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The use of ML for accurate monitoring of cyber-attacks and user acknowledgment

B. Rama Devi [1], Ch. Harsha Vardhan [2], B. Kishore Kumar [3], Dr. Y. Sesha Rao[4], D. Naga Mani[5]

[1,2,3,5] Department of Computer Science and Engineering,

[4] Department of Mechanical Engineering,

[1, 2,3,4,5] QIS College of Engineering and Technology, Ongole, Andhra Pradesh, India

[1]ramyadevi.b@qiscet.edu.in ,[2] harshavardhan.c@qiscet.edu.in, [3] kishorekumar.b@qiscet.edu.in, [4] sesharao.y@qiscet.edu.in, [5]nagamani.d@qiscet.edu.in

Corresponding Author Mail: qispublications@qiscet.edu.in

Abstract- Cyber-Attackers capture internet users and businesses in order to steal vital information. Attackers gain access to sensitive information on company computers, including login details or credit card details and bank account numbers. Phishing attacks are one type of cyber-attack in which hackers fool internet users into thinking their websites are legitimate in order to steal their non-public information. In malware attacks, attackers secretly installs a harmful Programs on company servers or user computers through internet, then proceeds to steal every piece of data stored on that server or computer. Attacks by malware are getting increasingly frequent. A network intrusion is an attack where the attacker intends to steal every resource from the network. Heuristic and visual similarity-based approach, whether blacklist or whitelist,

Keywords— Cyber-attacks, Intrusion detection system, HTTP sites, attackers.

1) INTRODUCTION

Cyber attackers seize businesses and internet users in order to access unauthorized data. Credit card details and bank account numbers are among the sensitive data that hacker's access on company computers. Cybercriminals may use phishing attacks to Internet users believe their websites are genuine, but they actually access unauthorized data. In a malware assault, a hacker install a harmful application covertly on a user's computer or a business server through the internet, then continues to steal every piece of data kept in that computer or server. Malware attacks are occurring more frequently. A network incursion is an attack where the goal is to take all network resources. Techniques based on visual resemblance and heuristics, whether blacklist or RELATEDWORKS

Several techniques are applied to detect cyber attacks

• Discovery method

- Visual Similarity Based Approach
- Machine-learning Techniques
- Signature-detection
- Anomaly-methods

Disadvantages of the current system

- Not all phishing sites are guaranteed these qualities, so they are less accurate than list-based strategies
- Once an attacker is aware of the algorithm or attributes used to identify phishing sites, he can get around the heuristic protections and steal sensitive data.

- Why it takes extra time and complexity to compare a suspicious website with the whole valid database store.
- More room for storing trustworthy picture databases.
- The low level of similarity between an animated website and a phishing website results in a high false-negative rate. When a website's backdrop is slightly altered without otherwise straying from the aesthetic appearance of a legitimate site, this strategy fails. The enormous data sets won't allow these approaches to operate effectively.

2) PROPOSED SYSTEM ARCHITECTURE

To decrease the false positives in detecting cyber-attacks, incorporate new features with machine learning algorithms. An attempt was made to find the optimal machine learning algorithms to detect cyber threats more accurately than existing methods. Five machine learning methods to distinguish between real and fraudulent websites: Decision Tree, Support Vector Machine, Random Forest, Logistic Regression, and KNN.

Advantages of the Proposed System

The suggested system is made up of a dataset that includes specific details about various cyber-attacks that are useful for attack detection and forecasting. Since the suggested method uses a variety of machine learning algorithms, the results are chosen based on their level of accuracy. Metric values are generated for each algorithm that might be thought of as anticipated outcomes. Voting Classifier, an ensemble approach, is used to compare the models and provides highly accurate error-free results.

