د/ علاء الدين محمد عباس

Alaa M. Abbas, received the BSc and MSc in Electronic Eng. – Communication from Menoufia University – Egypt in 1996 and 2001 respectively. Now he is a PhD student studying Pattern Recognition Systems at Menofia University - Egypt. His areas of interest are digital signal processing, Image processing, motion estimation, Pattern Recognition, and face detection and recognition.

Name: Alaa Eldeen Mohamed Abbas Saleh.

Date of birth: 21/10/1972.

Phone**: 002 02 24730147**

Mobile**: 002 01119341404**

E-Mail**:** aladin_abbas@yahoo.com

Affiliation: Department of Electronics and electrical Communications, Faculty of Electronic Engineering, Menoufia University, Egypt.

Conferences papers

البحث رقم (1)

Title

A Flexible Symmetric-Key Block Cipher Algorithm

Ibrahim F. Elashry1, Osama S. Farag Allah2,
Alaa M. Abbas3, S. El-Rabaie3, and Fathi E. Abd El-Samie3
1 Department of Electrical Communications, Faculty of Engineering, Kafrelsheikh University, Kafrelsheikh, Egypt.
2 Department of Computers Engineering, Faculty of Electronic Engineering, Menoufia University, Menouf, Egypt.
3Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University,
Menouf, 32952, Egypt.
E-mails: ibrahim_elashry@yahoo.com, osam_sal@yahoo.com,
aladin_abbas@yahoo.com,
srabie1@yahoo.com, and fathi_sayed@yahoo.com

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Abstract

In this paper, we present a symmetric-key encryption algorithm that is designed to encrypt data blocks of any size , which is an integer multiple of 32 bits .This algorithm depends on four parameters; the word size (w), the nonnegative number of rounds (r), the key length in bytes (b), and the block size (L). The key feature of the proposed algorithm is that the number of keys used in the encryption/decryption processes depends only on the number of rounds, not the block size. Thus, any block can be encrypted using the same number of keys, if the same number of rounds is used. The proposed algorithm was compared to the advanced encryption standard (AES). The test results show that theproposed algorithm has a self-confusion/diffusion mechanism, does not depend on the plainimage, and has a better computation time and throughput.

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البحث رقم (2)

Title

A New Diffusion Mechanism for Data Encryption in The ECB Mode.

Ibrahim F. Elashry 1, Osama S. Farag Allah2,
Alaa M. Abbas3, and S. El-Rabaie3
1 Department of Electrical Communications, Faculty of Engineering, Kafrelsheikh University, Kafrelsheikh, Egypt.
2 Department of Computers Engineering, Faculty of Electronic Engineering, Menoufia University, Menouf, Egypt.
3Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University, Menouf, Egypt.

E-mails: ibrahim_elashry@yahoo.com, osam_sal@yahoo.com, aladin_abbas@yahoo.com, and srabie1@yahoo.com.

Abstract:

In this paper, a diffusion mechanism for encrypting data in the electronic code book (ECB) mode is introduced. Our diffusion mechanism treats the encryption leakages of the ECB mode by using a substitution/permutation network (SPN), which diffuses the bytes of the data together before encryption. The tests were made on AES and RC6 block ciphers implemented in the ECB mode pre-processed with our mechanism and the results were compared to those obtained by these ciphers implemented in the ECB, cipher block chaining mode (CBC), cipher feedback (CFB) and output feedback (OFB) modes. Experimental results verify that this mechanism gives any encryption algorithm implemented in the ECB mode the ability to encrypt the data in a better efficiency than the CBC mode without losing the benefits of the ECB mode of parallel processing provided by processing powers nowadays.

Keywords:

Cryptography, block independency, ECB, Diffusion

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Biographies

***Ibrahim F. Elashry graduated from the Faculty of Engineering, Kafrelshiekh University, Egypt in 2007. He is now a teaching assistant and MSc student. His interest is in security over wired and wireless networks and image processing.**

***Osama S. Farag Allah received his BS in 1997, MSc in 2002, and PhD in 2007, all in computer science and engineering, from Menoufia University, Faculty of Electronic Engineering, Egypt. He was a demonstrator at the Department of Computer Science and Engineering, at Menoufia University, from 1997 to 2002, became an assistant lecturer in 2002, and was promoted to a lecturer in 2007.**

His research interests cover computer networks, network security, cryptography, Internet security, multimedia security, image encryption, watermarking, steganography, data hiding, and chaos theory.

***Alaa M. Abbas** received his BSc, MSc, and PhD in electrical engineering from Menoufia University, Egypt, in 1996, 2001,and 2008, respectively. He is currently a lecturer in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. His areas of interest are digital signal processing, image processing, motion estimation, pattern recognition, and face detection and recognition.*

***El-Rabaie** received the BSc with Honors in radio communications from Tanta University, Egypt, 1976, MSc in communication systems from Menoufia University, Egypt, 1981, and a PhD in microwave device engineering from the Queen's University of Belfast in 1986. He Was a postdoctoral fellow in the Queen's University Department of Electronic Engineering until 1989. In 1992, he was a Research Fellow at the North Arizona University, College of Engineering and Technology, and in 1994 he served as a visiting professor at Ecole Polytechnique de Montreal, Quebec, Canada. Prof. El-Rabaie has authored and coauthored more than 70 papers and technical reports, and 15 books. In 1993, he was awarded the Egyptian Academic Scientific Research Award (Salah Amer Award of Electronics), and in 1995, he received the Award of Best Researcher on CAD from Menoufia University. He is now the vice dean of postgraduate studies and research, Faculty of Electronic Engineering, Menoufia University.*

البحث رقم (3)

Puplished In:

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January 24 - 27, 2011- Cairo, Egypt

Title

An Effective Compression Technique for HSL Color Model.

