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Jyotsna Kumar Mandal · Biswapati Jana ·
Tzu-Chuen Lu · Debashis De
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Proceedings of International Conference on Network Security and Blockchain Technology

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Foreword

Since the days of the Greek empire, steganography has existed in a variety of ways. Steganography itself derives from the Greek words *steganos* which represents concealed or covered and *graphia* means to write something. The Greek historian Herodotus wrote about how a slave served as the conduit for secret communication. After shaving the slave's head and tattooing the message on the exposed skull, the hair was then permitted to grow back. The slave was delivered to the recipient of the message, who shaved the slave's head to disclose the contents. The communication was definitely not time-sensitive! As a scout for the British during the Boer War, Lord Robert Baden-Powell marked the locations of Boer artillery sites by incorporating maps into drawings of butterflies. Anonymization, for example, may be construed to be a result of such a steganographic approach toward data.

Materials can be classified into identifiable and non-identifiable categories based on their identifiability. Information is created by adding value to data, which are facts and claims. Applications may not be linear, but data is jokingly said to be the smallest building block of information. Informally, the following formula can be used to distinguish between information and data: The phrase "you provided me with valuable information" is often used because information plus value equals data. As a result, value is created in the part that transforms data into information, which can be bought and sold.

A name cannot be unique as it is open to be adopted by one and all. That is why, a name is never bought or sold, i.e., transacted against consideration. While that very name, when laced with other attributes making it unique, creates value. The following depiction will give a clear idea. It is becoming more and more crucial for individuals and organizations to be able to send and receive data anonymously over the Internet in a time when much of the information sent over the Internet is stored and analyzed by various companies, governments, and online criminals. It has also become crucial for individuals and organizations to be able to conceal their locations. An adversary can determine the location or even the identity of the individual behind the communication by knowing the sender's or receiver's original IP address.

The encryption had always served to safeguard the confidentiality between the sender and the intended recipient. To add a stronger layer of protection to the hidden data, steganography methods are now being used more frequently in addition to cryptography. This study addressed how to embed a message into a JPEG image by controlling JPEG quantization tables, and it demonstrated how the quality factor in a JPEG image can be an embedding space (QTs). This method can be utilized as a permutation algorithm combination.

Of course, using social networks which are conducting their *lossless data transfers* over these networks cannot be guaranteed due to internal picture compression. Nevertheless, these social networks can be used to distribute connections to amusing pictures on other websites. Websites that offer visitors original (undisturbed) media material may be the best candidates for using it as a channel for steganography data flows. It is often concluded that there should be a way to either check all incoming and outgoing Internet traffic (check for steganographic data on a firewall, proxy, etc.) or to directly check Internet traffic at workplaces in a web browser. A corporate web browser might be the best option to avoid steganographic data flow.

The common name in the first slot is a valueless fact, while it acquires value when laced with a mobile number because it becomes unique. Lastly, adding another unique attribute viz. AADHAR, etc. will make it invaluable. Sharing one's name is an etiquette while sharing identifiable information that creates unique attributes is frightening. Therefore, a casual share of data can become a devastating disclosure of identity. Thus, information is classified into personally identifiable information and sensitive personally identifiable information.

The empty locker is the one that does not need a lock. Otherwise, nothing of value is contained there. Similar to this, if information loses any of its valuable qualities, it loses all of its value. There is no need for a lock or encryption. Otherwise, the likelihood of losing the information decreases significantly if it is shared or known because of a need or necessity. A piece of information is typically collected for promotion, verification, and identification purposes. Until one discloses other characteristics, such as a residence or an organization they are a member of, their name does not identify them. Second, one's identity can be verified before accessing some restricted services thanks to unique identity proof like AADHAR, etc. Everyone has the right to know why being identified, the limits of identification, and the authority of the identifier. These three correlate to one's fundamental right of privacy enshrined in MY INFORMATION—MY RIGHT and RIGHT TO BE FORGOTTEN.

