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Research paper

SURVEY ON AIS BASED COMPUTER SECURITY SYSTEM

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Abstract

Now days due to increase in computerized system of every .Artificial intelligence is gaining popularity in wide area of technology ،emerging in computer security field the artificial intelligence is ،In recent days .security of any computer system is a big concern ،field It is .In the last few years artificial immune system has been applied in various fields .which evolves the computer security in a new way Artificial .especially in computer's security domain ،a very effective technology to detect anomalous behaviour in the computer system which grab the attention of researchers to solve various problems in Information Security ،inspired model-Immune System is a new bio A survey on current existing security .issues in security field The unique feature of AIS is very promising to solve various .field .technique based on Artificial Immune System is presented in this paper

Keywords: *Artificial Immune System(AIS), Danger Theory, Negative Selection Algorithm*

1 Introduction:

The immunity mechanism in human body is a very much complicated, adaptive, robust, system that shields the every human body from outer elements. This can classify each and every cells in the human body as self-cells and non-self cells. The protection system accomplish this job using a number of distributed agents, which are intelligent enough to take action locally or globally using its network which is built of chemical messengers for communicate with each other. The immune system is actually two types. One is innate immunity which is an older immune strategy and unchanging mechanism that identifies and perishes certain organisms. Another one is adaptive immunity which takes action against completely new outer cells and builds a protection against them which stays in the human body for life time. This outstanding capability of biological immune system to process information has gain the focus of researcher in computer science field in recent years. A brilliant idea for artificial intelligence technique, inspired from human immunology, became very popular, called Artificial Immune Systems. A few numbers of ideas from the human immunity system has been adapted and applied to solve critical science and engineering problems. Here an overview of biological immune system methodologies that are adapted into existing Artificial Immune Systems methods has been presented. Here we will show how we can solve a real-world problem using the methodology based on Artificial Immune System. Although artificial immune system is still evolving. It is not fully evolved yet.

2. HISTORY

In recent days Artificial Immune System became very much .It is very promising to solve various kind of problem .popular information security researchers are paying more ،Especially attention on AIS to build computer security system or intrusion It is not yet applied .Still AIS is under research .system detection .in all real time systems

The AIS is first introduced by Farmer in his article in 1980, after that by Packard and Perelson in their article in 1986, after that by Bersini and Varela in 1990 on immune networks. Forrest et al. and Kephart et al. published their first papers on AIS in 1994. Forrest published paper on negative selection algorithm.

.the AIS became much more popular ،2000Around the year of ate immune new ideas like danger theory and inn ،Currently All of these ideas are still under .system are being explored Dasgupta and 2008In .These are not yet fully evolved .research They .Nino published a book on artificial immune system date -ot-date work in this area and all the up-to-presented all the up .[11]application of artificial immune system

3. RELATED WORK:

Different researcher uses different approach to implement security Basically there are .system based on Artificial Immune System -Non-Self One way is .two fundamental ways to implement AIS Self discrimination and another way is application of Danger .Theory

3.1 NEGATIVE SELECTION MECHANISM

Self discrimination Mechanism is one of the key -non-The Self This is accomplished by .features of human immune system The main purpose of this .thmNegative Selection algori After producing .self cells-non-mechanism is to discriminate self Cells are sent to thymus for the maturation -all the T ،cells-the T cells get -cells which reacts to self-In the thymus all the T .process cells leaves the -e which don't react to selfdestroyed and only thos After that all the matured .Cells-thymus and these are the mature T Cells are being circulated throughout the whole body to give -T .protection against foreign invaders

then the ،antigen If any antibody got detected similar to any

.Cell clones itself and generates more antibodies-corresponding B .This process happens almost all the time and rapidly in the body
Gerry Dozier and ،Justin Zhan ،Nicholas Koceja ،Xing Fang ct phishing mail Dasgupta Dipankar proposed a technique to dete They used negative selection algorithm to detect Phishing .[1] every single ،According to their proposed method .mails The detectors will .meaningful word in an email is treated as token the tokens be generated based upon the number of appearance of If in an email the number of .in the email subject and body appearance of the token is high then the probability of that email .being a phishing mail is higher
Lu Hong proposed an immune learning algorithm which is a The main aim of this .[2]ithmscombination of three algor algorithm is taking the features of real valued negative selection and a classification algorithm and combining (RNSA)algorithm The real valued negative selection algorithm is used to .them sification algorithm will be The clas .self samples-produce non In . .self-used to find the characteristic function of the self or non the researcher proposed how real valued negative ،this paper The main .selection algorithm can be utilized to detect anomaly the limit point between normal and aim of this approach is to find As per the above mentioned approach first use .abnormal classes .self samples-the RNS algorithm to produce random distinct non After that using a classification algorithm identify a characteristic .self string-non function of the self or
Pagkalos I proposed a ، .Ilioudis C ، .Pangalos G ،.Samaras A conceptual design approach of bio inspired artificial immune They analyse the negative selection mechanism which .[7]system also discuss They .is the basic mechanism used to implement AIS The basic principle of Negative .about how to improve this design .self string-Selection mechanism is discriminating self and non One threshold∈This .is previously determined for all detectors Small .is value indicates how much similar the two pattern∈value means small differences while large∈value means similarity The algorithm will generate .between two patterns is high self string so that it can recognize the -detectors similar to the non .foreign invader and get attached with them