*Noura.A.Semary *Mohiy.M.Hadhoud **Alaa.M.Abbas
noura.samri@ci.menofia.edu.eg
mmhadhoud@ci.menofia.edu.eg aladin_abbas@yahoo.com
*Faculty of Computers and Information
Menoufia University– Shebeen ElKom – Egypt
**Faculty of Electronic Engineering – Menoufia University – Monouf – Menoufia-Egypt

Abstract

It's a fact that nonlinear color models like Hue-Saturation -Value/ Brightness/ Luminance/ Intensity (HSV/ HSB/ HSL/ HSI) have special feature for each channel. So in this paper we propose a new hybrid compression system that deals with each channel with a suitable compression technique to obtain encoded images with less size and high decoding quality than the traditional encoding methods.

Keywords:

HSL; HSI; Compression; Encoding;

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البحث رقم (4)

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Title

A Hybrid Scheme for Multispectral Images Compression and Transmission.

Sahar. R. Falila , Ahmad.M. Tobal
Electronic Research Institute,Giza,Egypt
Raouf Hamzaoui
De Montfort University
Salaheldin M. Diab, Alaa. M .Abbas,
Fathi.E.Abd El-samie,
Electronics and Electrical communications
dept.Faculty of Electronic Engineering,
Menoufia University, Menouf, Egypt.

Abstract:

A modified inter-band scheme based on the predictors used by lossless JPEG and Set Partitioning In Hierarchical Trees (SPIHT) algorithms is proposed for compression of multispectral images. In this scheme, the value of the current pixel in the current band is predicted by the best JPEG predictor on the

previously encoded band. After that, the difference between the actual value and the predicted value is encoded by the SPHIT algorithm, and then transmitted over a wireless channel using an Orthogonal Frequency-Division Multiplexing (OFDM) system. Improvements are achieved in the Peak Signal-to-Noise Ratio (PSNR) of the communicated images for the proposed technique compared with the SPIHT –OFDM algorithm only.

Keywords:

Multispectral images, SPIHT , OFDM, PSNR.

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البحث رقم (5)

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The 8th International Conference on INFOrmatics and Systems (INFOS2012) – 14-16 May.
Computational Intelligence and Multimedia Computing Track

Title

Efficient Fusion of Pan and Multispectral Satellite Images.

A. M. Ragheb, S. Khamis and* M. E. Nasr*

Department of Electronics and Electrical Communications Engineering, Faculty of Engineering, Tanta University, Tanta, Egypt.
*Saleh M. Elkaffas Information Technology Department, Institute of Graduate Studies & Research, Alexandria University, Alexandria, Egypt
*Waleed Al-Nuaimy Electrical Engineering and Electronics dept, The University of Liverpool, L69 3GJ, UK
H. A. Osman, A. M. Abbas,* M. E. Elhalawany, *M. I. Dessouky and* F. E. Abd El-Samie.

Electronics and Electrical Communications dept. Faculty of Electronic Engineering, .Menoufia University, Menouf, Egypt

*Tarek A. El-Tobely.

Computer and Automatic Control dept, Tanta University, Tanta, Egypt.

Abstract:

To identify objects in satellite images, Multispectral (MS) images with high spectral resolution and low spatial resolution, and Panchromatic (Pan) images with high spatial resolution and low spectral resolution need to be fused. Several fusion methods such as the Intensity-Hue-Saturation (IHS), the Discrete Wavelet Transform (DWT), the Discrete Wavelet Frame Transform (DWFT), and the Principal Component Analysis (PCA) have been proposed in recent years to obtain images with both high spectral and spatial resolutions. In this paper, a hybrid fusion method for satellite images comprising both the IHS transform and the DWFT is proposed. This method tries to achieve the highest possible spectral and spatial resolutions with as small distortion in the fused image as possible. A comparison study between the proposed hybrid method and the traditional methods is presented in this paper. Different MS and Pan images from Landsat-5, Spot, Landsat-7, and IKONOS satellites are used in this comparison. The effect of noise on the proposed hybrid fusion method as well as the traditional fusion methods is studied. Experimental results show the superiority of the proposed hybrid method to the traditional methods. The results show also that a wavelet denoising step is required when fusion is performed at low Signal-to-Noise Ratios (SNRs).

Keywords:

Image fusion; DWT, IHS transform; DWFT; Wavelet denoising.

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البحث رقم (6)

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Title

Color Image Encoding Using Morphological Decolorization

Noura.A.Semary
Faculty of Computers and Information
Menoufia University Shebeen ElKom – Egypt
0020163433040
noura.samri@ci.menofia.edu.eg
Mohiy.M.Hadhoud
Faculty of Computers and Information Menoufia University
Shebeen ElKom – Egypt
0020106639290
mmhadhoud@yahoo.com
Alaa.M.Abbas
Faculty of Electronic Engineering Menoufia University
Monouf – Menoufia-Egypt
0020119341404
aladin_abbas@yahoo.com

ABSTRACT

Image colorization is a new image processing topic which refers to recolor gray images to look like the original color images as possible. Different methods appeared in the literature to solve this problem, the way which leads to thinking about decolorization which means eliminating the colors of color images to just small color keys, aid in the colorization process. Due to this idea, decolorization is considered as a color image encoding mechanism. In this paper we propose a new decolorization system depends on extracting the color seeds using morphology operations. Different decolorization methods was studied and compared to our system results using different quality metrics.

