ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 6, June 2015

Improved Embedding for Line Based Morphological Images in Data Hiding

S.Kannan[1], N. Priya[*2]

[1]Assistant Professor, Department of CSE, Jerusalem College of Engineering, Chennai, Tamil Nadu, India

[2]Assistant Professor, Department of CSE, Bharath University, Chennai, Tamil Nadu, India

[*]Corresponding Author,

ABSTRACT: Data hiding has wide applications in military areas, especially in covert communications and in secret keeping. In the existing system data is directly hidden into cover image and sent to receiver side. When this method is used, it is easy for the hackers to extract the hidden data. Hence a new type of computer art, called Line-based Cubism-Like Image, which keeps lines and regions from multiple viewpoints are proposed. Cubism artists transform a natural scene into geometric form in paintings by breaking up, analyzing and reassembling objects in the scenes from multiple viewpoints. In this method, the prominent line segments which are present in the source image are detected and rearranged to form regions with cubism flavor. Data is hidden during the process of recoloring the region in the generated art image. By using this technique data hiding is skillfully done with minimal distortion. This data embedding process is proved to be reversible, that is, the cover image along with the hidden data can be recovered successfully. This way of combining art image creation and data hiding, which may be called aesthetic data hiding, is a new idea of information hiding. Attracted by the art exhibited by the image, people hopefully will pay no attention to the hidden data in the art image, and via this camouflage effect, the embedded data can be kept securely or transmitted securely. This method also suffers from a drawback, that is, the files which are one third of the size of the cover image can only be embedded. Larger files cannot be embedded. As an enhancement measure, DCT compression technique is used to compress those files which are larger in size. Thus by this compression technique, larger files can also be embedded in the cover image. Gamma correction is also done to enhance the quality of the cover image.

KEYWORDS: Line-based Cubism- like Image, cover image, stego image, Discrete cosine Transform(DCT), gamma correction.

I. INTRODUCTION

Data hiding has recently been proposed as a promising technique for the purpose of information assurance, authentication, fingerprint, security, data mining, and copyright protection, etc. By data hiding, pieces of information represented by some data are hidden in a cover media. Many image data hiding algorithms have been proposed in the past several years. In most cases, the cover media will experience some permanent distortion due to data hiding and cannot be inverted back to the original media. It is observed that most of the current data hiding algorithms are not lossless.With the popularly used least significant bit-plane (LSB) embedding method, the bits in the LSB are replaced according to the data to be embedded and the bit- replacement is not memorized. Consequently, the LSB method is not invertible[1]. With another group of frequently used watermarking techniques, called quantization index modulation (QIM), quantization error makes lossless data hiding impossible. In some applications, such as in the fields of law enforcement, medical and military image systems, in addition to perceptual transparency it is desired to reverse the marked media back to the original cover media after the hidden data are retrieved for some legal or other considerations. The marking techniques satisfying this requirement are referred to as reversible, lossless, distortion-free, or invertible data hiding techniques.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 6, June 2015

II. RELATED WORKS

A survey of stroke-based rendering by A.Hertzmann had proposed stroke-based rendering (SBR), an automatic approach to create non photorealistic imagery by placing discrete elements such as paint strokes or stipples. Researchers have proposed many SBR algorithms and styles such as painting, pen-and-ink drawing, tile mosaics, stippling, streamline visualization, and tensor field visualization[2].

Fig1.(a) Original image Fig1.(b) Art image

Fast paint texture by Hertzmann.A et al had proposed a technique for simulating the physical appearance of paint strokes under lighting. This technique is easyto- implement and very fast, yet produces realistic results[3]. The system processes a painting composed of a list of brushstrokes. A height map is assigned to each stroke, and a height field for the painting is produced by rendering the brush strokes textured with the height maps. The final painting is rendered by bump-mapping the painting's colors with the height map.