Documents for clinical trials can number in the thousands of pages. They are submitted for approval to regulatory agencies like the FDA. Clinical research organizations make the laborious effort of manually cleaning up the paperwork to make sure that these documents do not contain the participants' private information.

Privacy AI shortens the turnaround time from days to hours by employing an automated process that includes entity detection, extraction, relationship management, and anonymization.

There is a definitive role for steganography in security. It is meant to support cryptography rather than supplant it. Steganography techniques lessen the likelihood that communication will be picked up. However, if that communication is also encrypted, it must also be decrypted if it is found (yet another layer of protection). Applications for steganography are virtually limitless. A very small portion of the field of steganography is covered in this essay. It involves much more than just including words in an image. In addition to digital images, steganography also applies to other types of files (such as voice, text, and binary ones) as well as other types of media like contact channels.

The road ahead lies in technological intervention involving steganographic cryptography and/or other methods, coupled with process reform and it is called Data Anonymiser. Anonymiser is a strainer that strains attributable data from personally identifiable information making it lose value but not loses context. It is neither just redacting nor masking of data. Because both redacting and masking processes are retractable. Anonymiser can be an application, a process, or a hybrid of both. For example, a person keys in one's login credentials oblivious to the CCTV behind one's back. It is clear that the feed stored via that CCTV has the person's SPII, and using that, the person's privacy can easily be violated. How to avoid that? The answer could be repositioning that CCTV. But is it possible on the fly? No. The simplest solution is to reposition the person himself. Similarly, Anonymiser could be a process reform too. Hence, a single Anonymiser may not be the solution for various problem statements. There could be many Anonymiser Solutions.

The State Government of West Bengal in the Department of Information Technology and Electronics has rolled out the Anonymiser hackathon through which any individual can contribute to the ever-growing repository of problem statements via Ideathon and thereafter come together to solve each of such problem statements by innovative methods comprising the application, process reforms et al which will be known as the Anonymiser. These solutions will then be taken through the live transactional data repositied with the government to find out whether they can really strain the valuable attributes laced in the PII/SPII and create an anonymised data lake.

Various market study suggests that the anonymized data has a market value of \$ 220 Billion in 2021 that will grow to a whopping \$ 343 Billion in 2030, and the tons of data generated by public services on a daily basis in this country could be a game changer for the academia, industry as well as the professionals. They will create affordable and accessible solutions for the mass. The 2nd ICNSBT 2023 is one

of the platforms that brings academicians, researchers, technological students, and industry people with common interests and interact issues and innovations relating to the information and system security, cryptographic issues, and blockchain.



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Preface

This ICNSBT 2023 is focused on network security, privacy, and blockchain technology and its applications. The conference was held during March 25–26, 2023, at the Vidyasagar University, West Bengal, India. This volume consists of the privacy, authentication, digital watermarking, cyber-security, access control, security modeling, security in social networks, digital rights management, blockchain in the Internet of things (IoT), blockchain in cyber-physical systems, blockchain in social networking, blockchain in supply chain management, and cryptocurrency.

This volume contains a total of 44 distinct chapters authored by various researchers worldwide. This volume contains the research articles which are classified into three thrust areas, such as security and privacy, network security and its applications, and blockchain technology and IoT.

The first part “Security and Privacy” consists of the nineteen (19) research articles, contributed by the allied researchers, principally illustrates the machine learning-based identification of DDoS flood attack, phishing E-mail detection, improvement of a mutual authentication, collision avoidance and drowsiness detection of vehicles, face mask detection using CNN, and finds out the IoT-DDoS attack.

The second part “Network Security and Its Applications” consists of nine (09) articles mainly focused on the classification of brute-force attacks using CNN, malware analysis, asymptotic diffusion analysis, enhancement of data security for cloud computing, and increases the network security using genetic algorithm.

The third part “Blockchain Technology and IoT” consists of sixteen (16) original research articles and typically highlights the food supply chain for IoT, development of IoT-based biometric attendance system, protecting the privacy of IoMT, blockchain-based crowdfunding platform, and blockchain-based transparent solution for achieving investment for farming.

