Analysis of Machine learning based XSS attack Detection Techniques

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ABSTRACT

After the COVID-19 epidemic, most businesses move to online mode. Hence, the online activity of users increases, and the dependence on the Internet increases. There are many benefits of providing services on the internet; however, there are some vulnerability's of online transactions. Cross-Site Scripting (XSS) is one of the cyber attacks that is used by the attackers to steal the conditionals of the Vitim. In this context, we analyze the present machine learning-based XSS attack detection technique proposed by different researchers. The purpose of this study is to analyze machine learning-based XSS attack detection techniques that affect the web pages. Our research helps young researchers to understand the topic in more detail.

KEYWORDS XSS, Cloud computing, fog computing

I. INTRODUCTION

These days, the World Broad Web is more like a complex network that makes use of a wide range of components and technologies, such as client-side and server-side technologies, the HTTPs Protocol, and many more [1]. Web apps built on these frameworks are flexible enough to serve a large audience, and they make it easier for people to utilize the Internet by providing them with the many benefits of cutting-edge technology. However, supplying the necessary security measures for the secure creation of web applications is made more difficult by the differences between these technologies. Since so many online apps run on the open Internet, many of them are susceptible to critical flaws. White-hat security researchers and the Open Web Application Security Project (OWASP) have recently shown that XSS attacks are one of the most common types of vulnerability in web applications [2]–[4]. different XSS attacks are presented in Figure 1.

Cross-site scripting (XSS) [5], [6] is an example of a flaw in the application layer. Eighty percent or more of all online apps are vulnerable to XSS [7]–[9]. An attacker employs this technique by planting malicious JavaScript code in a web application's weak spots, where it will be executed by the browser when a user accesses the page in good faith. In order to mitigate the effects of the XSS attack, academic scientists and researchers have offered several cutting-edge methods [10]. However, there are still certain open research questions that prevent existing frameworks from adequately protecting web applications against XSS attacks. As a result, in this article, we highlight the most important aspects of current defensive solutions for XSS attacks for online applications and the performance concerns they cause [11]–[14].

II. LITERATURE REVIEW

There are wide verity of cyber-attacks present in today's world. Many researches are working in the field for detection of DDoS attacks [15]–[20], phishing attacks [21], [22], smart card attack [23] in fog/cloud computing [24]–[28]. Author in [29] proposed handoop based attacks detection technique. Also in [30] author proposed a game theory based attack detection techniques. Author in [31] proposed deep neural learning based technique for attack detection. Authors in [32]–[34] proposed soft-computing based attack detection method. Also, in [35] proposed attack detection technique in cloud computing. Author in [36] proposed DNS based attack detection technique. Authors in [37]–[41] proposed cryptography based attack detection techniques. Attack detection technique in smart vehicles is proposed in [42], [43]. For RFID tages author proposed a attack detection technique in [44]. Author in [45] proposed neural network based techniques. Author present a review for attack detection. Author in [46] proposed attack detection techniques for MANET. Author in [47] proposed attack detection method in virtual environment. Author in [48] proposed new rooting protocol. Author in [49] proposed machine learning technique for attack detection in IoT. Author in [6] proposed different XSS attack detection technique. Author in [50] review many attack detection technique. A URL based attack detection technique is proposed by author in [51]. Author in [19] proposed an ISP based attack detection technique. Author in [12] proposed machine learning based attack detection

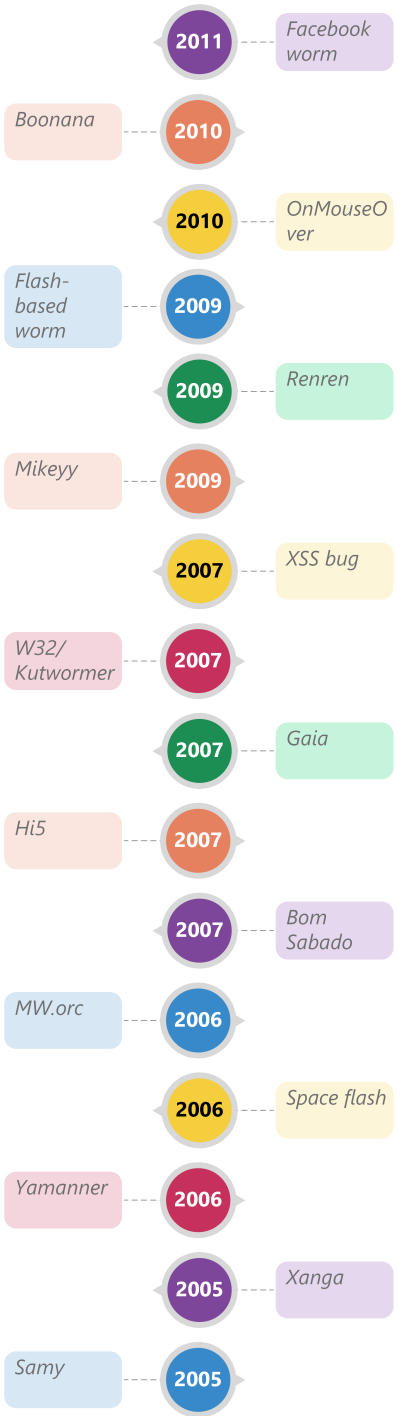

FIGURE 1: XSS Attack Timeline

technique. Author in [52] proposed blockchain based attack detection technique. Author in [53] proposed graph learning based attack detection technique. Author in [54] proposed deep learning approach for attack detection.

