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.

Run Length   (RLE)   Karhunen Loeve

Least Significant Bit (Encoding

LSB)

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Hiding Text Data in Karhunen Loeve Space by Using a Random Formula in Digital Images

Abstract

The increasing growth of the   multimedia on the network led
to increasing the need to offer efficient methods to protect data and the
individual property. The aim of hiding the information   is to remove
the suspection   in the existence of a hidden information and   the
special thing in the technique of hiding information is that it conveys the

*   /   /
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***   /   /

2011/ 12/ 21 :   2011/10/1:

modern techniques and protects the messages and reduces the necessary area to save it in a file or sending then on the net the technique of press. So, in this research a method of hiding was suggested depending on Karhunen Loeve information and using the method of (RLE) Run Length Encoding for pressing the resulted data and applying the method of (LSB) Least Significant Bit for hiding the data by using a random formula in choosing a location for saving the information in a covering image. The method showed a high efficiency in pressing and hiding in the digital images.

المقدمة

.

(Encryption) [1]

(Steganography)

[2]

Internet

[1]

( )

[2].

[3].

[4].

15-10 .

: .

'

.

.[5]

RLE

.

Previous Studies -1

'

.

Wang et al. 2007

[6] .

2008 Zuo و Chuan

YC$_b$C$_r$,

KL '

[7] .

Qian et al. 2010

Probabilistic Neural Networks (PNN)

[8] .

2011 Jian و Dong

Vector Machine Hybrid [9].

Lingala et al.

Magnetic Resonance Imaging (MRI)

.[10]

Introduction to Compression   **-2**

:[2]

Lossless Compression Algorithms   -1
Lossy Compression Algorithms   -2

3- طريقة RLE

بطول التعداد.   Run Length Encoding   RLE

.   .

.[11]

("1")   ("0")

.

,   .

.[12]

.

.[2]

RLE

,

...

"،

: [12]

min(find(im==1))

im   .

.   .

. im

(1)   ،   output

.

(1) **RLE** [12]

Image	Looking For	Place	RLE Output
			[ ]
[001110001]	1	3	[2]
[1110001]	0	4	[2 3]
[0001]	1	4	[2 3 3]
[1]	0	Not found	[2 3 3 1]

-4   **[13,8]**

-1   ،

, X   X   .N

$$covx=E\{(X-E(X))[X-E(X)]\} \quad …………….(1)$$

-:

: covx   . X

: E(X)   . X

-2   Ø (Eigen vectors)   λ Eigen)

values) :

$$covx_k Ø=_k \lambda_k \quad ………………..(2)Ø$$

k=1,……,n

3- Ø   λ   "   U

, ( )

.

4- :

$Y= U*(X-\mu)$ ....(3)

:

Y: , U:

", X: , μ: .

5- (Y).

-5

:

1- ( )

Byte .

2- (4) (y)

$Y=\sin(\text{index of byte})$ ------------------(4)

3- $(X.X_1X_2X_3X_4X_5)$ X_3

3

.

$\text{No. of. partition}=X_3 \bmod 3$ ------------------(5)

4-

.

5- (4-2) .

6-

1 :

Microsoft Word2007 .

.   : 2

.   : 3

Eigen vector   4 Row   : 4

.

.   : 5

. RLE   : 6

.   : 7

: 8

LSB

.

البداية

إدخال صورة الرسالة المخفية

تحويل الصورة إلى فضاء كارهونين لويف

اخذ أول Row 4 من القيم المميزة Eigen vector

كبس المعلومات الناتجة باستخدام طريقة RLE

تحويل المعلومات الناتجة إلى

إخفاء المعلومات الناتجة في الصورة الغطاء باستخدام طريقة البت الأقل أهمية LSB وبصورة عشوائية

النهاية

(1)

7-

:

'