Mosaic image is also a type of type of computer art image. Image Mosaics are assemblage of minute Images which are joined in such a way that if anyone sees the image from a distance it appears a larger image. The arrangement of small images may be manual or automatic. In Image Mosaics color is adjusted automatically. Choice depends on the person who is performing the Image Mosaics or the purpose of imagemosaics[4]. Just positioning Images at various scales is one of the attractive features of image mosaics. Another factor is distribution of colors. Uniform distributions of colors in images are more suitable for image mosaics. The drawback of this technique is that joins between consecutive photos will not exactly align. Mosaics are constructed from photographs and suffer from image displacement and scale variations. Distances, angles and areas will only be approximate and should not be measured from these images[5]. Digital overlays can be included with digital mosaics but the image will not represent the true position and hence may not align with design overlays. Scanning resolution will restrict magnification (enlarging areas) on digital mosaics.

Orientale textures for image-based pen-and-ink illustration by P.Salisbury Michael T. Wong John F. Hughes et al had proposed an interactive system for creating pen-and-ink-style line drawings from grayscale images in which the strokes of the rendered illustration follow the features of the original image.

III. PROPOSED SYSTEM

The proposed data hiding technique embeds message data into a cover cubism-like image by changing each pixel's color value in the cover image for the minimum amount of in each color channel[6]. As a result, people cannot tell the visual difference between the cover image and the stego image. This effect, in addition to that of attracting people by the artistic content of the Cubism-like image, gives the proposed data hiding technique a camouflage effect which arouses no suspicion from hackers. Furthermore, a reversible region recoloring scheme, which keeps the average color of each region unchanged, is designed as a substitute of the original re coloring process. This reversibility guarantees that we can extract the data embedded in the stego-image to restore the original content of the cover image lossless[7]. It is also noted that changing pixels' colors slightly while keeping average region colors unchanged, as proposed, creates integrally a mosaic effect in the regions, which makes the stego-image look nearly identical to the cover image and thus enhances the camouflage effect of the proposed technique.

This method has several merits. First, it generates Cubism-like images as stego-images to distract the hacker's attention to the message data embedded in them. Also, by using the minimum color shiftings of ±1 to embed data bits, the

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 6, June 2015

resulting pixels' color differences between the generated Cubism-like image and the stego-image are so small that a hacker will take no notice of the existence of the hidden data[8].

Consequently, the proposed data hiding technique is very suitable for use in covert communication or secret keeping. Furthermore, four measures of randomization of the input message data and the processing order of them with a secret key and several random-number generating functions have been adopted in the proposed method[9]. This enhances greatly the security of the proposed method. In order to enhance the image, DCT and gamma correction techniques are also adopted.

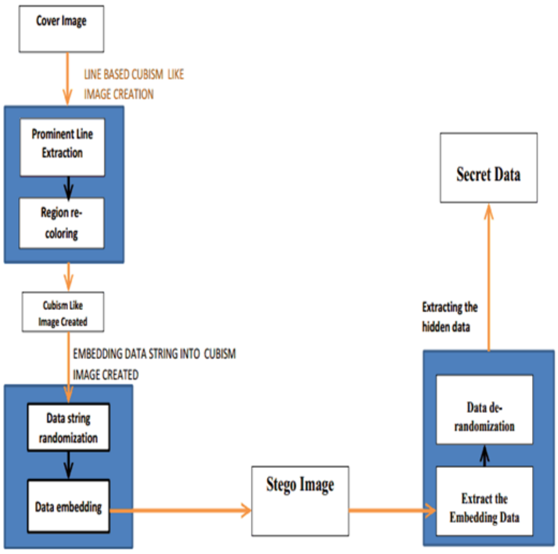

Fig2. Architecture diagram

IV. IMPLEMENTATION

A. *Line-Based Cubism-Like Image*

There are two major stages in the line-based Cubism-like image generation process—*prominent lineextraction* and *region recoloring*. In the first stage, at first we extract line segments from a given source image by edge detection and the Hough transform[10]. Then, we conduct short line segment filtering and nearby line merging. In the second stage, at first we create regions in the image by extending the line segments to the image boundary to partition the image space. Then, we recolor the regions by the average region colors and whiten the boundaries of the regions.

B. *Data Embedding Process*

In the proposed region recoloring process, when embedding a bit into a pixel with color , if is 0, then we decrement by an integer value , and if is 1, then we increment by . After hiding message bits into the pixels' colors in a region by color shifting in this way, the region's average color will also be changed. It is found in this study that the property of rounding-off in integer computation may be utilized to modify this region recoloring process to keep the average region color unchanged, resulting in a reversible region recoloring process[11]. Discrete Cosine Transform (DCT) techniques have a great relevance to data compression. Hence DCT is used for data compression.

