

# Impact of Cybersecurity on the emergence of Bigdata and IoT Technologies

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**Abstract** - Applications based on big data and the internet of things (IoT) are promising and essential in practically all disciplines. IoT applications deliver useful services to us while also collecting and sending data to big data databases for archival and analysis. Big Data and IoT have begun to be used in smart agriculture, smart housing, smart healthcare, smart education, and even smart shopping. These IoT- and Big Data-based applications are expanding quickly. The more these technologies improve our lives and provide us with useful applications, the more cybersecurity attacks are launched against them. Due to the extensive and useful data these programs contain, they are a target for hackers. With these technologies, cybersecurity is a big problem. Cybersecurity threats and attacks have the potential to halt the development of these technologies, which is bad news for both us and these promising innovations. Threats to cybersecurity degrade these technologies, allowing them to fully access user data. Knowing the potential uses and advantages that we might derive from these technologies is crucial. Furthermore, it is crucial to comprehend and be aware of any vulnerabilities that can endanger the various Big Data and IoT-based applications. Understanding potential cybersecurity dangers and attacks can help us learn how to defend these systems and applications against such threats. The security dangers and assaults that could be launched against Big Data and IoT-based apps and hinder their development are presented in this research as important cybersecurity implications. An example of a healthcare system with potential cybersecurity threats is used to further explain these effects. This case study demonstrates the connection between the development of Big Data and IoT technologies and cybersecurity attacks.

**Keywords**—Cybersecurity, bigdata, IoT technologies.

## I. Introduction:

In the real world, many organizations are using new technologies to run their operations, moving away from traditional methods and towards digital solutions. This shift has allowed companies to use data and information more effectively to govern their operations. However, with the increasing use of technology, the risk of data loss, data breaches, and other threats has also increased, leading to challenges in the utilization of big data. Despite the benefits of technological advancements, cybersecurity has become a crucial concern for businesses to protect their data and information from theft and damage. Companies are improving their IT infrastructure and adopting new technologies such as IoT devices, which offer enhanced operations but also pose cybersecurity risks. Although cybersecurity measures are important in ensuring data security, there are challenges associated with it such as IoT attacks, ransomware attacks, and software vulnerabilities. The shift towards technological advancement has impacted various fields, particularly in companies that utilize big data. While these shifts have enabled improved service delivery, higher productivity, profitability, and deliverables, it has also brought about cybersecurity challenges that need to be addressed.

## II. Explanation:

In Cybersecurity aims to provide protection for technologies' infrastructure from unauthorized access. This research paper represents some Big Data and IoT applications and discusses the impact of cybersecurity upon them. It shows how cybersecurity can negatively impact IoT and Big Data and their growth.

This paper gives an image of Big Data and IoT based applications and the effect of cybersecurity upon their growth. It provides examples of Big Data and IoT-based applications and defines their security threats. The

paper presents real examples of Big Data and IoT based applications. It shows the impact of cybersecurity over them and over their growth. This work helps us in understanding the possible cybersecurity threats that threaten the Big Data and IoT based applications. That leads us in turn to finding the suitable methods and strategies that we could have to protect these systems.

So, I have taken the DDoS Botnet attack on the IoT devices. Here, I am visualizing and analyzing dataset and to check the type of attacks place by using preprocessing techniques for the input data and visualizing and analyzing dataset, and it can be adapted for different datasets and analysis tasks.

### III. Implementation:

In this code, I have used various libraries such as numpy, pandas, matplotlib, seaborn, and scikit-learn to visualize and analyze a dataset stored in a CSV file named "DDoSdata.csv".