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البحث رقم(7)

Title

Fully Automated Black and White Movies Colorization System

Mohiy.M.Hadhoud#1, Noura.A.Semary#2, Alaa.M.Abbas*3
#Faculty of Computers and Information – Menoufia University
Menoufia – Shebeen ElKom – Egypt
1mmhadhoud@yahoo.com
2noura_semary@yahoo.com

*Faculty of Electronic Engineering – Menoufia University
Menoufia – Monouf – Egypt
3aladin_abbas@yahoo.com

Abstract

Since the human visual system is sensitive to colors rather than gray shades, we aim to emphasize the appearance of black and white movies and recolor them to obtain near natural colored movies that look like their original colors. The goal of our research is to implement a powerful automatic coloring system that is suitable for coloring movies with high quality colors and in fast time as possible .Our proposed system based on colorizing the movie shot by shot rather than frame by frame, so that different techniques are presented like shot cut detection , motion estimation, similarity features between images and colorization. By this paper we have succeeded to propose and implement a complete automatic colorization system specified for movies and we nearly achieve our goals.

Keywords:

Colorization, Shot Detection, Motion, Estimation.

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البحث رقم(8)

Title

High Performance Face Recognition Using PCA and ZM on Fused LWIR and VISIBLE Images on the Wavelet Domain.

E. G. Zahran, A. M. Abbas, M. I. Dessouky, M. A. Ashour
and K. A. Sharshar.

Abstract:

Real time face recognition systems have become an area of growing interest due to its wide area of applications. This paper exploits the energy compaction property of the wavelet transform to provide a high performance face recognition system using the PCA and ZM techniques on fused and DWT approximation sub band images. The experimental results indicate that the

wavelet sub band images enhance the face recognition accuracy by 27.2% for the PCA technique and by 3.9% for the ZM technique. Results also indicate that the wavelet approximation sub band images reduce the computational time by 50% for the PCA and by 38.46% for the ZM technique.

Index Terms:

Eigenfaces, image fusion, infrared face recognition, wavelet transform, Zernike moments

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البحث رقم (9)

Puplished In:

28th NATIONAL RADIO SCIENCE CONFERENCE (NRSC 2011) March 15□17, 2011, National Telecommunication Institute, Egypt

Title

Hybrid Encoding Scheme for HSI Model Using the Minimum Color Difference

Noura.A.Semary 1, Mohiy.M.Hadhoud 1, Alaa.M.Abbas2
1 Faculty of Computers and Information – Menoufia University - Shebeen ElKom – Egypt
2 Faculty of Electronic Engineering – Menoufia University- Monouf – Menoufia- Egypt

ABSTRACT

It's known that nonlinear color models like Hue-Saturation -Value/ Brightness/ Luminance/ Intensity (HSV/ HSB/ HSL/ HSI) have special feature for each channel. So in this paper we propose a hybrid compression system that deals with each channel with a suitable compression technique to obtain encoded images with less size and high decoding quality than the traditional encoding methods. There are three encoding techniques will be mixed in our proposed system ;Object Compression Technique for the Hue channel, Minimum Color Difference for Saturation, and the standard Jpeg2000 encoding technique for the Intensity channel. The proposed system results in high compression ratio with very good decoding quality.

Key Words:

HSI, HSL, Hue, Saturation, Intensity, Compression, Jpeg2000

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البحث رقم (10)

Title

Performance Analysis of Infrared Face Recognition Using PCA and ZM

E. G. Zahran, A. M. Abbas, M. I. Dessouky, M. A. Ashour and K. A. Sharshar.

Abstract:

Infrared (IR) Face recognition has become an area of growing interest since it can operate in dim light and total darkness. This paper introduces a comparative study between the infrared face recognition systems using the principle component analysis (PCA) and the Zernike moments (ZM) techniques. The performance is evaluated according to the recognition rate, time consumption, and immunity to both Salt & Pepper and Gaussian noise. The analysis shows that the PCA technique has the same performance as the ZM technique if a large size dataset is used. On the other hand, the ZM technique outperforms the PCA technique when using a small size dataset, but it consumes a time approximately equal to four times that required by the PCA technique. The simulations also show that the ZM technique outperforms the PCA technique in the presence of both Salt & Pepper and Gaussian Noise types at various values of noise variance.

Index Terms:

face detection, infrared face recognition, principal component analysis, Zernike moments.

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البحث رقم (11)

Title

Pixel decomposition for tracking in low resolution videos

Vivekanand Govinda*a, Jason F. Ralpha, Joseph W. Spencera, John Y. Goulermasa, Lihua Yanga, Alaa M. Abbasb
a Dept. of Electrical Engineering And Electronics, University of Liverpool, L69 3GJ, UK.
b Faculty of Electronic Engineering, Menouf 32952, Menoufia University, Egypt.

