Jonathon Meney

Professor Cezar Campeanu

Cryptography and Codes

31 October 2023

Steganography

Steganography is an incredibly unique form of cryptography. Its methods involve embedding hidden messages in simple plain files. Examples include hiding a secret message in an audio file, a video, or most commonly hiding images inside other images. Steganography can also be used for malicious intent by encrypting malware into something as simple as an image.

This project will aim to go into more detail about the type of cipher(s) that steganographic methods implement such as pure steganography, secret key steganography, and public key steganography. Different areas of application will be discussed as well, such as modern day printers. The mathematics and methodology will also be covered including substitution systems and least significant bit substitution along with several others. We'll also take a look at some examples of steganography in action, including a few famous examples. Comparisons to other encryption methods will also be made as steganography is a very different form of encryption. The security of steganography is another topic that will be included, detailing the security of transmitting data that was encrypted using steganography, along with the rise of malware encrypted using steganography, now referred to as Stegware.

To conclude, steganography is an incredibly interesting field of encryption. Steganography is also behind some of the greatest internet mysteries to have ever been discovered or created. These include Cicada 3301 from 2012, along with The May Day Mystery, from 1981. These internet mysteries are a large motivation for choosing steganography for this project.

Tentative Works Cited

AL-Ani, Zaidoon Kh., et al. "Overview: Main Fundamentals for Steganography ."
        Journal Of Computing, vol. 2, no. 3, Mar. 2010, pp. 158–165,
        https://arxiv.org/ftp/arxiv/papers/1003/1003.4086.pdf.

Choudhary, Kaustubh. (2012). Mathematical Modeling of Image Steganographic System.
        IOSR Journal of Computer Engineering. 2. 10.9790/0661-0250115.

Kessler, Gary C. "Hiding Data within Data." *Steganography*, Sept. 2001,
        www.garykessler.net/library/steganography.html.

Majeed, Mohammed Abdul et al. "A Review on Text Steganography Techniques."
        Mathematics 9.21 (2021): 2829. Available:
        http://dx.doi.org/10.3390/math9212829.

N. Subramanian, O. Elharrouss, S. Al-Maadeed and A. Bouridane, "Image
        Steganography: A Review of the Recent Advances," in *IEEE Access*, vol. 9, pp.
        23409-23423, 2021, doi: 10.1109/ACCESS.2021.3053998.

Semilof, Margie, and Casey Clark. "What Is Steganography?: Definition from
        TechTarget." *Security*, TechTarget, 18 Sept. 2023,
        www.techtarget.com/searchsecurity/definition/steganography.

"Steganography." *Wikipedia*, Wikimedia Foundation, 25 Oct. 2023,
        en.wikipedia.org/wiki/Steganography.