III. RESULTS AND DISCUSSION

In this research paper, we try to understand the types of XSS attack and different machine learning techniques available for its detection. As there is a large amount of available articles, we limit our analysis to the Scopus database. The combined analysis of the literature is presented in Figure 2. The annual production of articles is presented in Figure 2a and in Figure 2a it is clear that the number of articles published in the field of XSS attack detection increases. This is a proof that researchers are constantly working to find an optimal XSS attack detection technique. Hence, if a new researcher wants to work in this field, he or she can start his work. The type of publication is also a good criteria that may help young researchers find relevant papers. From Figure 2b, it is clear that the majority of work in the field of XSS detection is published in international conferences. In addition to the type of publication, the subject area is also a good factor to analysis the research field. The topic distribution is presented in Figure 2c. From Figure 2c it is clear that the majority of researchers in the computer science domain are working in the field of XSS attack detection.

Figure 2d represent the distribution of sources. From Figure 2d it is clear that *ACM* is the most popular source and the majority of researchers are willing to publish their research in *ACM*. The distribution of countries is also a good factor for analyzing the distribution of researchers. The distribution of researchers is presented in Figure 2e and from the figure it is clear that researchers from *India* and *China* are working in the field of XSS attack detection. Finally, the distribution of keywords helps to find the current research trend and helps to find potential future research areas. Figure 2e represent the keyword distribution.

IV. CONCLUSION

As the internet evolves, developers may take use of tools like browsers to send more complex web apps to users. Online online applications are put at risk, especially from XSS attacks, because of this. As a result, this article provides a thorough overview of the state of XSS defenses so that its readers may better understand their contributions and the limitations they now face in terms of performance.

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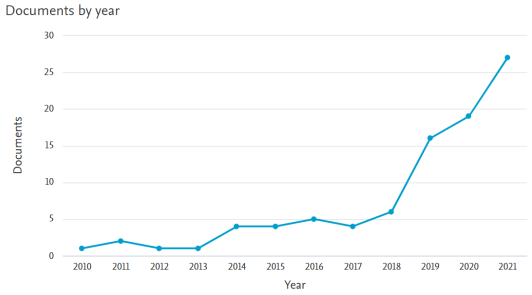
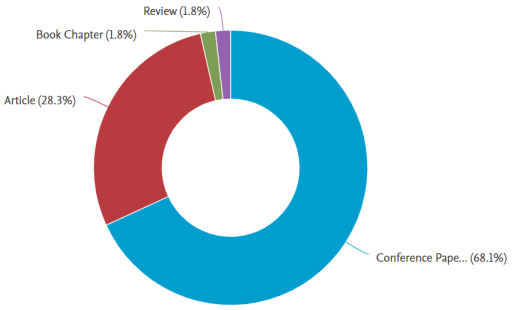
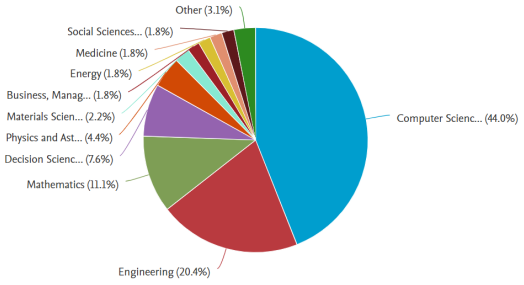


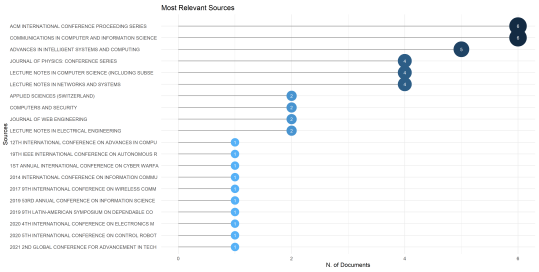
(a) Scientific Production



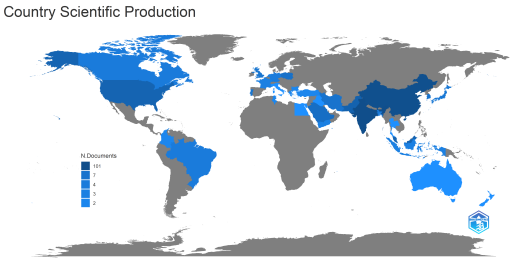
(b) Type of Articles



(c) Important Topics



(d) Popular Sources



(e) Country Scientific Production

(f) Important Keywords

FIGURE 2: Analysis of Available Literature

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