The first part of the code, I have defined three functions:

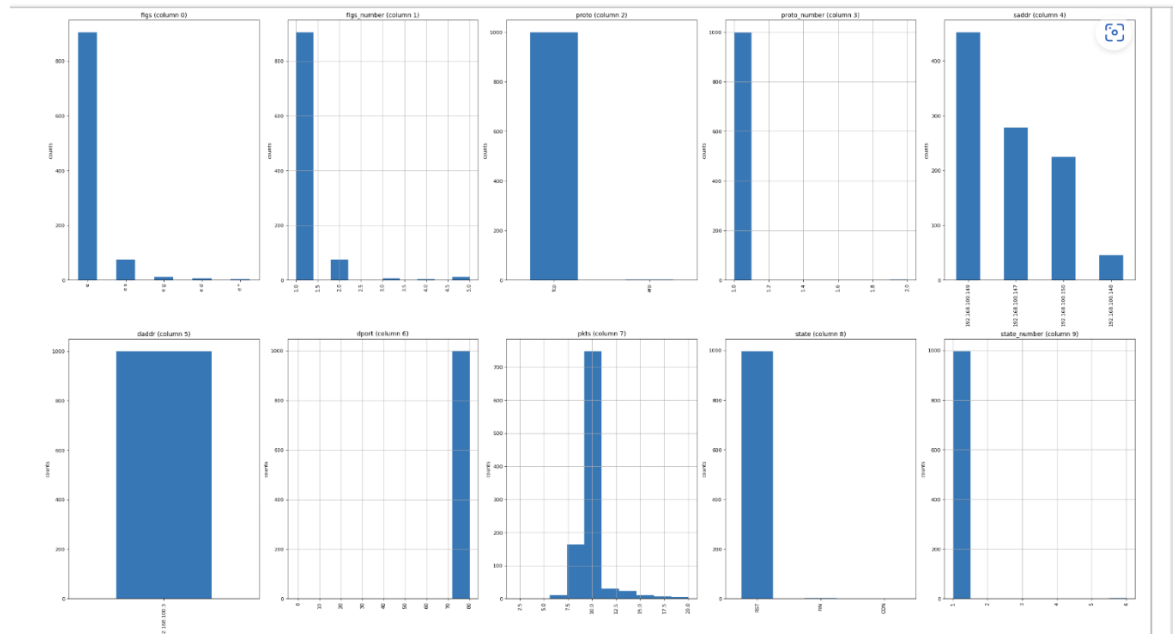
`plotPerColumnDistribution(df, nGraphShown, nGraphPerRow)`: This function plots the distribution (histogram or bar graph) of each column in the dataset. The function takes three parameters: the dataset (df), the maximum number of graphs to show (nGraphShown), and the number of graphs to show in each row (nGraphPerRow).

`plotCorrelationMatrix(df, graphWidth)`: This function plots a correlation matrix for the dataset. The function takes two parameters: the dataset (df) and the width of the graph (graphWidth).

`plotScatterMatrix(df, plotSize, textSize)`: This function plots a scatter and density plot for the numerical columns in the dataset. The function takes three parameters: the dataset (df), the size of the plot (plotSize), and the size of the text on the plot (textSize).

The second part of the code reads the dataset from the CSV file using pandas `read_csv()` function and stores it in a dataframe named `df1`. The code drops an unwanted column named "index" from the dataframe using the `drop()` function. Then, the code displays the number of rows and columns in the dataframe using the `shape` attribute and prints the first 5 rows of the dataframe using the `head()` function.

Finally, at last we called the three functions defined earlier to plot the distribution, correlation matrix, and scatter plot of the dataset. The plots are displayed using the `show()` function of matplotlib.



Therefore, it is necessary to work towards finding solutions that can fully protect Big Data and IoT-based applications from cybersecurity attacks. Only by doing so can we ensure the continued growth and success of these technologies, making them a vital part of our daily lives for years to come.

## V. References:

- [1] <https://ieeexplore.ieee.org/document/8973021B>. Rieder, *Engines of Order: A Mechanology of Algorithmic Techniques*. Amsterdam, Netherlands: Amsterdam Univ. Press, 2020.
- [2] <https://ieeexplore.ieee.org/document/9247722>