The conference received articles from more than ten countries with more than ten foreign authors. We are grateful to the Springer Nature for publishing the accepted and presented original research papers of ICNSBT 2023 in the “Lecture Notes in Networks and Systems” (LNNS), Springer Nature. On behalf of the organizing committee, we are grateful to the inaugurators, keynote presenters, and eminent experts who delivered the expert talks. Our sincere gratitude to the esteemed authors

and reviewers for extending support and cooperation. Hope this volume will be a valuable document for the researchers and budding engineers.

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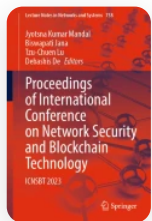
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Abstract

The onset of COVID-19 has shifted people to the virtual world more to avoid social interaction. In fact, the trading systems have shifted to E-Commerce platforms which include virtual transactions as well. Besides being a boon, virtual transactions have also brought in several cybercrimes. Several fraudulent sites are created for distracting the users from authentic sites and lead them to the unsafe ones where users lose their personal data or even their wealth at worst cases. This paper is to illustrate a machine learning solution for putting a check on these kinds of activities. Different Python tools have been used to preprocess the dataset that contains different URLs which is classified into safe unsafe categories depending on the presence of SSL certificate or encryption of the URL which is further fed into a model that classifies URLs into safe and unsafe categories using logistic regression. Other than earlier approaches, our proposed model not only checks simple URLs but also check whether URLs are safe for transaction.

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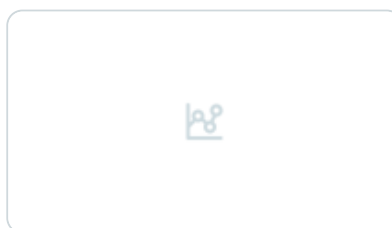
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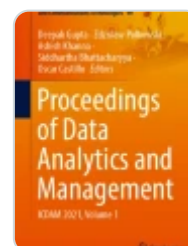
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References

1. Bendovschi A (2015) Cyber-attacks—trends, patterns and security countermeasures. *Procedia Econ Finan* 28:24–31

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2. Digital commerce transactions. Report
<https://www.moneycontrol.com/news/business/banks/digital-commerce-transactions-increased-30-in-2021-but-so-are-digital-frauds-says-rbi-report-8256031.html>

3. Karabatak M, Mustafa T (2018) Performance comparison of classifiers on reduced phishing website dataset. In: 2018 6th international symposium on digital forensic and security (ISDFS), pp 1–5

[Google Scholar](#)

4. Lakshmanarao A, Babu MR, Bala Krishna MM (2021) Malicious URL detection using NLP, machine learning and FLASK. In: 2021 international conference on innovative computing, intelligent communication and smart electrical systems (ICSES), pp 1–4

[Google Scholar](#)

5. Hevathige A, Rathnayake K (2022) Super learner for malicious URL detection. In: 2022 2nd international conference on advanced research in computing (ICARC), pp 114–119

[Google Scholar](#)

6. Manyumwa T, Chapita PF, Wu H, Ji S (2020) Towards fighting cybercrime: malicious URL attack type detection using multiclass classification. In: 2020 IEEE international conference on big data (Big Data), pp 1813–1822

[Google Scholar](#)

7. Peng Z, He Y, Sun Z, Ni J, Niu B, Deng X (2022) Crafting text adversarial examples to attack the deep-learning-based malicious URL detection. In: ICC 2022—IEEE international conference on communications, pp 3118–3123

8. Singh A, Roy PK (2021) Malicious URL detection using multilayer CNN. In: 2021 international conference on innovation and intelligence for informatics, computing, and technologies (3ICT), pp 340–345

9. Ren F, Jiang Z, Liu J (2019) A bi-directional LSTM model with attention for malicious URL detection. In: 2019 IEEE 4th advanced information technology, electronic and automation control conference (IAEAC), pp 300–305

10. Malware dataset. <https://www.unb.ca/cic/datasets/url-2016.html>

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