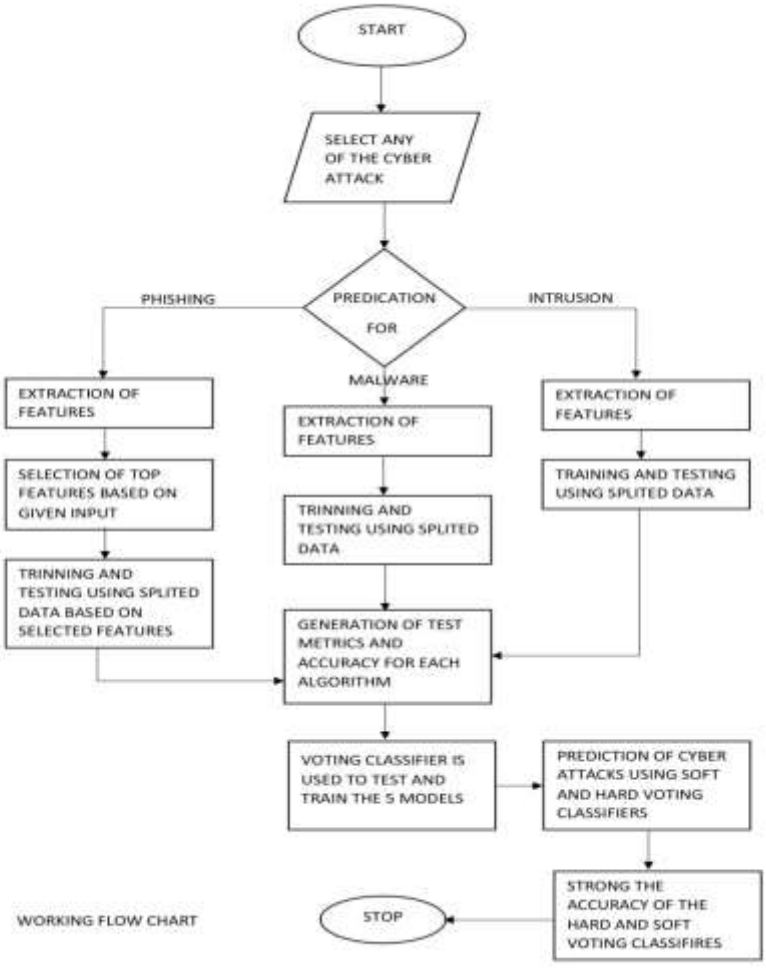

Figure 1: Flowchart

The system carries out the subsequent actions:

Step1: To start the procedure, choose one of the cyber-attacks, and it will proceed.
Step2: If the stated cyber-attack is a phishing attempt, the user must choose how many features to choose.
Step 3: The system uses a given dataset of cyber-attacks to train and test various machine learning algorithms to determine their accuracy.
Step 4: Voting classifier is currently used with 5 models to compare all models to generate certainty.

DATASET PRE-PROCESSING

Any method of machine learning that involves data pre-processing modifies or encrypts the input to make it simpler for the computer to parse. In other words, the algorithm is now able to swiftly recognize the features of the input. The term "dataset" refers to a grouping of data objects, which can also be called "records," "points," "vectors," "patterns," "occurrences," "instances," "samples," "observations," or "entities."A number of features that define data items can capture the fundamental characteristics of an entity, such as its mass or the precise instant at which an event occurred. The terms variables, characteristics, fields, attributes, or dimensions are frequently used to refer to feature. There are several The provided dataset contains a large number of features, and we will use the Feature Selection for Phishing dataset to only select the top features from the dataset. Due to the size of the datasets involved in malware detection and intrusion detection, data processing will be delayed. As a result, feature scaling is used to convert the dataset's values.

PHISHING DETECTION

Once data processing and feature selection are complete, To test and train the top features using five different types of algorithms, we take 75% of the dataset for training and 25% for testing. Algorithms generate and store accuracy and standard values.

INTRUSION & MALWARE DETECTION

Datasets are modified so that the values range from 0 to 1 due to the size of the datasets needed to detect intrusions and viruses. The Feature Scaling technique is used to accomplish this. Using 25% of the dataset for testing and 75% for training, the training and testing processes will start once the values have been converted. According to Figure 3, each of the five algorithms generates and stores accuracy and metric values.

VOTING CLASSIFIER

Testing is done using datasets using five different models and compared hard and soft voting based on probabilities.

