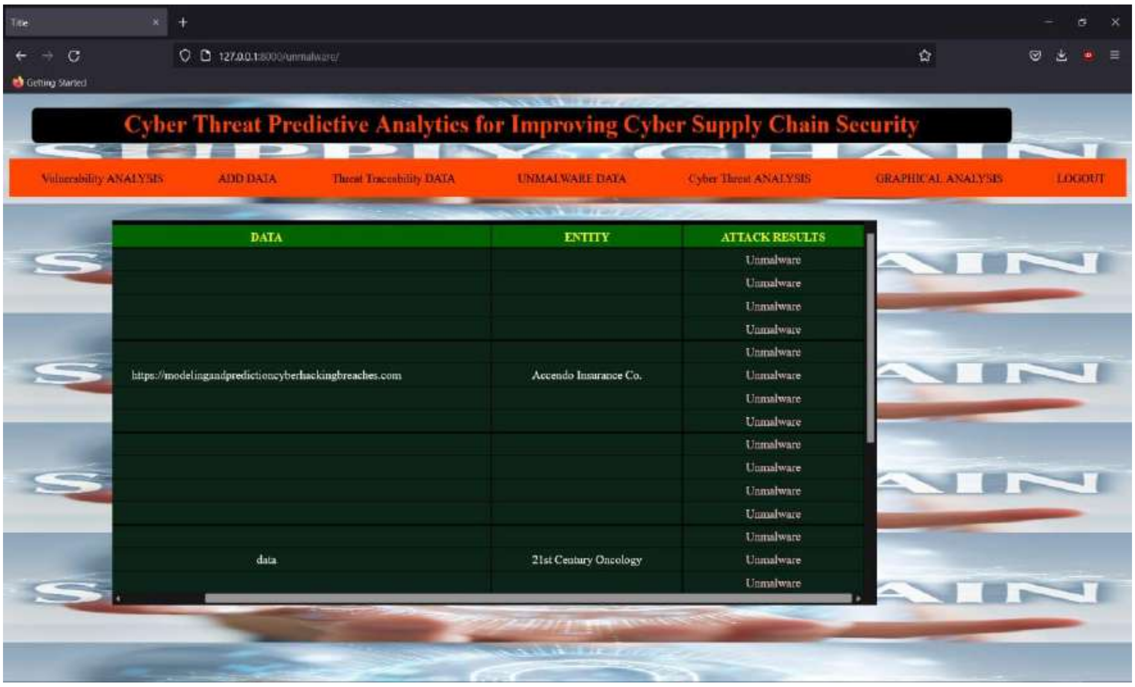
Screenshot 6.1 Login screen

Screenshot 6.2 Vulnerability Analysis

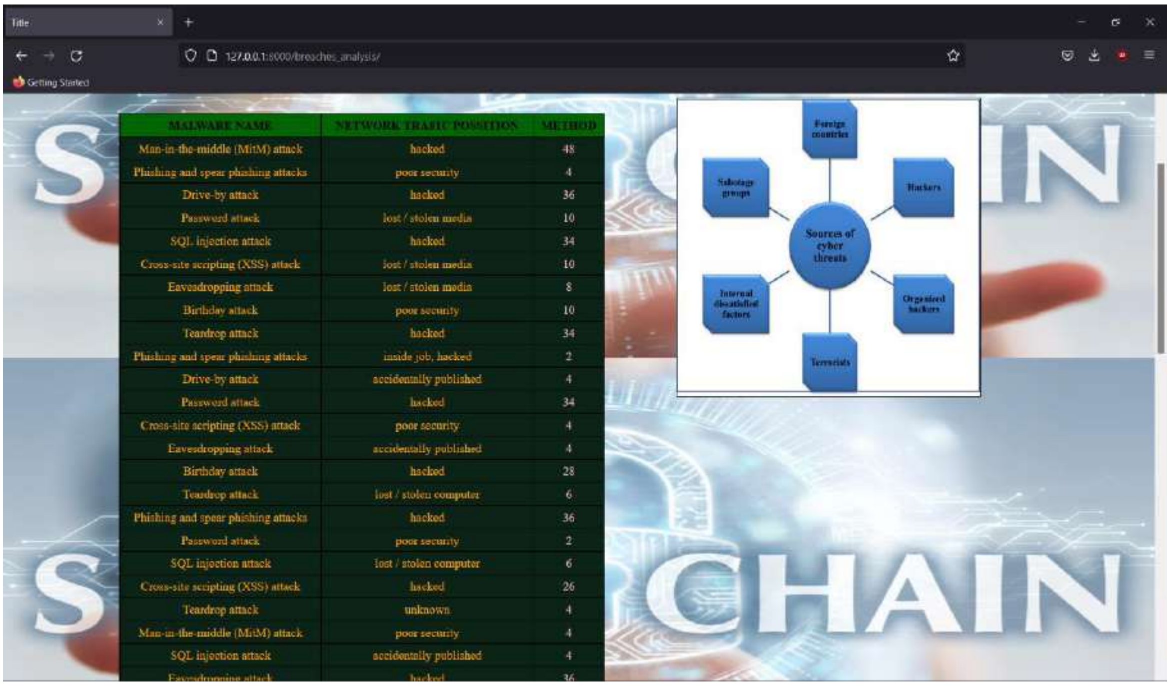


Screenshot 6.3 Upload Data

Screenshot 6.4 Threat Traceability Data



Screenshot 6.5 Unmalware data



Screenshot 6.6 Cyber Threat Analysis

Screenshot 6.7 Spline Chart

7. CONCLUSION & FUTURE SCOPE

7.1 PROJECT CONCLUSION

The integration of complex cyber physical infrastructures and applications in a CSC environment have brought economic, business, and societal impact for both national and global context in the areas of Transport, Energy, Healthcare, Manufacturing, and Communication. However, CPS security remains a challenge as vulnerability from any part of the system can pose risk within the overall supply chain context. This paper aims to improve CSC security by integrating CTI and ML for the threat analysis and predication. We considered the necessary concepts from CSC and CTI and a systematic process to analyse and predicate the threat. The experimental results showed that accuracies of the LG, DT, SVM, RF algorithms in Majority Voting and identified a list of predicated threats. We also observed that CTI is effective to extract threat information , which can integrate into the ML classifiers for the threat predication. This allows CSC organization to analyse the existing controls and determine additional controls for the improvement of overall cyber security. It is necessary to consider the full automation of the process and industrial case study to generalize our findings. Furthermore, we are also planning to consider evaluating the existing controls and the necessary of future controls based on our prediction results.

7.2 FUTURE SCOPE

The project can be further developed into the real time application for which can be applied in the organizations on the networks. The, organizational implementation plays an important role in the finding of the infected systems and to show the probable infected systems for which can be vulnerable.

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8.2 WEBSITES

