ISSN:2229-6107

INTERNATIONAL JOURNAL OF
PURE AND APPLIED SCIENCE & TECHNOLOGY

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www.ijpast.in

INTERNATIONAL JOURNAL OF PURE AND APPLIED SCIENCE & TECHNOLOGY
IJPAST

ISSN 2229-6107
www.ijpast.in
Vol 8,Issue 4.Oct 2018

The Role of Artificial Intelligence in Cyber- security

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Abstract

Perhaps the field that stands to gain the most from artificial intelligence (AI) is cyber-security. Artificial intelligence can be used to replace slow and inadequate conventional security systems. Strategies can enhance their overall security performance and offer stronger defense against a growing variety of complex cyber threats. In addition to the many benefits AI is said to bring to cyber security, there are legitimate risks and concerns associated with its use. Since neither people nor AI alone have shown general success in this field, a comprehensive understanding of organisations' cyber environments combining human knowledge with AI is necessary to further advance the maturity of cyber security. Therefore, using AI technology in a socially acceptable manner will be crucial to reducing associated dangers and concerns.

Keywords: Cyber- security, artificial intelligence (AI), security intelligence, Integrated Security Approach (ISA), cyber kill chain

Introduction

Everyone is in danger of a cyber attack. As indicated by Myriam Dunn Cavelty (2018),network protection "… alludes to the arrangement of exercises and measures, specialized and non-specialized,expected to safeguard the 'genuine geology' of the internet yet in addition gadgets, programming, and thedata they contain and impart, from every conceivable danger" (Cavelty 2010). Asinnovation propels consistently, cybercriminals are turning out to be more complex and getting in front of current network safety controls. To stretch out beyond cybercriminals, specialists arestarting to utilize Man-made consciousness (simulated intelligence) to counter new cyberattacks (Harel, Lady, and Elovici, (2017). Artificial intelligence is a discipline in software engineering that utilizes complex numerical calculations tocopy human reasoning (Lidestri 2018). The term Man-made brainpower was proposed in 1956 byJohn McCarthy and different specialists. The most vital phases in computer-based intelligence accomplished games like the checkersgame that had the option to learn through preparing. The game was fit for playing better compared to anormal player. As it was the finish of the first ten years for artificial intelligence, the accomplishment was an extraordinary move towardadvanced figuring. The issue was how to apply simulated intelligence to take care of genuine issues. Thespecialists missed the mark on an immense

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measure of information which kept them from understanding theissues (Tecuci, 2011). Albeit genuine simulated intelligence has not been accomplished at this point, it has developed at a quickerpace and has altered different fields and enterprises including auto, medication, andcosmology. The expanded interest in stopping cyberattacks prompted the utilization of simulated intelligence-basedprocedures in network protection.Simulated intelligence has numerous branches or subsets. One simulated intelligence-based strategy is AI (ML).AI is a subset of simulated intelligence that shows machines how to decide (Feizollah,Anuar, Salleh, Amalina, and Shamshirband 2013). The development of ML has helped scientists toRunning head: THE Advantages OF Man-made brainpower IN Network Safety 4foster methods to recognize growths, and upgrade network safety procedures to distinguish malware innetworks and phishing messages.One more part of computer-based intelligence is Profound Learning (DL) which scientists depict as a sort of MLthat performs design acknowledgment and forecasts (Polson, 2017). DL is equipped for dealing with humongous datasets. This permits its application in an enormous exhibit of fields like picturedelivery, securities exchange expectation, and farming. DL further develops areas of network protection, for example,interruption location and botnet identification because of the great handling power that it needs to look atinformation and gain as a matter of fact.The objective of this paper is to educate perusers about the conceivable outcomes regarding involving artificial intelligence in network safety by showing both the advantagesand the dangers. Network safety specialists are utilizing ML,what's more, DL to take care of issues in the space of Botnet Identification, and Interruption Discovery andAnticipation Frameworks (IDPS). Nonetheless, the combination of artificial intelligence-based advancements in associationsmay have suggestions that network protection specialists need to address to guarantee digital security. Computer-based intelligencemay likewise affect innovation customers who are utilizing gadgets that, somehow, werepreviously utilizing the innovation.Network safety issues that man-made intelligence can tacklewith mechanical progressions in the internet and network protection deals with new issues.A few issues have existed for quite a long time however network protection specialists need to track down better approaches tosafeguard networks from existing issues. Two of the current issues are botnets, which are utilized to send off Dispersed Disavowal of Administration (DDoS) assaults, and IDPS which produce huge quantities ofphony problems that occupy network safety specialists from tracking down genuine dangers.A botnet is an organization of PCs and different gadgets which are alluded to as bots.PCs that are essential for a botnet interface with it by malware disease. After the disease in Running head: THE Advantages OF Man-made Reasoning IN Network protection 5sent off, a "botmaster" sends orders to the bots using an organization channel. Generally, thebotmaster encodes the channel to keep away from identification. The botmaster utilizes an Order and a Control(C&C) server to push orders and fixes. Botnets assume a significant part in DDoS assaults.the bigger the botnet, the more viable the DDoS assault will be. Furthermore, botnets are also utilized for wholesale fraud and taking information (Mathur, Raheja, and Ahlawat 2018). In 2016, the Mirain malware contaminated Web of Things (IoT) gadgets and created a botnet that was associated with around 500,000 IoT gadgets. The botnet was utilized to release pulverizing DDoSassaults on locales and administrations (De Donno, Dragoni, Giaretta, and Spognardi 2018).