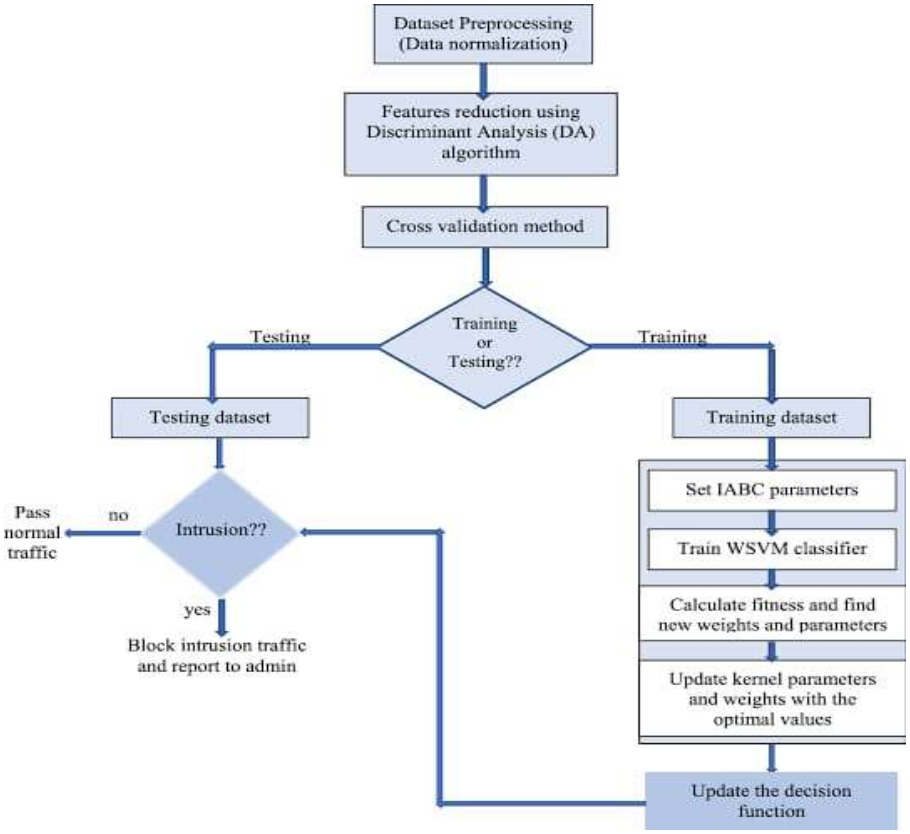

Fig. 2: Methodology of Intrusion Flowchart

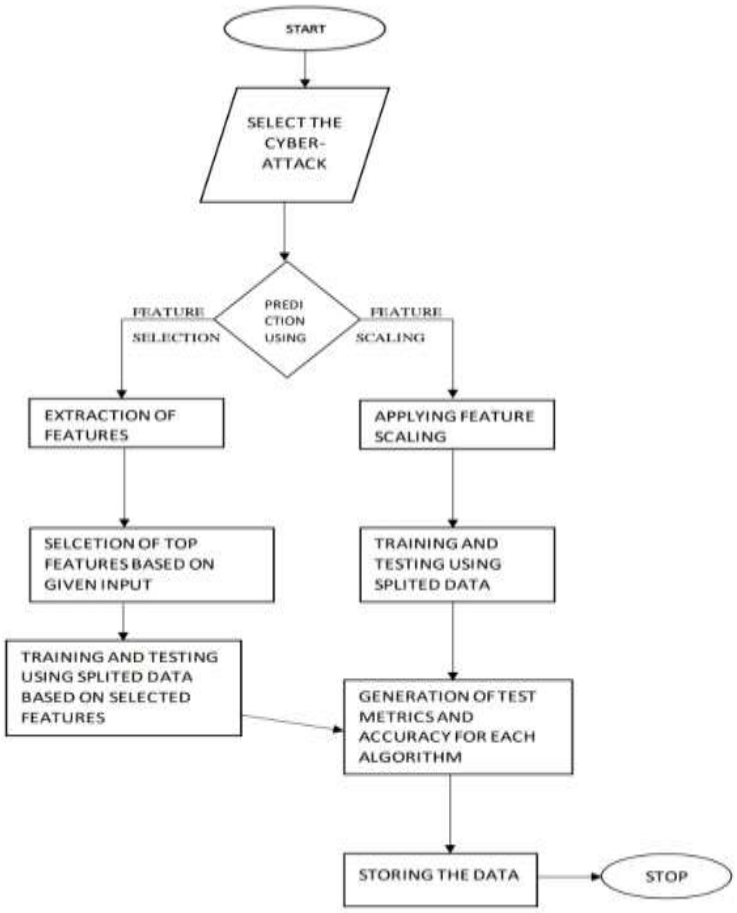

Fig. 3 Flowchart of Malware and Intrusion