:
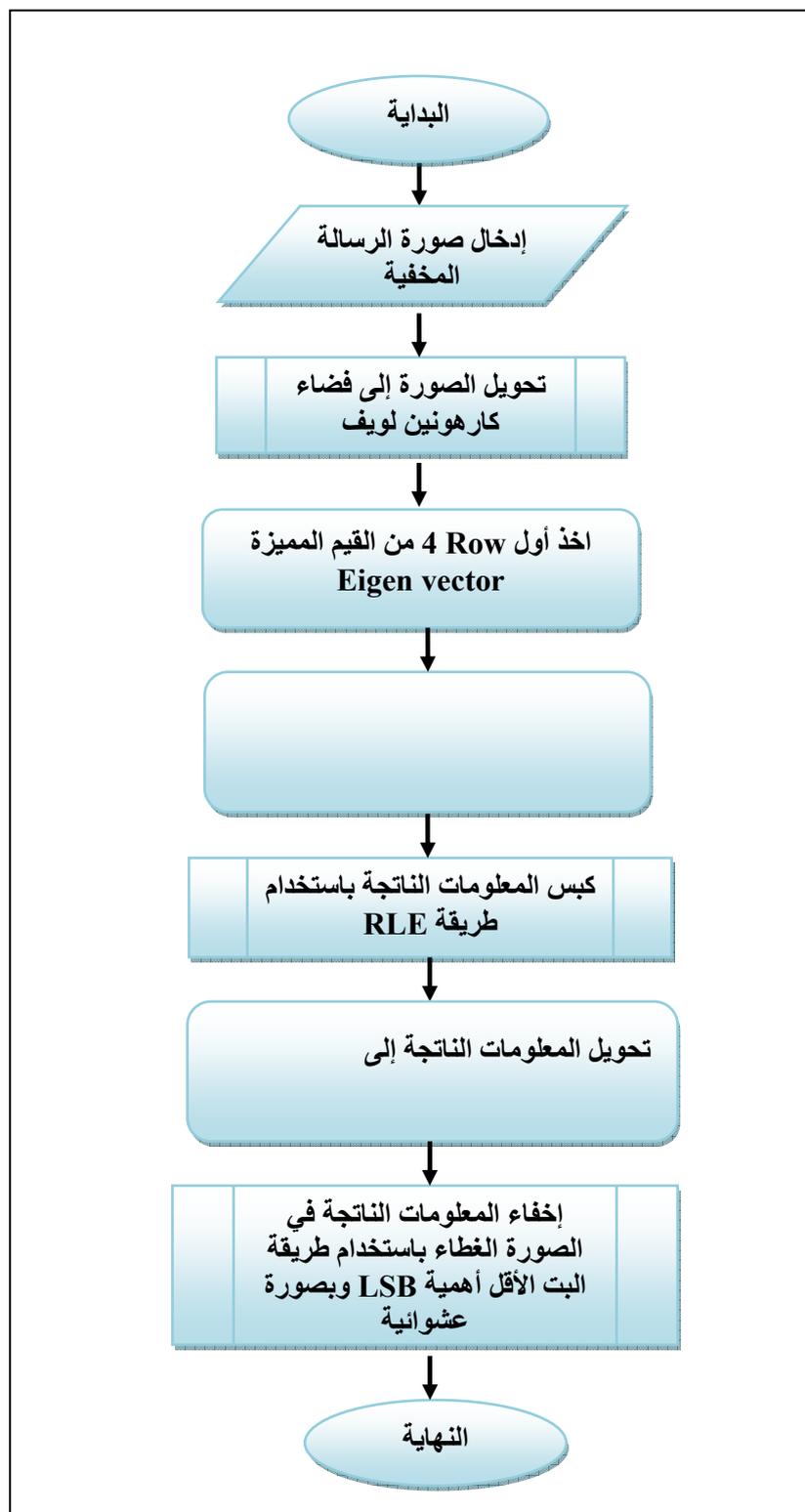
1- Microsoft Word

. (2) .

<div style="border: 2px solid #000; background-color: #f5d7d7; padding: 20px; text-align: center;">

في هذا البحث تم استخدام طريقة جديدة لتمييز الحرف العربي بالاعتماد على احجام مختلفة للحرف العربي وتم تطبيقها على جميع الحروف العربية المتشابه وغير المتشابه واخذت حركات للحرف (السكون، الضمة، والكسرة) وقد تم التوصل الى نتائج جيدة.

</div>

(2)

2- .

3- Eigen vector

.

(3) ,

.

process Imagbe by klt:

(3)

4- . im2bw

5-

,

.[15,14]

RLE

.

.

6- .

7- LSB

(4)

.

(4,5)......

(Byte)   [2]

.

Original Image: lena

(4)

...

-8   (5)

.

stganography image

(**5**)

8-

-1   (1)

.

-2   .

-3   decimal .

-4   RLE   "0"   "1"

.

-5   KL   .

-6   .

9-

'

'

4

'

.

(=) [11]

.

256×256 .

LSB 6291456

106592

.59.0237

LSB

.

-10

. [15]

MATLAB

:

.1

. [1,0]

.2

.

.3

.

.4 (4,5)

.

.5

.

.6 RLE ‏.

.7

Eigen vector

‏. ‏.

‏.

‏'

‏.

.8

- ‏.

- ‏.

- ‏.

- ‏.

‏.

[1] "‏ (2009) ‏"‏'

[2] "‏ (2011) ‏"‏'

‏.

[3] "‏ (2008) : ‏"‏.

[4] "‏ (2004) "‏"

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[5] " (2003)

"

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" (2003)   [14]

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                              ",(2006) ,   ,   [15]
,2   -   ,   ,"

                                    . 69-43