ABSTRACT:

This paper describes a novel set of algorithms that allows indoor activity to be monitored using data from very low resolution imagers and other non-intrusive sensors. The objects are not resolved but activity may still be determined. This allows the use of such technology in sensitive environments where privacy must be maintained. Spectral un-mixing algorithms from remote sensing were adapted for this environment. These algorithms allow the fractional contributions from different colours within each pixel to be estimated and this is used to assist in the detection and monitoring of small objects or sub-pixel motion.

Keywords:

sub-pixel motion, pixel decomposition, un-mixing, colour tracking

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البحث رقم (12)

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Fifth International Conference on Intelligent Computing and Information Systems (ICICIS 2011)
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Title

Space Transformation for HSL Model Encoding

Noura.A.Semary
Faculty of Computers and Information
Menoufia University
Shebeen ElKom – Egypt
0020163433040
noura.samri@ci.menofia.edu.eg
Mohiy.M.Hadhoud
Faculty of Computers and Information
Menoufia University
Shebeen ElKom – Egypt
0020106639290
mmhadhoud@yahoo.com
Alaa.M.Abbas
Faculty of Electronic Engineering Menoufia University
Monouf – Menoufia-Egypt
0020119341404
aladin_abbas@yahoo.com

ABSTRACT:

Common compression systems treat color image channels similarly, but while nonlinear color models like Hue-Saturation - Value/ Brightness/ Luminance/ Lightness (HSV/ HSB/ HSL/ HSI) have special feature for each channel, a new

hybrid compression system is proposed for encoding color images in HSL color model using new transformation function (YLD). The proposed encoding system deals with each channel with a suitable compression technique to obtain encoded images with less size and high decoding quality than the traditional encoding methods. There are three encoding techniques will be mixed in our proposed system; Object Compression Technique for the Hue channel, Luma(Y) Lightness (L) Difference (D) – for Saturation, and the standard Jpeg2000 encoding technique for the Lightness channel. The proposed system results in very high compression ratio with very good decoding quality.

Categories and Subject Descriptors

F.2.1 [ANALYSIS OF ALGORITHMS AND PROBLEM COMPLEXITY]: Numerical Algorithms and Problems--- Computation of transforms.
I.4.2 [IMAGE PROCESSING AND COMPUTER VISION]: Compression (Coding)--- Approximate methods.

General Terms:

Algorithms, Measurement, Performance, Reliability, and Experimentation.

Keywords:

HSL, HSI, HSV, Encoding, Compression, jpeg2000.

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Journals Papers

البحث رقم (1)

Title

A New Symmetry Approach For Frontal-view Face Detection

El_Sayed M. Saad 1), Mohiy M. Hadhoud 2), Moawad I. Moawad 3) , Mohamed El_Halawany 4) ,and *Alaa M. Abbas 5)
1) Faculty of Engineering, Helwan University, Egypt
2) Faculty of Computers and Information, Menoufia University, Egypt.
3,4,5) Faculty of Electronic Engineering, Menouf, 32952, Menoufia University, Egypt.
* Corresponding Author: aladin_abbas@yahoo.com

Abstract:

An efficient algorithm for detecting frontalview faces in color images is proposed. The proposed algorithm has a special task; it detects faces in the presence of skin-tone regions (human body, clothes, and background) Firstly, a pixel based color classifier is applied to segment the skin pixels from background. Next, a hybrid cluster algorithm is applied to partition the skin region. We introduce a new symmetry approach, which is the main distinguishing feature of the proposed algorithm. It measures a symmetrical value, searches for the real center of the region, and then removes the extra unsymmetrical skin pixels. The cost functions are adopted to locate the real two eyes of the candidate face region. A template matching process is preformed between an aligning frontal face model and the candidate face region as a verification step. Experimental results reveal that our algorithm can perform the detection of faces successfully under wide variations.

Keywords:

face detection, image segmentation, clustering, cost functions, symmetry approach.

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Biographies

1/El_Sayed M. Saad , received the BSc in Electrical Eng.-Commun. from Cairo University – Egypt in 1967, and the Dip. Ing., and the Dr.Ing from Stuttgart University- Germany in 1977, 1981 respectively. He is a member of European Circuit Society (ECS), Society of Electrical Eng.(SEE), and Consultant of the Supreme Council of Universities(SCV)- Egypt. Now he is a Prof. in the faculty of Eng. Helwan University. Egypt. His areas of interest are digital signal processing, Computer Eng, and Image processing.

2/M.M. Hadhoud received the BSc and MSc.degrees in Electrical Engineering from Menoufia University in Egypt in 1976 and 1981 respectively. He received the PhD degree from Southampton University in 1987 . He is a professor of in the Dept. of Inform. Tech., Faculty of Computers and Information , Menoufia University. His areas of interests are signal processing , image processing and digital communication.

3/M.I. Dessouky received the BSc and MSc.degrees in Electrical Engineering from Menoufia University in Egypt in 1976 and 1981 respectively. He received the PhD degree from McMaster University

in 1986. He is a professor of in the Dept. of Electronics and Elect. Communications, Fac. Of Electronic Eng., , Menoufia University. His areas of interests are signal processing , image processing and digital communication.

4/M. M. El-Halawany received the MSc.degree in Electrical Engineering from Menoufia University in Egypt in 1982. He received the PhD degree from Wroclaw University in 1989. He is an Assoc. professor of in the Dept. of Electronics and Elect. Communications, Fac. Of Electronic Eng., Menoufia University. His areas of interests are signal processing , image processing and digital communication.