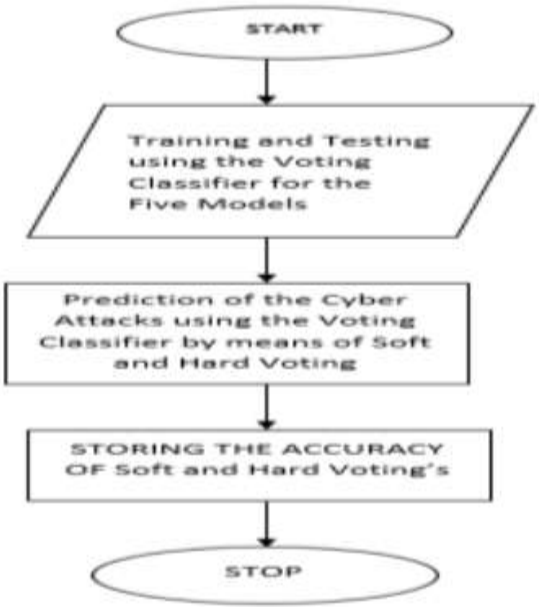

Fig.4 Flowchart of Voting Classifier

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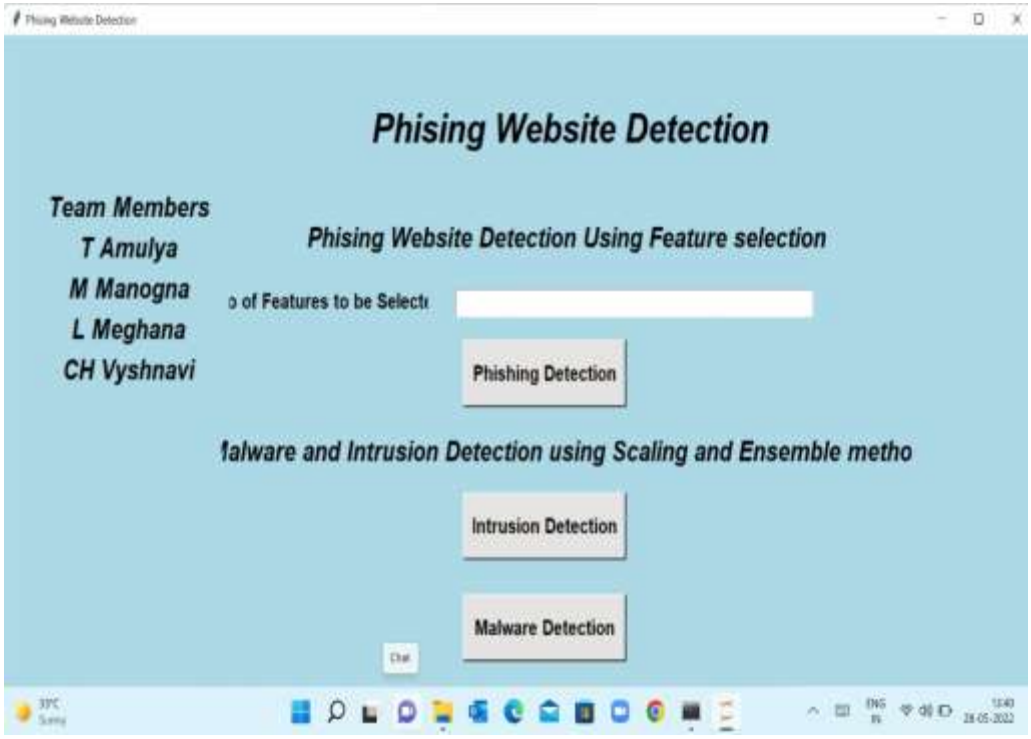
3) DISCUSSION AND RESULTS