https://github.com/Akondi956/Predictive-Analytics-for-Cyber-Threats-to-Improve-Cyber-Supply-Chain-Security-.git

PREDICTIVE ANALYTICS FOR CYBER THREATS TO IMPROVE CYBER SUPPLY CHAIN SECURITY

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ABSTRACT
The Cyber Supply Chain (CSC) system is complicated, with numerous subsystems, each of which is responsible for a specific function. It is difficult to maintain supply chain security because of the inherent weaknesses and threats that can be exploited at any stage in the supply chain. This has the potential to have a significant impact on the ongoing operations of the company. Consequently, it is critical to understand and identify the threats in order to implement the essential supply chain security management measures. Threat actors' expertise and motive, Tactics, Techniques and Procedures (TT and P), and an Indicator of Compromise (IOC) are all used to detect new to recognized threats in Cyber Threat Intelligence (CTI) (IOC). This research examines and predicts threats to the cyber supply chain in an effort to increase its security level. With the help of CTI and Machine Learning approaches, we've been able to analyze and forecast risks using CTI attributes. By doing so, the inherent CSC vulnerabilities can be identified and the proper control measures performed to improve the overall security. As a way to show our approach's viability, we gather a variety of CTI data and use a range of ML techniques. Microsoft Malware Prediction dataset is used. As input parameters, the experiment analyzes attacks and TTPs, as well as vulnerabilities and indicators of compromise (IOC). The predictions show that spyware/ransomware and spear phishing are the most likely risks in CSC. Additionally, we've included suggestions for countermeasures to these dangers. Using CTI data in the ML predicate model for CSC cyber security enhancement overall is something we strongly suggest doing.
Key Words — Cyber Threat Intelligence, Predictive Analytic, Cyber Security, Tatic Techniques Procedure\