5/Alaa M. Abbas, received the BSc and MSc in Electronic Eng. – Communication from Menoufia University - Egypt in 1996 and 2001 respectively. Now he is a PhD student studying Pattern Recognition Systems at Menofia University - Egypt. His areas of interest are digital signal processing, Image processing, motion estimation, Pattern Recognition, and face detection and recognition

البحث رقم (2)

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Optical Engineering 47_1_, 017002 _January 2008_

Title

Fusion of Zernike moments and Fourier-Mellin transform for invariant image resolution

Elsayed M. Saad
Helwan University Faculty of Engineering
Department of Communications and Electronics
11795, Helwan, Cairo, Egypt
Mohiy M. Hadhoud
Menoufia University Faculty of Computers and Information
Department of Information Technology
32511 Shebin Elkom, Egypt
Moawad I. Dessouky
Mohamed E. Elhalawany
Alaa M. Abbas
Menoufia University
Faculty of Electronic Engineering

Department of Electronics and Electrical
Communications
32952, Menouf, Egypt
E-mail: aladin_abbas@yahoo.com

Abstract:

We consider the use of Zernike moments _ZMs_ for rotationand scale-invariant classification of images. It is well known that ZMs are rotation-invariant only. We make use of the major benefit of the Fourier- Mellin _FM_ transformation, which changes the rotation and the scale into translation. We introduce a new algorithm, which fuses the ZMs with the FM transform and is invariant under both rotation and scaling. Two sets of images were used to test the proposed algorithm. Experimental results reveal that the proposed algorithm has much better recognition rate than using ZMs within a variation of rotation between 0 and 360 deg, and scaling down and up between 25% and 400% of the original size.
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Subject terms:

pattern recognition; Zernike moments; Fourier-Mellin transform; log-polar transform.
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Biographies

1/Elsayed M. Saad received the BSc in electrical engineering and communications from Cairo University, Egypt, in 1967, and the DipIng and the DrIng from Stuttgart University, Germany, in 1977 and 1981, respectively. He is a member of the European Circuit Society _ECS_ and the Society of Electrical Engineers _SEE_, and a consultant of the Supreme Council of Universities_SCU_, Egypt. Now he is a Professor on the Faculty of Engineering, Helwan University, Egypt. His areas of interest are digital signal processing, computer engineering, and image processing

2/Mohiy M. Hadhoud received the BSc and MSc degrees in electrical engineering from Menoufia University in Egypt in 1976 and 1981, respectively. He received the PhD degree from Southampton University in 1987. He is a professor in the Department of Information Technology, Faculty of Computers and Information, Menoufia University. His areas of interests are signal processing, image processing, and digital communication.

3/Moawad I. Dessouky received the BSc and MSc degrees in electrical engineering from Menoufia University in Egypt in 1976 and 1981, respectively. He received the PhD degree from McMaster University in 1986. He is a professor in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. His areas of interests are signal processing, image processing, and digital communication.

4/Mohamed E. Elhalawany received the MSc degree in electrical engineering from Menoufia University in Egypt in 1982. He received

the PhD degree from Wroclaw University in 1989. He is an associate professor in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. His areas of interests are signal processing, image processing, and digital communication.

5/Alaa M. Abbas received the BSc and MSc in electronic engineering _communication_ from Menoufia University, Egypt, in 1996 and 2001, respectively. Now he is a PhD student studying pattern recognition systems at Menoufia University. His areas of interest are digital signal processing, image processing, motion estimation, pattern recognition, and face detection and recognition

البحث رقم (3)

Puplished In:

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Title

Homomorphic image encryption

*Ibrahim F. Elashry
Kafrelshiekh University Faculty of Engineering
Department of Electrical Communications
Kafrelshiekh, Egypt
*Osama S. Farag Allah
Menoufia University Faculty of Electronic Engineering
Department of Computers Engineering
Menouf, Egypt
**Alaa M. Abbas
**S. El-Rabaie
**Fathi E. Abd El-Samie
Menoufia University
Faculty of Electronic Engineering
Department of Electronics and Electrical Communications
Menouf, Egypt
E-mail: fathi_sayed@yahoo.com

Abstract:

This paper presents a new homomorphic image cryptosystem. The idea of this system is based on encrypting the reflectance component after the homomorphic transform and embedding the illumination component as a least significant bit watermark into the encrypted reflectance component. A comparison study is held between the RC6 block cipher algorithm and the chaotic Baker map algorithm for the encryption of the reflectance component.

We present a security analysis for the proposed cryptosystem against the entropy, brute-force, statistical, and differential attacks from a strict cryptographic viewpoint. Experimental results verify and prove that the proposed homomorphic image cryptosystem is highly secure from the cryptographic viewpoint. The results also prove that this cryptosystem has a very powerful diffusion mechanism (a small change in the plain text makes a great change in the cipher image). The homomorphic encryption using RC6 algorithm is more secure than that using the chaotic Baker map algorithm but not robust to noise. Thus, the proposed homomorphic cryptosystem can be used in different applications, depending on the core algorithm used. _DOI: 10.1117/1.3167847_

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Biographies

1/Ibrahim F. Elashry graduated from the Faculty of Engineering, Kafrelshiekh University, Egypt in 2007. He is now a teaching assistant and MSc student. His interest is in security over wired and wireless networks and image processing.