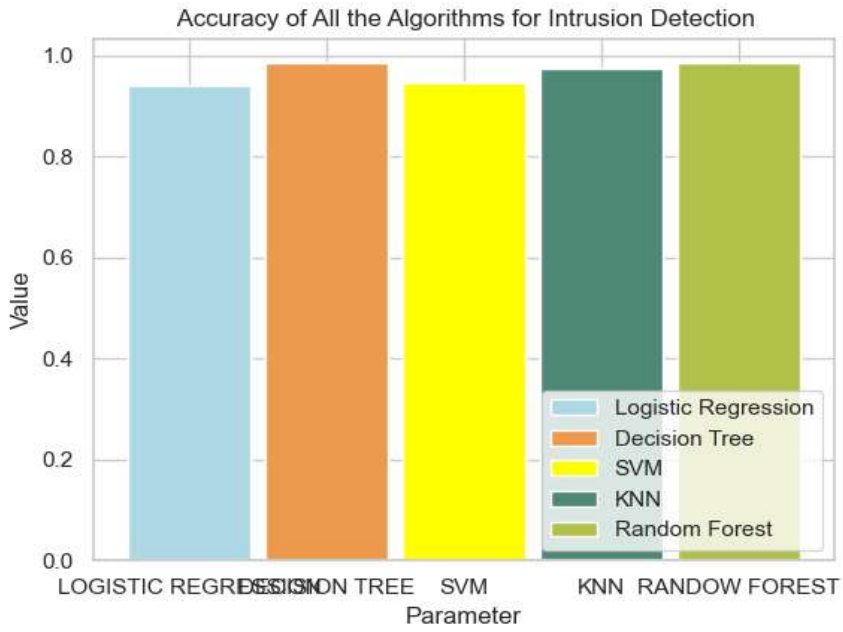


Fig.6 Average accuracy for Intrusion detection

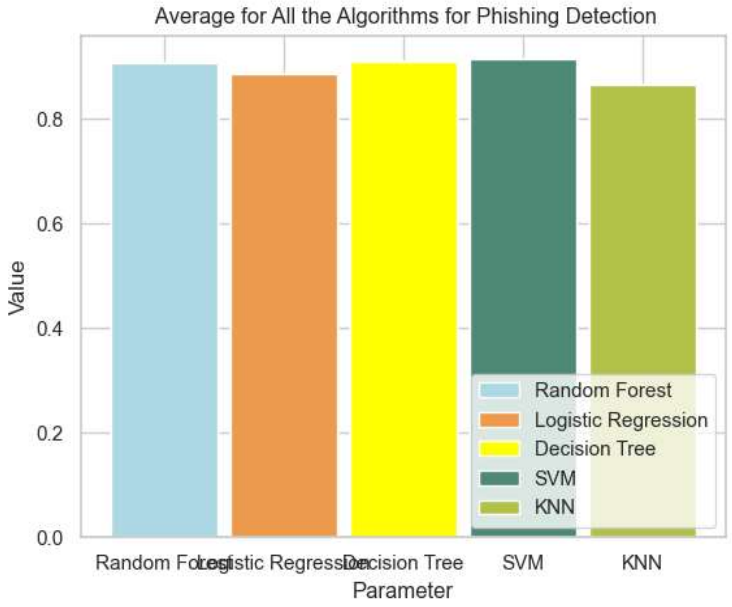


Figure. 7 Average phishing detection accuracy

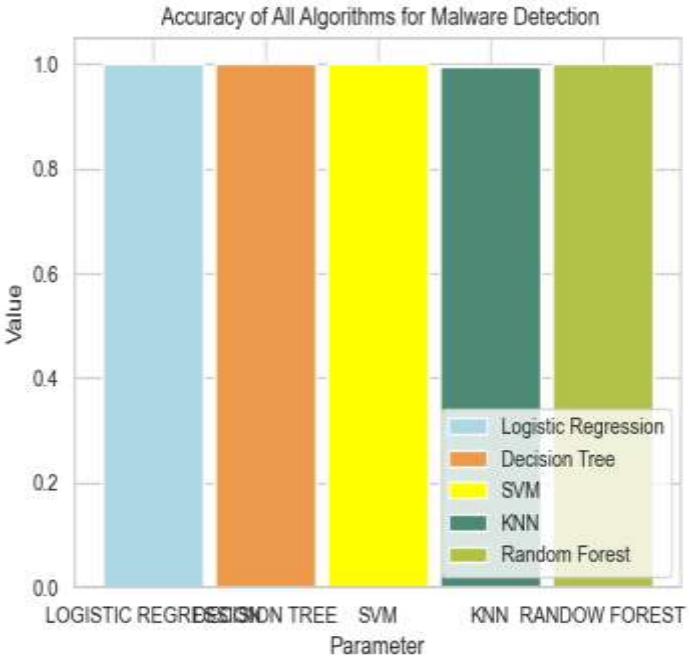
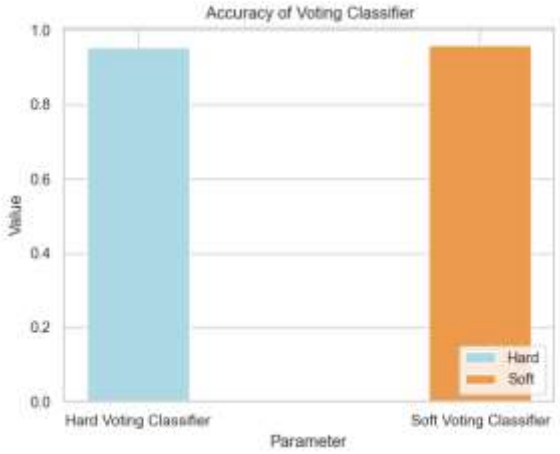


Figure. 8 Average malware detection accuracy



Voting classifier, Figure 9. Reliability of

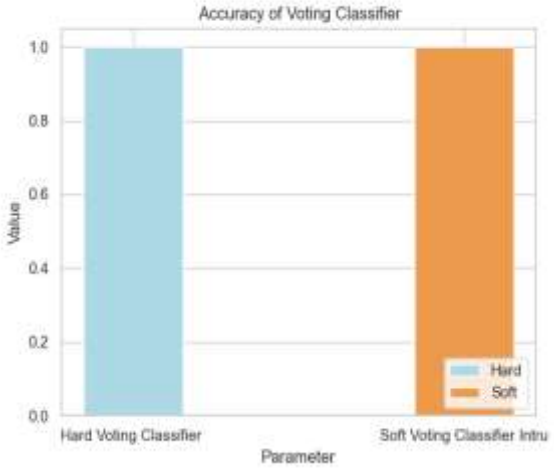
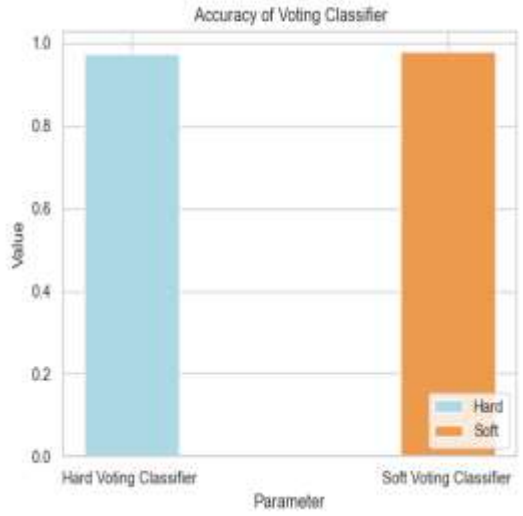


Figure. 10: Accuracy of a voting classifier for detecting phishing



Voting classifier in Figure 11. Reliability of intrusion detection

4) FUTURE SCOPE AND CONCLUSION

Cybercrime techniques such as phishing, malware, and intrusions use online services to steal people's personal information. To give the algorithm the best accuracy, the system uses phishing websites, malware detection, and the KDD dataset while applying several categorization techniques. Unsupervised machine learning algorithms identify cyber-attacks more effectively than supervised machine learning algorithms, so in the future we hope to use them to design and host websites.

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