Moreover,Mirai malware is open-source, and that implies that other cybercriminals may add new highlights tothe malware, and make new varieties of Mirai. Simulated intelligence can distinguish botnets insidenetworks. The recognition of botnets will assist with forestalling the contamination of additional gadgets and stopDDoS assaults, and information spillage.An IDPS is an innovation that organization and framework directors use to distinguish interruptions.After the IDPS recognizes interruption, the approved chairmen might get email alarms. Thisinnovation identifies interruptions as well as forestalls interruptions when an aggressor attempts to acquireunapproved admittance to an organization (Whitman and Mattord 2017). To accomplish a higher securitylevel, network directors need to appropriately design IDPS instruments. Engineers have madeequipment and programming-based Interruption Discovery and Anticipation Frameworks. Networkheads might introduce a framework on a host, which they call Host-based IDPS, or on thenetwork, which they allude to as Organize-based IDPS. One of the principal issues is setting up and

designing an IDPS is tedious because a standard setup doesn't exist.Network traffic contrasts associations. Because of that, IDPSs produce an enormous number of misleading cautionsRunning head: THE Advantages OF Computerized reasoning IN Network safety 6or on the other hand "misleading up-sides." With simulated intelligence, network protection, and organization managers desire to sift through bogusalerts and increment identifications rate.Interruption Identification and Interruption CounteractionIDPS frameworks come in two classes. Interruption Identification Framework (IDS), and InterruptionAnticipation Framework (IPS). As of now, IDPS innovation depends on Mark put together and concerning Abnormality-based frameworks. Signature-put-together identification frameworks depend on information basedon known dangersto recognize interruptions. Signature-based frameworks inspect approaching parcels recover themarks from network parcels and think about them against the information base. On the off chance that there is a match, theframework accepts that an interruption has been identified. It is a compelling technique to recognize interruptionsthat have been recently identified, however, one of the serious issues is that it just neutralizesdangers that it knows (Jean-Philippe 2018). For instance, after the Mirai botnet spread, designersmade patches to safeguard IoT gadgets from malware. Simultaneously, a mark wasrecognized for Mira. On the off chance that an assailant endeavors to taint a fixed IoT gadget, the mark-based framework will forestall it. Nonetheless, a mark-based framework can't distinguish a variety of Miraisince the mark varies from the data set.Then again, there are abnormality-based identification frameworks. Not at all like mark-based location frameworks, irregularity-based discovery frameworks signal interruptions or endeavors by evaluatingthe conduct in an organization. For instance, if a new malware advances into an organization, thesignature-based discovery framework wouldn't classify that malware as real though the oddity-based identification framework will dissect its way of behaving and decide if it is a danger.Identifying dangers as a result of the way of behaving instead of by the marks demonstrates that the abnormality-based identification framework is more effective because it doesn't require past dataabout the approaching danger. To recognize new dangers, specialists and directors need to

Running head: THE Advantages OF Man-made Brainpower in Network Protection 7make conventions inside the framework that will work as validators. Those conventions decidewhat typical or authentic organization traffic looks like (Jose, Malathi, Reddy, and Jayaseeli 2018).The inconsistency put together frameworks dependsonthe human connection to have new guidelines. They can't view it as a danger on the off chance that the standard that distinguishes it doesn't exist.

