



A New Algorithm for Hiding Data Using Image Based Steganography

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Introduction

- **Definition of Steganography**
- **Differences between Steganography and Cryptography**
- **Image Steganography**

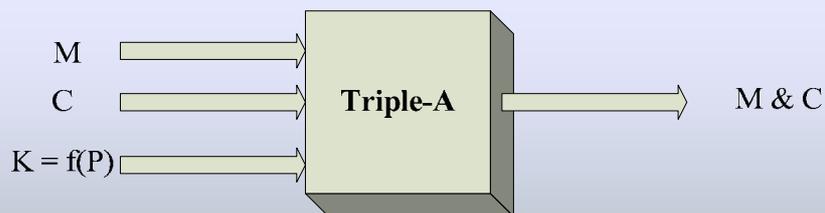
Previous Work

We will consider only three algorithms:

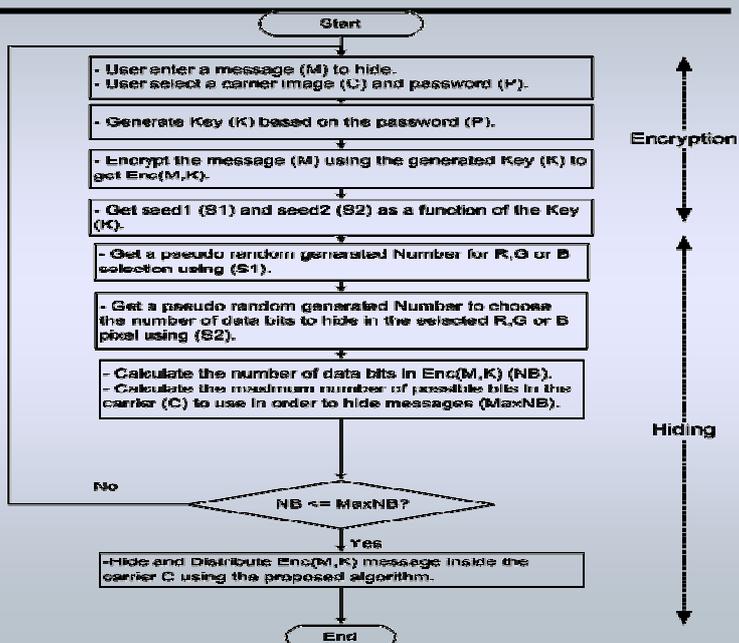
- **LSB**
- **Pixel Indicator**
- **SCC**

Proposed Algorithm (Triple-A)

- Encryption:
- Two Seeds:
 - To determine the used channels
 - To determine the number of bits used



Proposed Algorithm.