1. INTRODUCTION

Smart CPS relies on a secure Cyber Supply Chain (CSC) to provide reliable service delivery and overall business continuity. When exploited, CSC systems vulnerabilities can spread from a source node to numerous target nodes within the larger cyber-physical system (CPS). The NCSC recently released a list of CSC attacks that exploit system vulnerabilities. More and more firms are entrusting their company operations and sensitive data to third-party service providers, increasing the risk of a security breach. Examples of successful CSC assaults can be found in the literature. For example, the Cyber Espionage group Dragonfly is well-known for its attacks against the CSC. Cyberattacks on Saudi Aramco's power plant forced the company to shut down operations. However, there is a dearth of attention paid to the threat intelligence aspects that might help improve overall cyber security. Additionally, the business must be able to forecast cyberattack trends so that it may plan its countermeasures in a timely manner. It is not just the threat actors' goals and intentions that can be gleamed via predictive analytics, but also their current supply system vulnerabilities. Using Cyber Threat Intelligence (CTI) and Machine Learning (MI) approaches, this study attempts to improve the cybersecurity of CSC systems by predicting cyberattack trends on CSC systems and recommending appropriate controls to combat the attacks.

2. LITERATURE SURVEY

Miller proposed a cyber supplier chain framework and attack pattern that comeup with a comprehensive view of supply chain attacks of malicious insertions over a full question life cycle**.** The protection of the CSC is critical as it includes numerous embedded networks, software and computation algorithms for information flows and data structures in the live and mission-critical system**.**

Gao et al., proposed an ontology based model of network and computer attacks for protection purpose, assessment and standards classifications that establishes relationships between network security services, threats, vulnerabilities and cause of failures**.**

Gyrard et al. proposed an ontology for attacks and counter measures for capturing and presenting concepts of security purpose and these are essential.Machine Learning in cybersecurity uses numerous algorithms to acquire and train datasets to find out their classifications anf for threat predictions.

3. PROPOSED METHODOLOGY

First and foremost, we look to Cyber Threat Intelligence (CTI) for the systematic collection and analysis of information on the threat actor and the cyber-attack using multiple concepts such as threat actor skill, motivation, IoC, TTP and incidents.Secondly, in order to anticipate attacks, we used machine learning approaches and classification algorithms, which we then mapped using CTI proprieteis.Finally, we use a well-known cyberattack dataset to estimate the likelihood of an attack. APT, command and control, and industrial espionage are all considered in the predication, which focuses on assessing threats pertinent to CSC.According to the findings, a combination of CTI and ML algorithms can be used to accurately forecast cyberattacks and pinpoint weak points in CSC systems.