AI Approach as cybercriminals become more complex, network protection specialists need more moderndevices and methods to have the option to safeguard their organizations. ML-based IDPS might improve guardsalso, simultaneously lessen misleading up-sides. There are six distinct kinds of AIstrategies, and everyone has novel attributes and values that network safety specialists maybenefit from. As per Ruth Jean-Philippe (2018), all ML strategies are not the same, in this way,analysts need to give the right information to the ML-based framework to attempt to its fullest.Among the six ML strategies, two of them are remarkable for network protection.The principal technique is Counterfeit Brain Organizations (ANN). ANNs are hubs that mimic thehuman cerebrum. This technique utilizes handling hubs or neurons that associate with one another, andinterface with a secret layer (Jean-Phillipe, 2018). As per Jean-Philippe's examination, ANNs are

fit for perceiving designs that are extremely mind-boggling for people to perceive. Additionally, ANNs areready to perceive uncertain examples. The use of ANN in IDPS improves networksecurity. Cybercriminals have figured out how to sidestep security controls. They are fit for sendingassaults that don't set off cautions in the framework which makes their recognition a harder errand foronline protection specialists. For instance, if cybercriminals play out a port sweep, inactively, this impersonatesa genuine association to identify open ports. In any case, ANN would be prepared to recognize whether an association is genuine and when it ought to set off a security alert due to the

Running head: THE Advantages OF Man-made Reasoning IN Network Safety 8association designs. Typically, latent outputs start an association and afterward,close them before theassociation arrives at the end and things would be identified as pernicious.The second ML technique is Hereditary Calculation (GA). GA recognizes dangers by gaining fromexperience given to past inconsistency conduct. Like the human cerebrum, that's what people knowfire is hazardous as a result of the experience of precursors. GA is valuable in recognizing normal dangerswith normal examples. Thus, GA utilizes past examples to settle on choices on new examples thatthe framework can't perceive (Jean-Phillipe, 2018). Applying this technique to ML-based IDPSframeworks, analysts would have the option to increment identification rates for new oddities. For instance, ifransomware figures out how to enter the firewall, using email or other vector, when it plans tospread and encode records, the ML-based IDPS utilizing GA will identify it and forestall the encryptionof an enormous bunch of gadgets across the organization.Not at all like mark-based frameworks, ML-based frameworks don't require data sets with marks(Jean-Philippe, 2018). Taking care of directed AI calculations with a dataset that contains data about what typical organization traffic ought to resemble and giving awhitelist that the ML-based IDPS will use to recognize dangers. The ML-based IDPS framework cango with choices against various new examples. Normal IDPSs don't have these abilities asthey depend on past arrangements to safeguard organizations.

I. Literature Review

The weaknesses of artificial intelligence present serious impediments to further developing cyber- security incredible potential. New testing techniques ready to catchwith the absence of straightforwardness of computer-based intelligence frameworks, and the misleading natureof digital assaults focusing on them, are essential to survivethese cutoff points. Drives to characterize new principles and confirmationmethodologies to evaluate the vigor of man-made intelligence frameworks are arising ona worldwide scale.The Worldwide Association for Normalization (ISO) haslaid out a board of trustees (ISO/IEC JTC 1/SC 42) to explicitly workon computer-based intelligence guidelines. One of these guidelines (ISO/IEC NP TR 24029-1)concerns the appraisal of the heartiness of brain organizations.In the US, the Guard Progressed Exploration Activities Organization(DARPA) sent off 2019 another examination program, calledEnsuring Artificial Intelligence Strength against Trickiness, to cultivate theplan and advancement of more strong computer-based intelligence applications. In thesame vein, the 2019 US chief request on artificial intelligence commanded the improvement of public guidelines for solid, vigorous, and reliableComputer-based intelligence frameworks. What's more, in May 2019, the US Division of Business'Public Establishment of Guidelines and Innovation gave a formaldemand for remarks fully intent on characterizing these guidelines bythe finish of 2019.