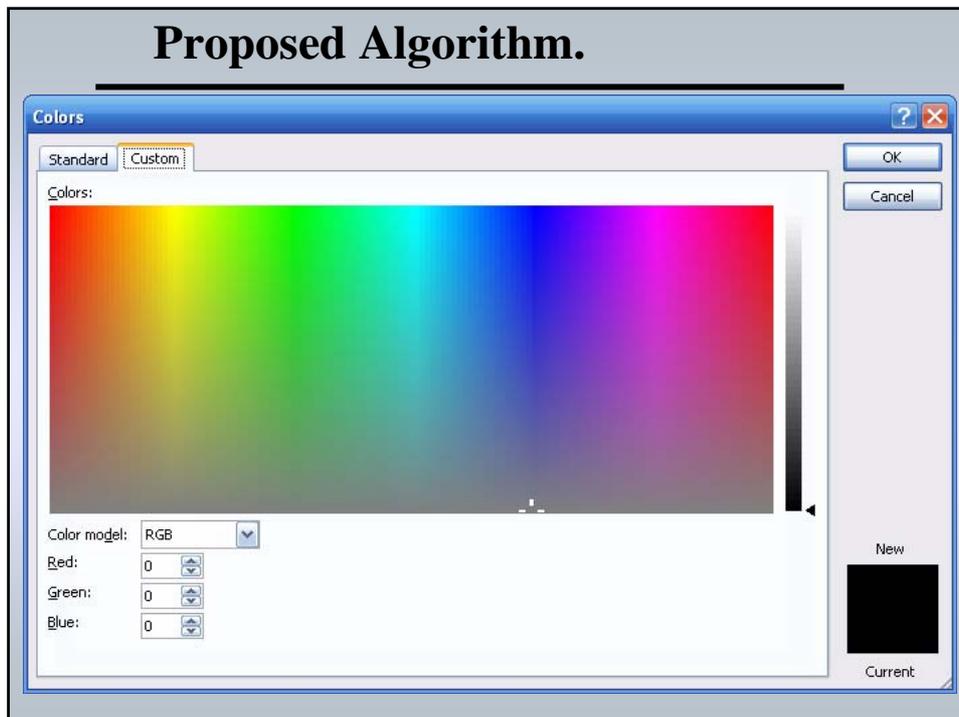


Proposed Algorithm.

1 st PRNG	Random number	Meaning to the algorithm
	0	use R.
	1	use G.
	2	use B.
	3	use RG.
	4	use RB.
	5	use GB.
	6	use RGB.

2 nd PRNG	Random number	Meaning to the algorithm
	1	use 1 bit of the component(s).
	2	use 2 bit of the component(s).
	3	use 3 bit of the component(s).

Proposed Algorithm.



Proposed Algorithm (Example).

Hiding (Enc) Data : (0x15, 0xF9, 0xCD, 0x5B , 0x09) = (0000_1111,1001_1111,1100_1101, 0101_1011, 0000_1001)

R N 1	R N 2	CMPs Before Hide			CMPs After Hide			CMPs Before Hide			CMPs After Hide		
5	3	32	93	160	32	95	161	0010_0000	0101_1101	1010_0000	0010_0000	0101_1111	1010_0001
1	1	31	93	154	31	92	154	0011_1111	0101_1101	1001_1010	0011_1111	0101_1100	1001_1010
1	1	33	94	161	33	94	161	0010_0001	0101_1110	1010_0001	0010_0001	0101_1110	1010_0001
0	1	34	93	154	35	93	154	0010_0010	0101_1101	1001_1010	0010_0011	0101_1101	1001_1010
2	2	37	95	154	37	95	155	0010_0101	0101_1111	1001_1010	0010_0101	0101_1111	1001_1011
6	3	39	97	161	35	102	166	0010_0111	0110_0001	1010_0001	0010_0011	0110_0110	1010_0110
3	2	40	97	164	40	99	164	0010_1000	0110_0001	1010_0100	0010_1000	0110_0011	1010_0100
1	2	37	96	162	37	99	162	0010_0101	0110_0000	1010_0010	0010_0101	0110_0011	1010_0010
2	1	39	99	162	39	99	162	0010_0111	0110_0011	1010_0010	0010_0111	0110_0011	1010_0010
3	2	41	102	167	43	102	167	0010_1001	0110_0110	1010_0111	0010_1011	0110_0110	1010_0111
5	3	45	104	170	45	104	169	0010_1101	0110_1000	1010_1010	0010_1101	0110_1000	1010_1001
1	1	51	110	178	51	111	178	0011_0011	0110_1110	1011_0010	0011_0011	0110_1111	1011_0010

Implementation.

How we get the random number in both:

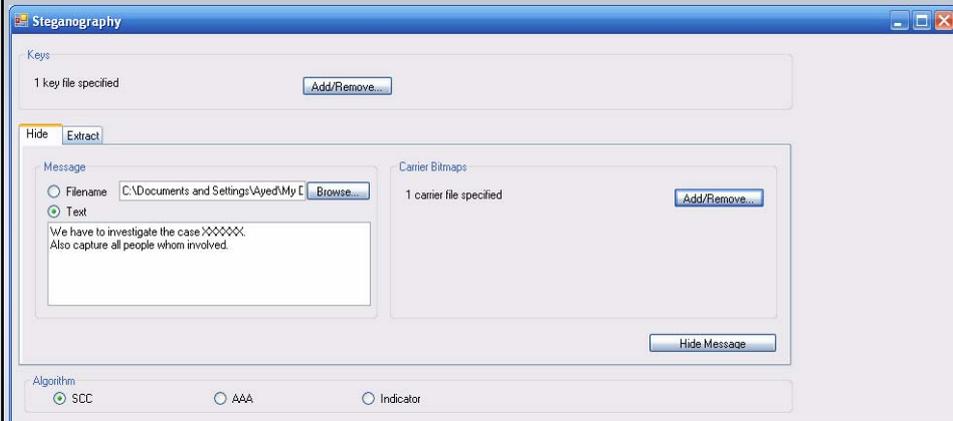
Number of bits:

```
int RNG_Bits = (R_Bits.Next(1, 4));
```

RGB used component:

```
int RNG_RGB = (R_RGB.Next(0, 7));
```

Implementation.