3.2 DANGER THEORY

It is known as .a new idea became very popular ،In recent years This theory .and it is proposed by Matzinger ،the Danger Theory ،Though it is not fully completed yet .has a number of advantages potential to grab but its key features and ideas has enough .attention of the researches
.The main idea of danger theory is to react against danger only .Actually all the foreign cells are not harmful to human body Whenever a harmful cell enters in the .Some are harmless to body cells in the surrounding of the foreign cell -self body then all the Then the immune system takes action against .raise danger signal self cell is -non-So only discriminating the self .the danger signal cell also could bring -Sometime some self .not always effective But whenever the state of body got changed into .e bodyharm to th doesn't ،an abnormal state then the danger signal will generate Then the immune system will take action .matter who is the cause .to bring back the stable state of the body
Mao Bo preferred Danger theory ،oLi Ta ،Liang Yiwen ،Yang He They proposed how .[4]to implement Artificial Immune System One mathematical .to calculate or measure the Danger signal approach using differential calculus has been proposed to measure ad been published before this All the papers h .the danger signal paper didn't give any effective solution to measure the Danger .But the Danger signal is the heart of Danger theory .signal Whenever an abnormal changes happen in the system then the computer has a Each and every .danger signal get generated If any .In this state the computer is fully balanced .normal state harmful thing happens then the systems balanced will be In .compromised and the normal working flow will be disrupt alculate mathematics differential calculus is used to analyse or c This method is known as Digital Differential .any changes .Calculus
Azween Abdullah ،Muna Elsadig ،Brahim Belhaouari Samir proposed a method to prevent intrusion in system which is based According to the .[5]on the Danger theory of immunology there is an immune system which has ،ioned approachment linear classification algorithm will be -multiple agents and non In this approach .used to detect abnormal behaviour of network using a method which is a ،multi agent based system ،they used Nearest algorithm -K-Cluster ،dric cell algorithmmixture of Den which provides a highly ،mean and the Gausian algorithm-and K .exact security system which can perform classification faster There are different intelligent agents which replicate the distinct s of immune system and protect system from harmful functionalitie .activities in network and help the system to heal by itself
Ou proposed an IDS based on Danger .R.Ming Ou and C-Chung In this proposal they used the .[6]Theory in immunology Antigens are .human immunology mechanism of dendritic cell in represented as system call and behaviours are represented as one is DC ،In this method there are two detection agent .signal Each agent .agents for signal and AG agents for antigens .e Danger Valuecooperates with each other to calculate th action against malicious behaviours is ،According to DVs activated by either the machine itself or Security Operating self string get detected in system then -Whenever a non .Centre each DC agent get alert message from corresponding Antigen When an Ag agent issues an alert message then the .agent corresponding DC agent analyse the message to calculate the danger value to determine whether the system is really under .danger or not
Liu Changdong proposed a ،Li Tao ،Yang He ،Liang Yiwen based on Artificial ،method to detect malicious software dynamic malicious software brings ،The main idea is .[9]Immune System changes in system and danger alert will be generated whenever By monitoring the .there is an abnormal change in the system system and using the principle of mathematical changes in the a system for malicious software detection ،differential calculus inspired by differential coefficient has been presented in this This methodology explains most of the immune . .paper Since .ceptions are still therethough some ex ،phenomena ،differential coefficient is used to describe mathematical changes in this paper the researcher proposed an ideology called DDC to describe any changes occurred (Digital Differential Coefficient) .in a computer system
Soo Kim researcher -Chang ،Yusuf Kurniawan ،g RamadhanGilan Many .[10]discussed about how to prevent DDOS attack researcher has done many research on DDOS attack and proposed Dendritic Cell .many method to detect and prevent it ortant method to detect DOSone of the most imp (DCA)Algorithm DCA belongs artificial immune system algorithm to detect .attack anomaly inspired by Danger
They proposed a design to track out DDOS attack using .Theory The main goal of Dendritic Cell .Dendritic Cell Algorithm solve different type of network intrusion detection Algorithm is to This algorithm gives a very positive result and also helps .problem The most and major .to reduce number of false positive signal way -3problems of TCP connection is the incompletion of open connection the server -In case of half .Phandshaking in TC server /So whenever a host .waits for the client's acknowledgement in other ،handshake-way-will face a huge number of half three server that /a huge no of ACK packet waiting in the host ،word According .nd danger signal will be generatedmeans it is danger a .to the danger signal the immune system will response

4. Conclusion:

Day by day computer or computer aided system and Internet is information security became a big ،So .increasing in large amount the ،Due to unique features of AIS .concern in today's world

researchers gave more attention to implementation of AIS in Though AIS is a very promising .ion security fieldinformat .but still it is not fully evolve yet ،method to solve many problem Many researchers are still working on AIS and implementation of Different .There is no fixed algorithm to implement AIS .AIS sed different technique or algorithm to build up researcher u .security system based on Artificial Immune System

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