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Detection of Internal Intruder Using Users Habit File

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ABSTRACT: Numerous computer systems utilize user IDs and passwords as the login patterns to approve users. In any case, the greater part of the general population shares their login designs with colleagues and demands them to help co-works. This makes the pattern as one of the weakest points of computer security. The principle issue of computer security is insider attack. Insider attack is one of the most troublesome attacks to be identified in the fact that firewalls and intrusion detection systems (IDSs) usually defend versus outside attacks. In an additional research, analyzing the OS-level System Calls (SCs) is helpful in detecting attackers and identifying users. Therefore, in this paper, a security framework, called Internal Intrusion Detection and Protection System (IIDPS), is intended to discover insider assaults at SC level by utilizing information mining and strategies. The IIDPS builds users habit profiles to monitor users habits and decides whether the login user is the account holder or not by contrasting the current computer usage behaviors of the user with the patterns gathered in the account holders habit profile. The contribution work is performance analysis comparison between proposed algorithm and the machine learning classifier applied for intruder detection.

KEYWORDS: Data Mining, Insider Attack, System Calls (SCs), Habit File, Users Behaviors, Intrusion Detection, SVM

I. INTRODUCTION

Information mining (learning disclosure) is the way toward joining data from alternate points of view and studying it into important information. In other words the practice of examining large pre-existing databases in order to produce new information is known as data mining. Computer systems have been widely employed to provide users with simpler and more comfortable lives. However, when people make use of powerful capabilities and processing power of computers, security has been considered as one of the major and serious problems in the computer domain since attackers very usually try to break through computer systems and behave false heartedly, e.g., nicking critical data of a company, wrecking the systems or even making the systems out of work. Generally, among all well-known attacks such as Distributed Denial-of-Service (DDoS), eavesdropping attack, and spear-phishing attack, insider attack is one of the most difficult ones to be detected because firewalls and Intrusion Detection Systems (IDSs) usually defend against outside attacks. To validate users, presently, most systems examine user ID and password as a login pattern. However, intruders may install Trojans to nick victims login patterns or issue a large scale of trials with the aid of a dictionary to acquire users passwords. When efficacious, they may then log in to the system, access users private files, or modify or destroy system settings. Although OS-level System Calls (SCs) are helpful in detecting attackers and identifying users, processing a large amount of SCs, ex-cavating malicious behaviors from them, and finding possible intruders for an intrusion are still implementing challenges. Therefore, in this paper, a security system, called Internal Intrusion Detection and Protection System (IIDPS), which finds malicious behaviors launched toward a system at SC level is designed.

II. MOTIVATION

1) To create a system that detects internal attacks and provides security against internal intrusion
2) The user's forensic features retrieved from their basic operations are helpful in detecting any malicious behaviors and tell us who the possible attackers is.

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3) The SCs generated and the SC-patterns produced by using commands so that the IIDPS can detect those malicious behaviors issued by user and then prevent the protected system from being attacked.

III. REVIEW OF LITERATURE

The paper [1] proposes a Malicious node Identification Scheme (MIS) in which the malicious node is identified and is isolated, so that the pollution on the network and the network traffic will get reduce and subsequent streaming will not be affected. In this it uses the block-based schema and it rapidly detects harmful nodes, so the system can quickly recover from pollution threat. Advantages are: Achieves much higher efficiency and very small computational latency, and also can handle of handling greater number malicious nodes, requires less time for identification. MIS can rapidly identify malicious nodes. Disadvantages are: This scheme required higher hash computations for incoming block.

In the paper [3] proposes a novel trace-back method which is effective and feasible for identifying individual or a mobile which is involve in attack. Designed a trace-back framework which can trac and find a mobile bots with IP packet. Advantages are: The method use the unique hardware number i.e. IMEI no which is use for the trace-back which
can identify every possible attacking mobile. Disadvantages are: The traceback architecture is centralized. Scalability and detection at WAP gateways these are the issues.

The paper [4] describes a security system, which is Intrusion Detection and Identification System (IDIS), which extracts the information from the log data and finds the sequences of the commands i.e. C-sequences and assembles a profile for every user in an intranet to monitor his/her usage habits. By contrasting users present information charges and every one of others already stored profiles, the IDIS can distinguish who the user is. Advantages are: Higher accuracy is achieved. Improve performance of future detection. Disadvantages are: Require faster data processing by implementing improved algorithm and distributed computing environment.

Paper [6] the main goal is to provide protection to Advanced Metering infrastructure (AMI), which is a standout amongst the most pivotal segments of Smart Grid(SG). Proposes an-other AMI IDS engineering in view of the AMI design which was presented by OPEN Meter, which is an undertaking conveyed by a few European nations to lessen hole between the best in class advancements and AMI's necessities. Advantages are: AMI's primary functionalities envelop control estimation offices, helping versatile power valuing and request side ad-ministration, giving self-mending capacity, and interfaces for different frameworks. Information speed is high as it needs to deal with an enormous measure of meter information, occasion information, summons, and so forth. Disadvantages are: The primary issue is lack of computing resources in the present smart meters.

