Hiding the text into 24-bit BMP images using XOR operation with the use of MSB

CH. N. MANISHA[1]* and MANDAVA V. BASAVESWARA RAO[2]

[1]St. Mary's Vocational Junior College, Mylavaram (India).
[2]Krishna University, Machilipatnam - 521 001 (India).

(Received: September 25, 2009; Accepted: October 29, 2009)

ABSTRACT

Hiding the text process using for Steganography and Invisible watermarking techniques. This process is widely used in images because of more number of redundant bits and hard to detect. In this paper hiding the text using XOR with the help of Most Significant Bits of the image.

Key words: XOR, Image, byte, MSB, LSB

INTRODUCTION

Hiding the text into the digital media are used because of secrete communication between the two parties. This process is different from cryptography. Since cryptography is used to change the information into unreadable form. So, the third parties are understood that the information in unreadable form is sending from one party to another party. But, in Hiding the text into the image is used for completely hide the message for the third party. Hiding the text into digital media are widely used in Steganography and Watermarking fields. In digital media hiding information into image is most popular. Because the image contain more number of redundant bits for embed and hard to detect. In this paper introduced a new algorithm using XOR operation with the help of MSB.

XOR Operation

XOR is known as 'Exclusive-OR' and it is a Boolean operator that returns a 1 when only one of the operands is 1 and returns a 0 when both of the operands are either 1 or 0. It is a logical operation on two logical values.

This operation widely used in encryption stardards.
The equcation is
A XOR B=A'B+ AB'
Advantages of XOR
A XOR B= C
A XOR C=B
B XOR C=A
If A XOR with C then we can get B or If B XOR with C we can get A.
Therefore, it is most applicable for encryption and decryption mechanism.

BMP

The BMP file format also called as bitmap. It contains 55 bytes of header. Image pixels are stored with a color depth of 1, 4, 8, 16, 24, or 32 bits per pixel. Images of 8 bits and fewer can be either grayscale or indexed color.

24-Bit Color Image

Each pixel is represented by three bytes supports 256 x 256 x 256 possible combined colors (16,777,216). 24-bit image also known as RGB image. RGB colors also called true colors.

MSB

MSB can be abbreviated from Most Significant Bit. The first MSB is starts from Right side of the data. In computing, the most significant bit (MSB) is the bit position in a binary number having the greatest value.

In computing, the least significant bit (LSB) is the bit position in a binary integer giving the units value, that is, determining whether the number is even or odd.

Proposed Algorithm

This algorithm is supported and tested on 24-bit BMP image files. Embed every bits are depend on First two MSB of every byte. This algorithm is implemented in VB.Net.

Consider First two MSBs are MSB1, MSB2.

The number of bits to be embed into every byte is as shown in table – 1.