China is additionally an effective financial planning asset to cultivate norms for strong man-made intelligence.Following the technique depicted in the New Age FakeKnowledge Advancement Plan, in 2019 the China HardwareNormalization Organization laid out three working gatherings: 'Artificial Intelligence andOpenSource', 'ArtificialIntelligence Normalization Framework in China', and 'Artificial Intelligence and Socialmorals'. They are likewise expected to distribute their rules toward the endof 2019.The European Association (EU) may show others how itdid the global endeavors to foster affirmations and norms for online protection because the 2017 Network Safety Structure and the 2019Network Safety Act laid out the foundation to make andauthorize network protection guidelines and accreditation systems forcomputerized advancements and administrations accessible on the EU market. Specifically, the Online Protection Act orders the EU Office for Organizationalso, Data Security (ENISA) to work with part states tosettle network protection accreditation structures. Strangely, a setof predefined objectives will shape ENISA work in this area23. They alludeto weaknesses recognizable proof and divulgence, access and controlof information, particularly delicate or individual information, yet none of the predefined objectives refers to computer-based intelligence. However, ENISA must concentrateadditionally on simulated intelligence frameworks, generally, the affirmation system will best just to some extent work on the security of computerized innovations andadministrations accessible on the EU market.

Data Flair
AI in CyberSecurity
Faster Detection
Phishing Detection
Behavioural Analytics
Network Security
Secure Authentication
Preventing Online Frauds

Fig 1: AI in Cyber- security.

The previously mentioned drives are still inthe early stages, so it is right on time to survey their viability. Be that as it may, they all offer something very similarobjective, for they all try to evoke human confidence in artificial intelligence frameworks. Trust is asignificant component of the US chief request on man-made intelligence and the EuropeanCommission's Online Protection Act and a central one of the EuropeanCommission's rules for AI24. Trust is additionally focal in the 2017IEEE report on the improvement of principles for simulated intelligence in cyber-security25. Clients' confidence in innovation is essential to cultivate adoption26.Notwithstanding, characterizing and creating guidelines and affirmation strategies fully intent on creating reliable computer-based intelligence in network protectionis reasonably deceptive, and may prompt extreme security chances.Philosophical investigations qualify trust as the choice to designatean undertaking, with no type of control or management over the way thetask is executed13. Effective occasions of trust lay on a suitable appraisal of the reliability of the specialist to which thetask is appointed (the legal administrator). Dependability is both a forecastabout the likelihood that the legal administrator will act true to form, giventhe legal administrator's previous way of behaving and a proportion of the gamble run by thetrustor, should the legal administrator act in an unexpected way. At the point when the likelihood that the normal conduct will happen is either excessively low or notassessable, the gamble is excessively high and trust is ridiculous. This is thecase with trust in computer-based intelligence frameworks for online protection. The absence of straightforwardness and the learning skills of man-made intelligence frameworks, as well as the natureof assaults to these frameworks, make it hard to assess whether thesame framework will keep on acting true to form in some random setting. Records of past ways ofbehaving of computer-based intelligence frameworks are neither prescientof the frameworks' power to future assaults, nor are they a sign that the framework has not been defiled by a lethargic assault(for instance, has a secondary passage) or by an assault that has not yet beendistinguished. This disables the evaluation of dependability. Also, aslong as the appraisal of dependability stays hazardous,trust in man-made intelligence applications for network safety is unjustifiable. This isn'tto say that we shouldn't designate 3R assignments to artificial intelligence, particularly when man-made intelligenceNature Machine Insight | VOL 1 | December 2019 | 557-560 | www.nature.com/natmachintell 558NATUrE MAcHInE Insight Viewpointends up being ready to perform them effectively and strongly. Onthe opposite, the designation can and ought to in any case happen. Nonetheless, sometypes of controls are important to moderate the dangers connected to theabsence of straightforwardness of computer-based intelligence frameworks and the absence of consistency oftheir heartiness. Strategy procedures trying to evoke clients' trust neglect toaddress this significant issue.