In this paper [7] explains a strategy for reconciliation be-tween HTTP GET flooding among DDOS attacks and MapRe-duce preparing for quick attack recognition in distributing and cloud computing condition. This technique is conceivable to guarantee the continue accessibility of the objective system for exact and solid detection in view of HTTP GET flooding. Advantages are: Exact and solid identification based on HTTP GET flooding strategy. processing time of proposed strategy is shorter with expanding congestion. Proposed technique is superior to Snort discovery strategy. Disadvantages are: Required different types of pattern recognitions for identifying DDoS attack on cloud computing environment.

The [8] paper proposes new approach; here the sensors gath-ers the network parameters and send this collected information to the forecasters and the intrusion detection systems (IDSes). A multi-target controller chooses the best suited assurance strategy to recoup the system on the basis of signature of attack. Advantages: The given approach works appropriately for an extensive variety of endeavors with low overhead. The exactness of this approach is sufficiently catch to meet the requests of framework early recognition too. Disadvantages : This detection attack algorithm is time consuming.

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In paper [9] a powerful model of exhaustion threat for a distributed node is formulated. In addition, a pattern guessing scheme which is distributed is defined to efficiently identify such an threat. This schema is given for threat identification in wireless sensor networks using distributed pattern recognition scheme. Advantages are: Attack detection with lower overhead

IV. SYSTEM ARCHITECTURE

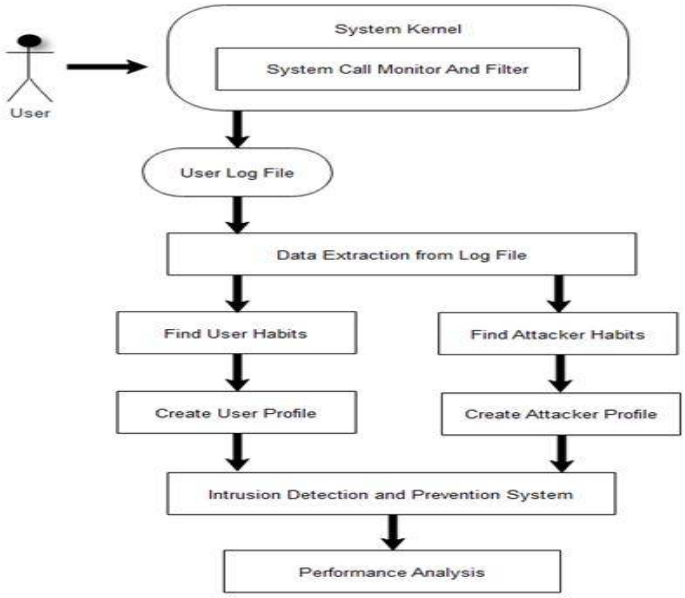

Fig. 1. System Architecture

V. SYSTEM OVERVIEW

A. System call monitoring and filtering

Here, this is the first component of the system in this it gathers the System Calls (SCs) i.e. users actions and stores the SCs in the protected system. The user entries are stored in users log file i.e., a file used to keep the SCs submitted by the user. Considering an example, when an user modifies his/her password, up to 2916 SCs will be generated by capitulating a password command to a Linux OS. Thus, it is difficult for a computer to analysis all SCs in the meantime. Subsequently, we have to sifter out some as often as possible utilized safe SCs. To discover what actual System Calls are the essential, the measurement model of term frequency-inverse document frequency (TF-IDF) is utilized to inspect the significance of caught SCs gathered in a log file. The term frequency (TF) is utilized to figure the heaviness of the recurrence of a SC generated. The inverse document frequency (IDF), measures the hugeness of ti i.e., execution time of command among all concerned user activities recorded. TF-IDF is generated by

(T F IDF)i; j = T F i; j IDF i

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B. Data Extraction from log File

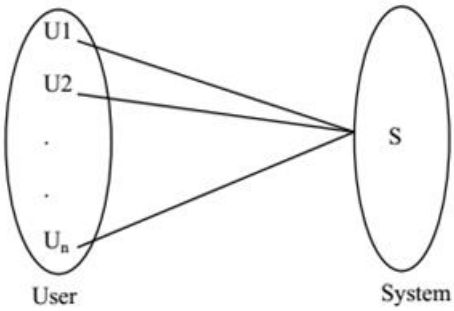
The System Calls are extracted from user log file by mining server and checks the circumstances that a SC-pattern shows up in this file and stores it in the user habit file. A habit file is a SC-pattern appearance tally that is substituted by its relating similitude weight. At that point the SC-pattern similitude weights are considered to sifter out those SC-pattens typically
utilized by all or generally users. An attack pattern or a particular format that an attacker uses or an pattern normally utilized by an attacker.