2/Osama S. Farag Allah received his BS in 1997, MSc in 2002, and PhD in 2007, all in computer science and engineering, from Menoufia University, Faculty of Electronic Engineering, Egypt. He was a demonstrator at the Department of Computer Science and Engineering, at Menoufia University, from 1997 to 2002, became an assistant lecturer in 2002, and was promoted to a lecturer in 2007. His research interests cover computer networks, network security, cryptography, Internet security, multimedia security, image encryption, watermarking, steganography, data hiding, and chaos theory.

3/Alaa M. Abbas received his BSc, MSc, and PhD in electrical engineering from Menoufia University, Egypt, in 1996, 2001, and 2008, respectively. He is currently a lecturer in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. His areas of interest are digital

signal processing, image processing, motion estimation, pattern recognition, and face detection and recognition.

4/S. El-Rabaie received the BSc _with Honors _ in radio communications from Tanta University, Egypt, 1976, MSc in communication systems from Menoufia University, Egypt, 1981, and a PhD in microwave device engineering from the Queen's University of Belfast in 1986. He Was a postdoctoral fellow in the Queen's University Department of Electronic Engineering until 1989. In 1992, he was a Research Fellow at the North Arizona University, College of Engineering and Technology, and in 1994 he served as a visiting professor at Ecole Polytechnique de Montreal, Quebec, Canada.

5/Prof. El-Rabaie has authored and coauthored more than 70 papers and technical reports, and 15 books. In 1993, he was awarded the Egyptian Academic Scientific Research Award _Salah Amer Award of Electronics_, and in 1995, he received the Award of Best Researcher on CAD from Menoufia University. He is now the vice dean of postgraduate studies and research, Faculty of Electronic Engineering, Menoufia University.

6/Fathi E. Abd El-Samie received his BSc, and MSc, and PhD in electrical engineering from Menoufia University, Egypt, in 1998, 2001, and 2005, respectively. He is currently a lecturer in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. He received the most cited paper award from Digital Signal Processing Journal in 2008. His areas of interests are signal processing, image enhancement, restoration, super resolution and interpolation, and digital communications.

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Title

A New Method for Encrypting Images with Few Details Using Rijndael and RC6 Block Ciphers in the Electronic Code Book Mode

Ibrahim F. Elashry a , Osama S. Faragallah b , Alaa M. Abbas c , S. El-Rabaie c & Fathi E. Abd El-Samie c
a Department of Electrical Communications, Faculty of Engineering, Kafrelsheikh University, Kafrelsheikh, Egypt
b Department of Computer Science & Engineering, Faculty of Electronic Engineering, Menoufia University, Menouf, Egypt
c Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University, Menouf, Egypt
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ABSTRACT :

In this paper, we propose an efficient method for encrypting images with few details using Rijndael and RC6 block ciphers in Electronic Code Book (ECB) mode. Images with few details are images with large areas of similar gray levels such as medical images, infrared images, and logo images. This leads to encryption leakage if the Rijndael or RC6 block ciphers are used. The proposed method solves this problem by using a preprocessing step to eliminate the repeated patterns before encryption. A comparison is held between encryption of images with few details with preprocessing and encryption without preprocessing. Experimental results verify that the proposed preprocessing method gives the encryption algorithms the ability to encrypt images with few details in an efficient manner in the ECB mode.

KEYWORDS:

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BIOGRAPHIES

Ibrahim F. Elashry graduated from the Faculty of Engineering, Kafrelshiekh University, Egypt in 2007. He is now a teaching assistant and MSc student. He is doing his PhD studies in the University ofWollongong (UOW) Australia. His research interests are in security over wired and wireless networks and image processing.

Osama S. Faragallah received a B.S. in Computer Science & Engineering from Menoufia University, Faculty of Electronic Engineering, Egypt in 1997, a M.Sc. in Computer Science & Engineering from Menoufia University, Faculty of Electronic Engineering, Egypt in 2002, and a Ph.D. in Computer Science & Engineering from Menoufia University, Faculty of Electronic Engineering, Egypt in 2007. He was appointed as a demonstrator at the Department of Computer Science and Engineering, Faculty of Electronic Engineering, Menoufia University, from 1997 to 2002. He became an assistant Lecturer in 2002 and promoted to a Lecturer in 2007. His research interests cover Computer Networks, Network Security, Cryptography, Internet Security, Multimedia Security, Image Encryption, Watermarking, Steganography, Data Hiding, Chaos Theory.

Alaa M. Abbas received the BSc and MSc in electronic engineering communication from Menoufia University, Egypt, in 1996 and 2001, respectively. Now he is a PhD student studying pattern recognition systems at Menoufia University. His areas of interest are digital signal processing, image processing, motion estimation, pattern recognition, and face detection andrecognition.

