

Discrete Least Significant Bit Substitution

Presentation

Önder Görmez - 21501035

Computer Engineering
Faculty of Electrical and Electronics
Yıldız Technical University

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Agenda

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Steganography Process

Steganography Process

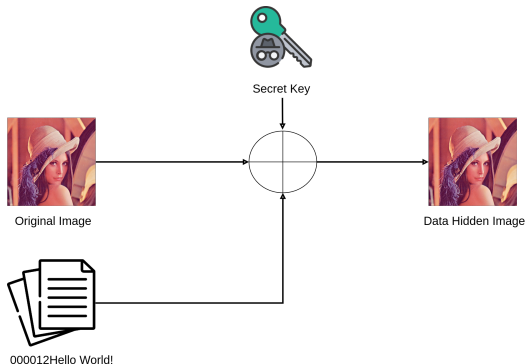


Figure 1: Simple Flow

[1, 2]

Steganography Process

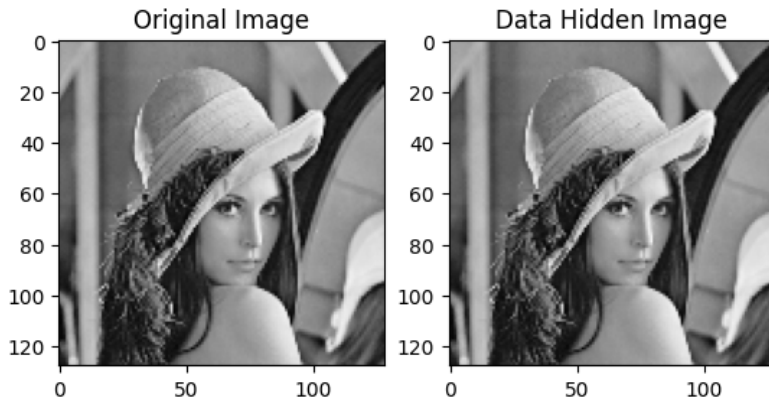


Figure 2: Comparison of Images

Discrete Least Significant Bit Substitution

Discrete Least Significant Bit Substitution

- The bits of each pixel are not changed. A **key** is used to **select** the pixels to be changed.
- One letter 8 bits

$$N \Rightarrow 0x4E \Rightarrow 01001110$$

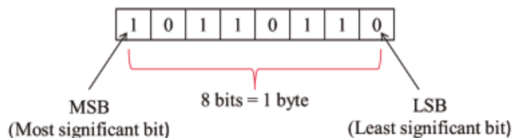


Figure 3: Pixel Value

[0]

Discrete Least Significant Bit Substitution

- The discrete logarithm function is used.

$$y_i = a^i \bmod(p)$$

- i: Index of the bit to hide
- p: A very large prime number
- a: prime root derived from p

Euler's Phi Function

- Euler's Phi Function, bir sayının kendisinden küçük ve aralarında asal olan eleman sayısını verir.

- Sayının çarpanları bulunur.

$$12 = 2^2 * 3^1$$

- Çarpanlarının üssünden 1 çıkarılır. Oluşan sayı çarpandan çıkarılır.

$$\phi(12) = (2^2 - 2^{2-1}) * (3^1 - 3^{1-1})$$

- Tüm çarpanlar için oluşan sonuçlar çarpılır.

$$\phi(12) = (4 - 2) * (3 - 1)$$

- $\Phi(x)$ sayısı bulunur

$$\phi(12) = 4$$

- Yukarıdaki örnek için 4 tane asal çarpanı vardır denilebilir.
Bunlar; "1, 5, 7, 11"

Demonstration



[0]

Feature Works

- Image formats **other than PNG** can be supported.
- The algorithm can be improved to support the use of images **larger than 128 x 128 pixels**.
- Message Header Validation
"000012Hello World!" → "****000012****Hello World!"
- **Message length correction** for content with Turkish characters



B. Elhalawany. Least significant bit. [Accessed on 8-June-2023]. [Online]. Available:

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Thank You