C. Intrusion Detection

Here, this component identifies an internal attacker or threat.Here the server used for detection records the SCs submitted by the underlying user u and store them in the user log file . At that point, the server tries to recognize whether user is the valid record holder or not by processing the similitude score between the newly produced SCs, denoted by NSC, in the user recent inputs (uses log file) and the usage habits, i.e. behavior patterns gathered in user profile to match the user. The current habit file NHF is established by SC Su-sliding window pair-wised. The Detection accuracy is the accuracy of finding out the users identity.

VI. MATHEMATICAL MODEL

A] Mapping Many users can use one system.



B] Set Theory

Let us consider S as a system for IIDPS Framework.

S = fs; e; X; Y; F; g

Where,

s = Start of the program.

Login into system.

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e = End of the program.

End state.

X = Input of the program.

Input given to the system is: -User Log File (User log data).

Y = Output of the program.

Results demonstrate that the intrusion detected or not.

Above mathematical model is NP Complete.

F is a set of functions

F = fF 1; F 2; F 3; F 4g

F1 = Log file generator()

F 2 = SystemCall(SCs) fopen(); close(); read(); write(); update(); F2 = Generate User Habit or Profile()

F3 = Intruder Detection()

= Failures and Success condition.

VII. ALGORITHMS

Input Input given to the system is:User Log File (User log data).

Output Results demonstrate that the intrusion detected or not

1) Start
2) First we identify the representative SC-patterns for a user.
3) After find the habitual SC pattern from user log files. We used specific algorithm for filtering most commonly used SC-patterns.
4) Create the user profile using habitual data
5) Distinguish the user and attacker profile (By identifying a users SC-patterns as his/her PC utilization habits from the users present information SCs, the IIDPS opposes suspected attackers).
6) Finally results demonstrate that the intrusion detected or not.
7) Stop

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A. SVM Support Vector Machines

A support vector machines are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis

1) Start

2) SVMs maximize the margin around the separating hyperplane.

Assume linear separability for now: in 2 dimensions, can separate by a line in higher dimensions, need hyperplanes

Can find separating hyperplane by linear programming (e.g. perceptron):

separator can be expressed as ax + by = c

3) Step2: The decision function is fully specified by a subset of training samples, the support vectors.

4) Step3: Quadratic programming problem

5) Step4: Text classification method

6) Stop

VIII. EXPERIMENTAL RESULT

In this System, to monitor all SCs at the meantime, especially when numerous users are running their programs. As a result, require to filter out through some regularly utilized safe SCs. In the data recovery area, the connection between a term and a document frequency calculated for intruder detection.To verify the feasibility and accuracy of the IIDPS, two experiments were performed. The first studied the accuracy for the intruder detection in IIDPS system. The second defined the response time to detect intruder in IIDPS System. The comparison graph shown below: computer usage habits from the users current input SCs, the IIDPS resists suspected intruders. The performance analyzing between proposed algorithm with SVM machine learning classifier for intrusion detection system.

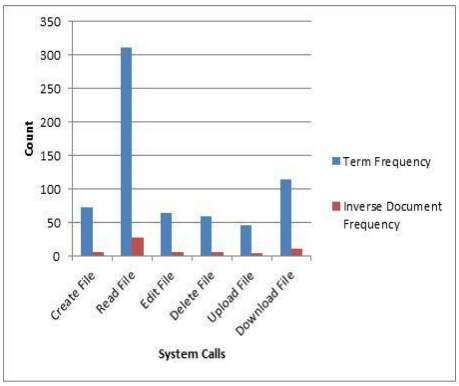

Fig. 2. TF-IDF of System Calls

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TABLE I
TABLE NAME (TF-IDF)

System Calls	Term Frequency (TF)	Inverse Document Frequency (IDF)
Create	72	6.54
Read	313	28.36
Edit	65	5.9
Delete	59	5.36
Upload	46	4.18
Download	114	10.36

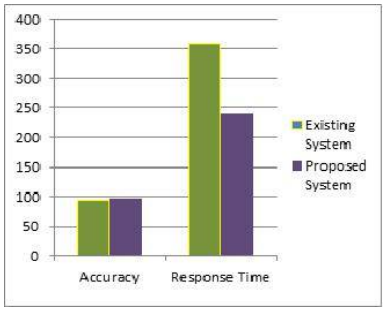

Fig. 3. Accuracy

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12. In this paper, an approach that utilizes data mining and forensic techniques to identify the representative SC-patterns for a user is proposed. The time that a frequent SC- pattern appears in the users log file is counted, the most frequently used SC-patterns are filtered out, and then a users profile is established. By identifying a users SC-patterns as his/her