S. El-Rabaie (Senior Member, IEEE'1992 MIEEChartered Electrical Engineer) received the B.Sc. Degree with Honors in Radio Communications from Tanta University, Egypt, 1976, the M.Sc. Degree in Communication Systems from Menoufia University, Egypt, 1981, and the Ph.D. Degree in Microwave Device Engineering from the Queen's University of Belfast, 1986. He was a Postdoctoral Fellow at Queen's (Dept. of Electronic Eng.) until February 1989. In his Doctoral Research, he Constructed a CAD Package used in Nonlinear Circuit Simulations based on Harmonic Balance Techniques. Since then, he has been involved in the development of GaAs FET Doublers, Triplers, and Oscillators From X to K band. He was invited in 1992 as a Research Fellow in the North Arizona University (College of Engineering and Technology) and in 1994 as a Visiting Prof. in Ecole Polytechnique de Montreal (Quebec), Canada. Prof. El-Rabaie has authored and co-authored more than 70 papers and technical reports, as well as fifteen books. In 1993, he was awarded the Egyptian Academic Scientific Research Award (Salah Amer Award of Electronics) and in 1995, he received the award of the Best Researcher on (CAD) from Menoufia University. He has shared in translating the first part of the Arabic Encyclopaedia. Now he is the Vice Dean of Postgraduate Studies and Research, Faculty of Electronic Engineering, Menoufia University.

Fathi E. Abd El-Samie received the B.Sc. (Honors), M.Sc., and PhD. from the Faculty of Electronic Engineering, Menoufia University, Egypt, in 1998, 2001, and 2005, respectively. He joined the teaching staff of the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University, in 2005. He is a co-author of 180 papers and two

textbooks. He has received the most cited paper award from Digital Signal Processing journal for 2008. His current research areas of interest include image enhancement, image restoration, image interpolation, and super resolution reconstruction of images, data hiding, multimedia communications, medical image processing, optical signal processing, and digital communications.

البحث رقم (5)

Title

Secure Semi Blind Image Watermarking Using Fractional Fourier and Wavelet Transforms

Ehab H. Elshazly [1], Mahmoud A. Ashour [1], El-Sayed M. El-Rabaie [2], Alaaeldin M. Abbas [2], Fathi E. Abd El-Samie [2] and H. B. Kazemian[3]

[1] Eng. Dept., NCRRT, EAEA, 3 Ahmed Al-Zomar, 8th District, Nasr City, Cairo, Egypt, eng_ehab_helmy@yahoo.com

[2] Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia
University, Menouf, 32952, Egypt.
[3] London Metropolitan University

Abstract:

In this work, we present a secure and robust digital image watermarking algorithm using both the Discrete Wavelet Transform (DWT) and the Fractional Fourier Transform (FrFT). The main purpose of the paper is to obtain a robust watermarking algorithm that is secure and that allows multiple watermarks to be embedded in the same cover image. We first decompose the host image into its sub-bands with the 2-D DWT. After that, we implement the 2-D FrFT on the selected sub-bands. Two random Pseudo-Noise (PN) sequences are used to modulate the selected FrFT coefficients according to the watermark pixels and inverse transforms are performed to get the watermarked image. In watermark extraction, we do not need the original image. We just need the two PN sequences used in the embedding process and the watermark size. So, a correlation coefficient is used to determine whether the extracted pixel is one or zero. The proposed algorithm shows improved security, capacity and imperceptibility. Also, robustness is still within the acceptable range under different attacks.

Key words :

Watermarking, DWT, FrFT, Security, and Robustness.

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Biographies of the Authors:

Ehab H. Elshazly, he was born in 1982 and received his Bsc degree in electronics and electrical communication engineering from faculty of electronic engineering, Menoufya University, Egypt in 2004. He is working to finish his MSc. Degree. His field of interest is image processing in general specially image watermarking and image encryption.

Prof. S. El-Rabaie (Senior Member, IEEE'1992-MIEE-Chartered Electrical Engineer) was born in Sires Elian (Menoufia), EGYPT in 1953. He received the B. Sc. degree with honors in radio communications from Tanta University, Egypt, 1976, the M.Sc. degree in communication systems from Menoufia University, Egypt, 1981, and the Ph.D. degree in microwave engineering from the Queen's University of Belfast, 1986. He was a postdoctoral fellow at Queen's (Dept. of Electronic Eng.) up to Feb. 89. In his doctoral research, he constructed a CAD package used in nonlinear circuit simulations based on the harmonic balance techniques. He has been involved in different research areas including CAD of nonlinear microwave circuits, nanotechnology, communication systems, and digital image processing. He was invited in 1992 as a research fellow in the North Arizona University (College of Engineering and Technology) and in 1994 as a visiting Prof. in Ecole Polytechnique de Montreal (Quebec), Canada. Prof. El-Rabaie has authored and co-authored more than 120 papers and technical reports, fifteen books under the titles (Computer Aided Simulation and Optimization of Nonlinear Active Microwave Circuits, The Whole Dictionary for The Computer and the Internet Terminologies, Basics and Technologies of Data Communications in Computer Networks, Technologies and Internet Programming, The Distance Learning and its Technologies on the Third Millennium, Computer Principles and Their Applications in Education, Software Engineering (1), Management of Computer Networks(1,2), Advanced Internet Programming, Data-base Principles, Building of Compilers, Software Engineering (2), Ethics of Profession). In 1993, he was awarded the Egyptian Academic Scientific Research Award (Salah Amer Award of Electronics) and in 1995, he received the Award of the Best Researcher on (CAD) from Menoufia University. He has participated in translating the first part of the Arabic Encyclopedia.

Now, he is a professor of Electronics and Communications Eng., Faculty of Electronic Engineering, Menoufia University.

Alaa M. Abbas received the BSc and MSc and PhD in Electrical Engineering from Menoufia University in Egypt in 1996 and 2001 and 2008, respectively. He is currently a lecturer in the Dept. of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menoufia University. His areas of interest are digital signal processing, image processing, motion estimation, pattern recognition, and face detection and recognition.