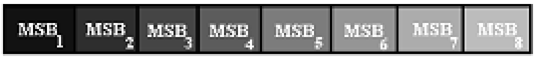


Fig. 1: MSB format in a byte

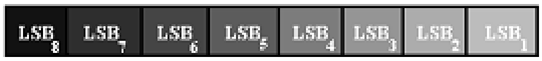


Fig. 2: The format of LSB in a byte

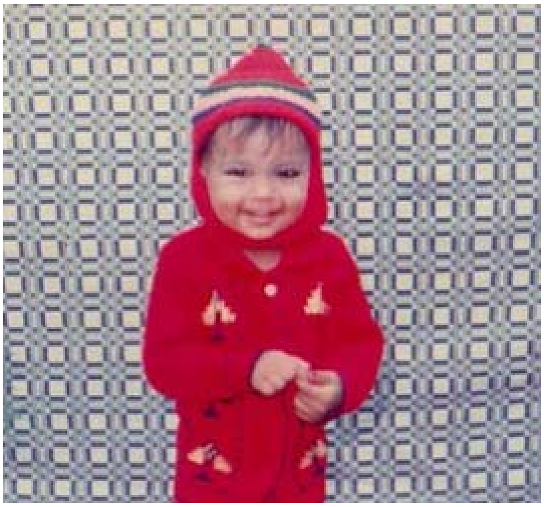


Fig. 3: This image are shown as original image

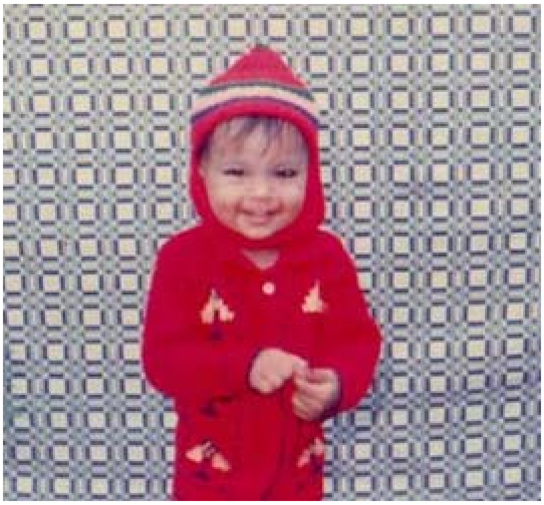
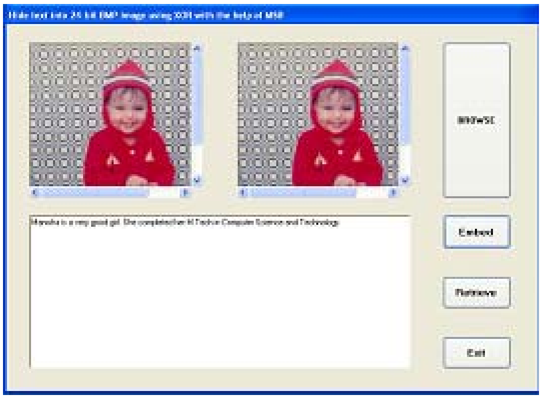


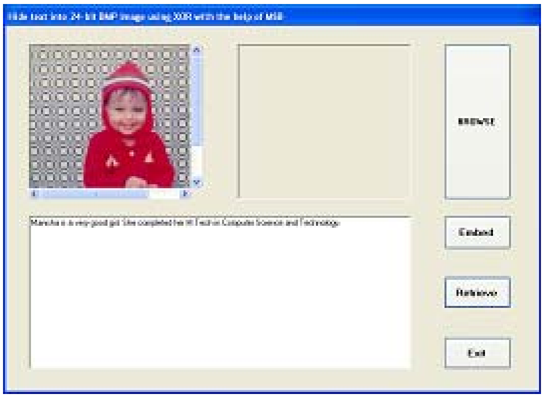
Fig. 4: Embed some text it can be converted to stegoimage



Hide text into 24-bit BMP image using XOR with the help of MSB

Manisha is a very good girl. She completed her M.Tech in Computer Science and Technology.

Fig. 5: The system is developed using VB. Net



Hide text into 24-bit BMP image using XOR with the help of MSB

Manisha is a very good girl. She completed her M.Tech in Computer Science and Technology.

Fig. 6: retrieve phase

Table 1: Looks as a format of conversion of binary to decimal number

MSB1	MSB2	No. of Embed bits
0	0	1
0	1	2
1	0	3
1	1	4

Using table -1 upto 4 bits are embed into the byte.

Consider the first four least significant bits are LSB1, LSB2, LSB3, LSB4.

Consider the four message bits are MSG1, MSG2, MSG3, MSG4.

```
Embed the message bits into the image.
If  ebits >=1 then
   LSB1=MSB4 XOR MSG1
End If
If  ebits >=2 then
   LSB2=MSB3 XOR MSG 2
End If
If  ebits >=3 then
   LSB3=MSB2 XOR MSG 3
End If
If  ebits =4 then
   LSB4=MSB1 XOR MSG 4
Retrieve the message bits from the image
If ebits>=1 then
         MSG1=MSB4 XOR LSB1
End If
If ebits>=2 then
         MSG2=MSB3 XOR LSB2
End If
If ebits>=3 then
         MSG3=MSB2 XOR LSB3
End If
If ebits>=4 then
         MSG4=MSB1 XOR LSB4
End If
```

Example:

Consider the byte of the image is 11011101 and message bits are 1110.

MSB1 and MSB2 both are 1’s. Therefore number of embed bits are four.

After applying this algorithm the new byte is 11010101

Advantages

- Embed more number of bits in a byte.
- Embed number of bits are vary from byte to byte.

CONCLUSION

Hiding the text into the image using XOR operation with the help of MSB bits of the byte. Embed bits are vary from byte to byte. Therefore it is more secure.

REFERENCES

1. http://www.tech-faq.com/xor.shtml
2. http://en.wikipedia.org/