II. Future Scope

Even thoughcomputer-based intelligence brings many advantages, the coordination of man-made intelligence in a workplace can bringgambles that are more complicated. "...the situation with two sides is that while man-made intelligence frameworks can help safeguard.Running head: THE Advantages OF Man-made consciousness IN Online protection 14against cyberattacks, they likewise present new focuses for programmers, possibly representing variousnew network safety weaknesses for people and organizations," Zielezienski said (Chordas,2017). People are adversely affected also. Solid safety efforts by ordinary clientsmake them more powerless against assaults. Frequently, clients don't know about the security gambles that they face while utilizing new advances (Chordas, 2017). Customary clients frequently miss security patches fortheir gadgets. They will more often than not use and run applications without patches. Thus, unpatchedapplications run behind the scenes and more often than not customary clients don't utilize them.With the far and wide utilization of simulated intelligence, data about man-made intelligence become effectively open to anybody.Some books show you how to program artificial intelligence. Miles Brundage, Shahar Avin, Jack Clark,Helen Toner, Peter Eckersley, Ben Garfinkel, and different creators, including Hyrum Andersonguarantee that:Endeavors to forestall pernicious purposes exclusively through restricting computer-based intelligence code expansion are far-fetchedto succeed completely, both due to not exactly amazing consistency and because adequatelyroused and well-resourced entertainers can utilize undercover work to get such code. Notwithstanding, therisk from less skilled entertainers utilizing man-made intelligence can probably be decreased through a mix ofintercessions pointed toward making frameworks safer, mindfully unveiling advancementsthat could be abused, and expanding danger mindfulness among policymakers (p. 59).The foundation of guidelines to diminish the inescapable utilization of computer-based intelligence code is a complextask for policymakers. As creative cybercriminals figure out how to utilize artificial intelligence noxiously, theyturn into a more predominant danger.In 2016, the Safeguard Progressed Exploration Ventures Office (DARPA) did a "bug-hunting contest. The opposition included Catch the Banner (CTF) games. CTF challengesRunning head: THE Advantages OF Man-made reasoning IN Network safety 15 are valuable in the programmer's local area since it permits them to learn new strategies. During therivalry, seven groups utilized robotized simulated intelligence devices that recognized inward blemishes and fixed them.

From that point forward, the Massachusetts Foundation of Innovation (MIT) specialists have utilized simulated intelligence to identifydangers and caution security experts to act (Wilner, 2018). The dynamic development of man-made intelligenceutilization in online protection not only includes cybercriminals, it likewise includes country-state entertainers.Country-state entertainers will want to take advantage of obscure weaknesses in a quicker design andexfiltrate touchy data that could contain data about power matrices. They willinfluence that data to utilize it against a country. Man-made consciousness itself will be a newweapon for cyberespionage.

III. Conclusion

Computerized reasoning is a tremendous field that specialists and network safety specialists need toinvestigate. They have applied computer-based intelligence and branches in different regions use innovation for help.Research shows the way that computer-based intelligence can be valuable for network protection. In Interruption Identification andCounteraction Frameworks, research demonstrates that AI is a strategy that brings positiveresults. The utilization of ML in IDPS frameworks diminishes misleading positives and incrementsexactnessfurthermore, it simultaneously figures out how to see new dangers. Essentially, Profound Learning is morestrong than ML for IDPS frameworks. DL research shows that the exactness rate is higher whenscientists utilize DL with Profound Conviction Organizations (DBN). With the assistance of DBN, IDPSs havemore hubs to perform estimations and accordingly produce improved results.Botnet location likewise profits fromcomputer-based intelligence. Specialists utilized ML to learn methods to identifybotnets by breaking down space inquiries that botmasters use to speak with gadgets. The botnet discovery with area questions model proposes two stages: the learning stage, in which MLbased framework extricates the information to characterize awful information and great information; and the location stage, in running head: THE Advantages OF Computerized reasoning IN Network protection 16which in utilizes the information from the principal stage to identify botnets. When botnet location frameworksapply k-Closest Neighbor and Arbitrary Woodland results are precise and lessen misleading up-sides. Theutilization of computer-based intelligence in additional areas, for example, network safety would build the assault surface orvectors of assault in an association. Man-made intelligence devices may also add new weaknesses inframeworks. Cybercriminals will turn out to be more learned to foster new devices that utilize artificial intelligence totake advantage of weaknesses. This would permit cybercriminals to conceal their goals while testingorganizations and sending malware. Online protection experts will require lively strategies tomanage artificial intelligence in associations so dangers are less up and coming.

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