**Digital Steganography: The art of hiding information in plain sight**

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*Abstract:* For as long as we have known ourselves as humans, besides other problems such as food, water or shelter, we have also had the difficulty of communicating sensitive information. While this dilemma existed in our minds since the birth of humankind, rudimentary solutions started to be implemented back in the ancient times. Nowadays, in an era of information technology, where virtually anybody owns some kind of device connected to the internet, which provides access to lots of data, digital steganography is the modern way of concealing messages or other delicate information. As opposed to ancient steganography techniques, which were implemented in a physical manner, using special ink, writing the message in an unobservable area of a letter or using certain rules for extracting the concealed information from an otherwise normal looking text, the modern implementations makes use of the digital form in which information circulates now.

*Key-Words:* image steganography, audio steganography, digital steganography, data hiding, steganalysis

**1 Introduction**

For as long as we have known ourselves as humans, besides other problems such as food, water or shelter, we have also had the difficulty of communicating sensitive information. While this dilemma existed in our minds since the birth of humankind, rudimentary solutions started to be implemented back in the ancient times. Nowadays, in an era of information technology, where virtually anybody owns some kind of device connected to the internet, which provides access to lots of data, digital steganography is the modern way of concealing messages or other delicate information. As opposed to ancient steganography techniques, which were implemented in a physical manner, using special ink, writing the message in an unobservable area of a letter or using certain rules for extracting the concealed information from an otherwise normal looking text, the modern implementations makes use of the digital form in which information circulates now.

**2 Problem Formulation**

[ to-do]

***2.1 Subsection***

[ to-do]

***2.1.1 Sub-subsection***

[ to-do]

**3 Problem Solution**

[ to-do]

**4 Conclusion**

[ to-do]

# *References:*

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| [1] | "What is Steganography? Webopedia Definition," [Online]. Available: https://www.webopedia.com/TERM/S/steganography.html. [Accessed 25 April 2020]. |
| [2] | M. ZAMANI, A. MANAF, R. AHMAD, F. JARYANI, H. TAHERDOOST and A. M. ZEKI, "A Secure Audio Steganography Approach," *International Conference for Internet Technology and Secured Transactions,* 2009. |
| [3] | M. S. SHAHREZA, "Stealth Steganography in SMS," *International Conference on Wireless and Optical Communications Networks,* 2006. |
| [4] | P. POCATILU, I. IVAN, A. VIȘOIU, F. ALECU, A. ZAMFIROIU and B. IANCU, Programarea Aplicațiilor Android, Bucharest: Editura ASE, 2015. |
| [5] | M. S. MEGHA, "Methods of Audio Steganography," *International Journal of Engineering and Management Research,* vol. 4, no. 3, pp. 154-156, 2014. |
| [6] | C. MAITI, D. BAKSI, I. ZAMIDER, P. GORAI and D. R. KISKU, "Data Hiding in Images Using Some Efficient Steganography Techniques," *Communications in Computer and Information Science,* vol. 260, pp. 1-9, 2011. |
| [7] | N. F. JOHNSON, Z. DURIC and S. JAJODIA, Information Hiding: Steganography and Watermarking - Attacks and Countermeasures, Boston, MA: Springer, 2001. |
| [8] | N. HAMID, A. YAHYA, B. AHMAD and O. M. AL-QERSHI, "Image Steganography Techniques: An Overview," *International Journal of Computer Science and Security,* vol. 6, no. 3, pp. 168-187, 2012. |
| [9] | R. CHANDRAMOULI and N. MEMON, "Analysis of LSB based image steganography techniques," *Proceedings 2001 International Conference on Image Processing,* vol. 3, pp. 1019-1022, 2001. |
| [10] | R. G. BALDWIN, "Steganography 101 using Java," [Online]. Available: https://www.developer.com/java/ent/article.php/10933\_3530866\_2/Steganography-101-using-Java.htm. [Accessed 12 March 2020]. |
| [11] | R. G. BALDWIN, "Processing Image Pixels Using Java: Controlling Contrast and Brightness," [Online]. Available: https://www.developer.com/java/other/article.php/3441391. [Accessed 12 March 2020]. |
| [12] | R. G. BALDWIN, "Processing Image Pixels using Java, Getting Started," [Online]. Available: https://www.developer.com/java/other/article.php/3403921. [Accessed 12 March 2020]. |
| [13] | S. K. ARORA, "Audio Steganography : The art of hiding secrets within earshot (part 2 of 2)," [Online]. Available: https://medium.com/@sumit.arora/audio-steganography-the-art-of-hiding-secrets-within-earshot-part-2-of-2-c76b1be719b3. [Accessed 11 March 2020]. |
| [14] | S. K. ARORA, "Audio Steganography : The art of hiding secrets within earshot (part 1 of 2)," [Online]. Available: https://medium.com/@sumit.arora/audio-steganography-the-art-of-hiding-secrets-within-earshot-part-1-of-2-6a3bbd706e15. [Accessed 11 March 2020]. |
| [15] | “Steganography,” [Online]. Available: https://en.wikipedia.org/wiki/Steganography. [Accessed 9 March 2020]. |
| [16] | "Documentation | Android Developers," [Online]. Available: https://developer.android.com/docs. [Accessed 10 March 2020]. |