- [Install .Net Framework](#)

- [Run](#)

Results.

Overlooking Rio.bmp



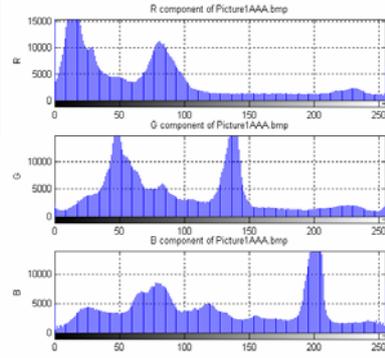
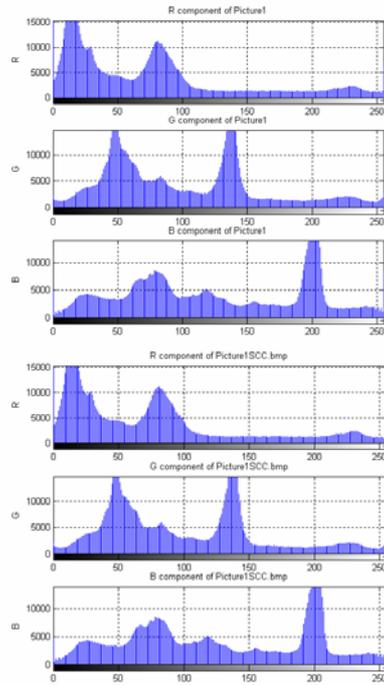
Overlooking Rio_h_AAA.bmp



Overlooking Rio_h_SCC.bmp



Results.

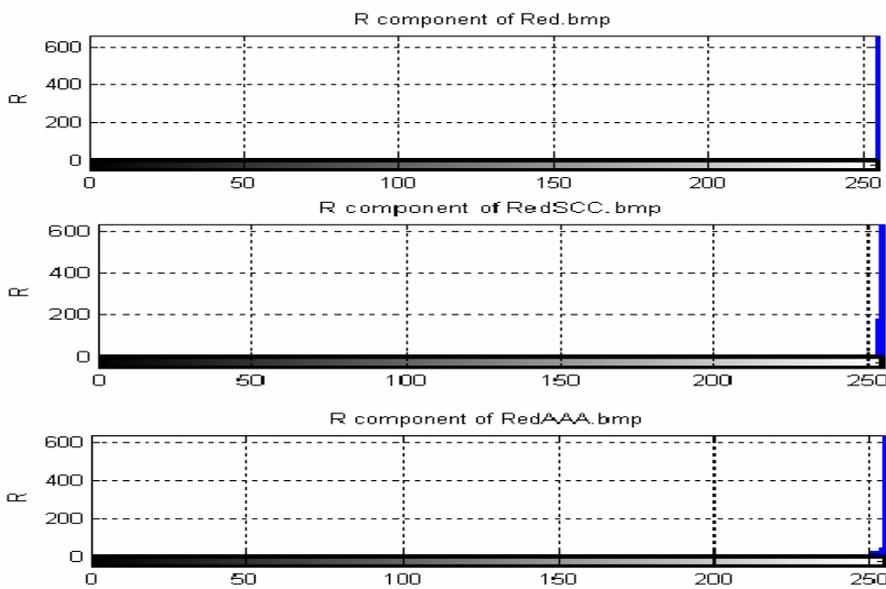


Results

Red.bmp

Red_h_SCC.bmp

Red_h_AAA.bmp



Results.

Size of M (bytes)	SCC		Triple-A	
	Pixels used to hide M inside C	capacity ratio	Pixels used to hide M inside C	capacity ratio
28 KB	27984	4.16%	7169	16.27%

Conclusion.

- **Randomization adds more security to the algorithm.**
- **Higher capacity (more than the SCC and the Pixel indicator)**
- **Real capacity ratio is 14% to the actual size of the carrier image for Triple-A algorithm while it is around 4% for SCC.**

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Questions.

Questions?