F. E. Abd El-Samie was born in Tanta, Egypt, on May 12, 1975. He received the B.Sc. degree in communication engineering from Faculty of Electronic Engineering, Menoufia University, Egypt, in May 1998, the MSc. in Electrical Communications, Faculty of Electronic Engineering, Menoufia University, 2001. PhD. In Electrical Communications, Faculty of Electronic Engineering, Menoufia University, 2005. He has received the most cited paper award from Digital Signal Processing Journal in 2008 for the paper entitled: "Efficient Implementation of Image Interpolation As An Inverse Problem", authored and co-authored more than 150 papers and 2 Books, interested in Image Processing: (Enhancement of old images and images acquired under bad illumination conditions, restoration of degraded images, restoration of degraded and noisy images, multi channnel image processing, image interpolation and resizing, super resolution reconstruction of images, color image processing, image watermarking, encryption, and data hiding) , Signal Processing: (Spectral Estimation, Wavelet Processing, Signal Separation, and Speech Processing) and Digital Communications (CDMA, OFDM, Dynamic Spectrum Management, Channel Equalization and Channel Estimation).

H. B. Kazemian (SM'1988) received a B.Sc. in Engineering from Oxford Brookes University ,UK, a M.Sc. in Control Systems Engineering from the University of East London, UK, and a Ph.D. in Learning Fuzzy Controllers from Queen Mary University of London, UK, in 1985, 1987 and 1998, respectively. He is currently a full

professor at London Metropolitan University, UK. He worked for Ravensbourne College University Sector, UK, as a senior lecturer for eight years. Previous lecturing experience includes the University of East London, UK, University of Northampton, UK, and Newham College, UK. Research interests include fuzzy and neuro-fuzzy control of networks, 2.4 GHz frequency bands (ZigBee, Bluetooth, WiFi), ATM, video streaming and rate control. Prof. Kazemian is a senior member of the Institute of Electrical and Electronics Engineers (SMIEEE), Fellow of the Institution of Engineering and Technology FIET (formerly IEE) UK and Chartered Engineer (C.Eng.) UK.

البحث رقم (6)

Title

Novel Compression System for Hue-Saturation and Intensity Color Space

Noura Semary1, Mohiy Hadhoud1, Hatem Abdul-Kader1, and Alaa Abbas2
1Faculty of Computers and Information, Menofia University, Egypt
2Faculty of Electronic Engineering, Menofia University, Egypt

Abstract:

Common compression systems treat color image channels similarly. Nonlinear color models like Hue-Saturation - Value/ Brightness/ Luminance/ Intensity (HSV/ HSB/ HSL/ HSI) have special features for each channel. In this paper a new hybrid compression system is proposed for encoding color images in HSI color model. The proposed encoding system deals with each channel with a suitable compression technique to obtain encoded images with less size and

high decoding quality than the traditional encoding methods. There are three encoding techniques will be mixed in the proposed system; Object Compression Technique for the Hue channel, Luma(Y) Intensity (I) Difference (D) - for Saturation, and the standard JPEG2000 encoding technique for the Intensity channel. The proposed system results demonstrate the proposed architecture and give considerable compression ratio with good decoding quality.

Keywords:

Hue, saturation, intensity, encoding, compression. Received March 18, 2010; accepted July 28, 2011

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Biographies

Noura Semary is an assistant teacher in Information Technology department, faculty of Computers and Information, Menofia University. She received her B.Sc in Computers and Information- Information Technology, faculty of Computers and Information, Cairo University, 2001. She received her M.Sc and Ph.D in Computers and Information- Information Technology, faculty of Computers and Information, Menofia University, 2007 and 2011 respectively. Her research interests are in Image and Video Processing, Computer Vision, Data Compression, Virtual Reality and Pattern Recognition fields.

Mohiy Hadhoud is a professor in Communications, Information Technology Department, faculty of Computers and Information, Menofia University. He received his B.Sc and M.Sc in telecommunications, faculty of electronic engineering, Menofia

University, 1976 and 1981 respectively. He received his Ph.D in Signal and Image processing Department of Electronics and Computer Science, Southampton University, UK Aug 1987. His fields of Interest are Digital Signal Processing, Adaptive filtering, Digital Image Processing, Digital communications, Switching Systems, Multimedia applications, and Information security and data hiding.

Hatem Abdul-Kader obtained his BS and MSC, both in electrical engineering from the Alexandria University, Faculty of Engineering, Egypt, 1990 and 1995, respectively. He obtained his PhD degree in electrical engineering also from Alexandria University, Faculty of Engineering, Egypt in 2001. His areas of interest are data security and computer vision, and he is specialized in neural networks. He is currently an assistant professor in the Information Systems Department, Faculty of Computers and Information, Menofia University, Egypt, since 2004.

Alaa Abbas is a lecturer in the Department of Electronics and Electrical Communications, Faculty of Electronic Engineering, Menofia University. He received his B.Sc, M.Sc, and Ph.D in electrical engineering from Menofia University, Egypt, in 1996, 2001, and 2008, respectively. His areas of interest are digital signal processing, image processing, motion estimation, pattern recognition, and face detection and recognition.

List of Publications

Affiliation:

Department of Electronics and electrical Communications, Faculty of Electronic Engineering, Menoufia University, Egypt.

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