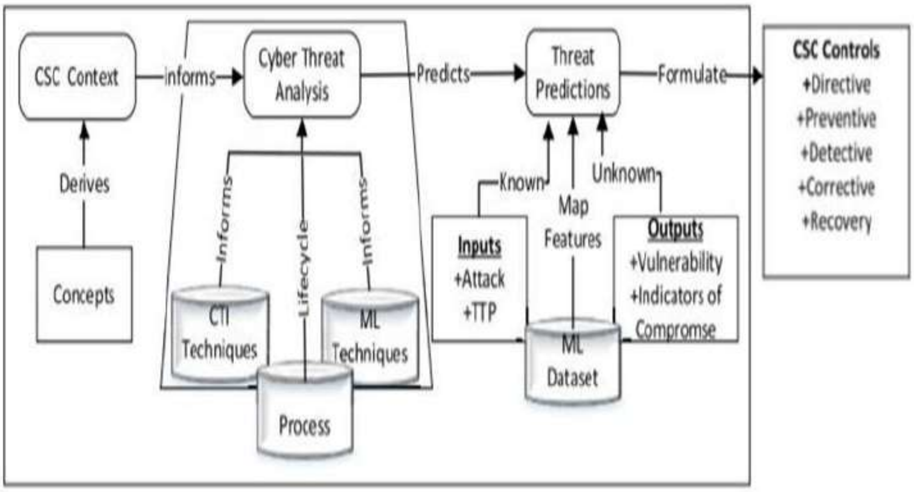

Fig 3.1: Project Functionality

4. RESULTS

Fig 4.1 Login screen

Fig 4.2 Vulnerability Analysis

Fig 4.3 Upload Data

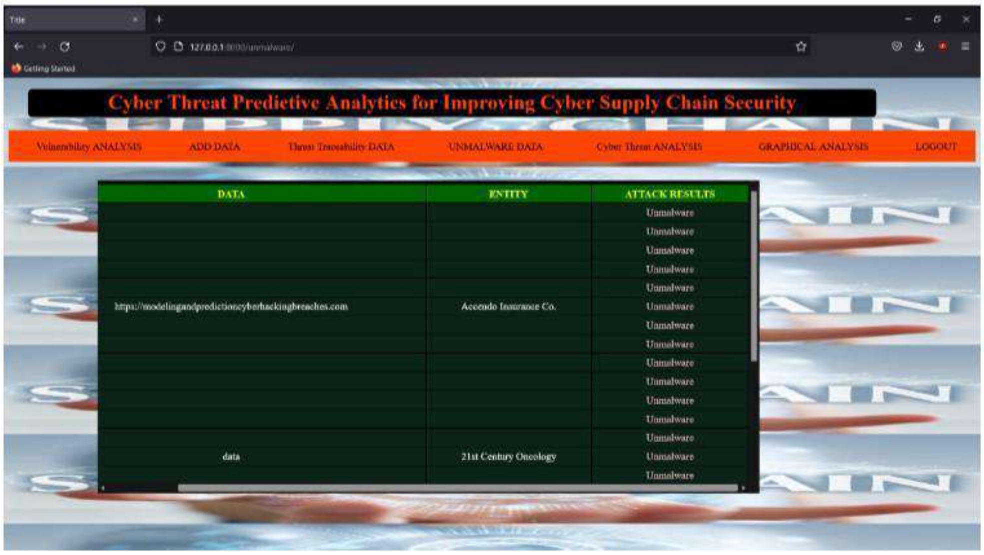

Fig 4.4 Threat Traceability Data

Fig 4.5 Unmalware data

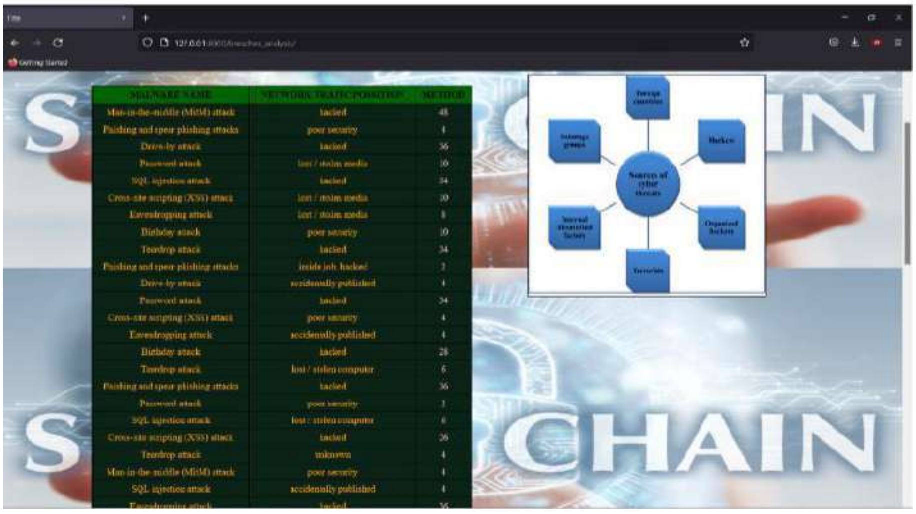

Fig 4.6 Cyber Threat Analysis

FUTURE SCOPE

The project can be further developed into the real time application for which can be applied in the organizations on the networks. The, organizational implementation plays an important role in the finding of the infected systems and to show the probable infected systems for which can be vulnerable .

CONCLUSION

The security of the CPS remains a challenge however, because any vulnerability in the system might pose a risk to the supply chain as a whole. CTI and ML are used in this paper to enhance CSC security by detecting and predicting potential threats before they happen. We used CSC and CTI ideas and a methodical approach to assess and predict the threat. we found that CTI is useful in extracting threat information, which may be used in ML classifiers to predict the likelihood of a given danger. Thisgives the CSC organization the ability to examine the currently in place security measures andidentify new ones that may be implemented to further enhance overall cyber security.

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9. CERTIFICATES

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