C. *Data Extraction Process*

It is basically a reverse version of the proposed data hiding process and consists of two stages—embedded data extraction and data de-randomization. In the first stage, we recover the region recoloring sequence in the stego-image and obtain the area and the average color of each region in the stego-image[12]. Based on the average color of each

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 6, June 2015

region, we retrieve the message data embedded in the stego-image by comparing it with the pixels' colors in the region. In the second stage, the retrieved data are de-randomized to get the original message data using the secret key.

D. Gamma Correction

Gamma correction matters if we have any interest in displaying an image accurately on a computer screen. Gamma correction controls the overall brightness of an image. Images which are not properly corrected can look either bleached out, or too dark. Trying to reproduce colors accurately also requires some knowledge of gamma[13]. Varying the amount of gamma correction changes not only the brightness, but also the ratios of red to green to blue.

Conclusion

In this paper, a new method of combining art image gen- eration and data hiding to enhance the camouflage effect for various information hiding applications is proposed[14]. At first, a new type of computer art, called line-based Cubism-like image, and a technique to create it automatically from a source image have been proposed[15]. Also Discrete Cosine Transform(DCT) is used to enhance data compression process. Gamma correction technique is also used to enhance the quality of the cover image.

REFERENCES

[1]. Shan-Chun Liu and Wen-Hsiang Tsai,(October 2012.)"Line-Based Cubism-Like Image-A New Type Of art Image and its application to lossless data hiding"IEEE Trans on Information forensics and security,Vol.7,No 5.

[2]. A.Hertzmann,(2003)"A Survey of stroke-based rendering" ,IEEE Compute. Graphics Application ,vol.23 ,no.4,pp.70-81,jul/aug.

[3]. D.Mould, (2007)" Stipple placement using distance in a weighted graph", in proc. Int. Symp. Computational Aesthetics in Graphics,visualization imaging Baniff Albertz, Canada.

[4]. Mahalakshmi K., Prabhakar J., Sukumaran V.G., "Antibacterial activity of Triphala, GTP & Curcumin on Enterococci faecalis", Biomedicine, ISSN : 0970 2067, 26(Mar-4) (2012) pp. 43-46.

[5]. D.Mould,(2003) "A stained glass image filter," in proc. 14thEurographics workshop on rendering, Leuven , Belgium,.

[6]. Bhuvaneswari B., Hari R., Vasuki R., Suguna, "Antioxidant and antihepatotoxic activities of ethanolic extract of Solanum torvum", Asian Journal of Pharmaceutical and Clinical Research, ISSN : 0974-2441, 5(S3) (2012) pp. 147-150.

[7]. A.Hausner,"Simulating decorative mosaics," in proc.Conf.Computer Graphics Interactive Techniques,Dallas, TX, 1990.

[8]. Sathyanarayana H.P., Premkumar S., Manjula W.S., "Assessment of maximum voluntary bite force in adults with normal occlusion and different types of malocclusions", Journal of Contemporary Dental Practice, ISSN : 1526-3711, 13(4) (2012) pp.534-538.

[9]. C.K. Chan and L.M.Cheg "Hiding data in images by simple LSB substitution" Vol 37, March 2004.

[10]. Udayakumar R., Khanaa V., Saravanan T., "Chromatic dispersion compensation in optical fiber communication system and its simulation", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) pp. 4762-4766

[11]. J Tian,"Reversible data embedding using a difference expansion" IEEE Trans Vol.13, No 8, August 2003.

[12]. Selva Kumar S., Ram Krishna Rao M., Deepak Kumar R., Panwar S., Prasad C.S., "Biocontrol by plant growth promoting rhizobacteria against black scurf and stem canker disease of potato caused by Rhizoctonia solani", Archives of Phytopathology and Plant Protection, ISSN : 0323-5408, 46(4) (2013) pp.487-502.

[13]. H.Otori and S.Kuriyama, "Robust data hiding on texture images" in Proc. Fifth Int. Conf. Intelligent Information Hiding, Kyoto, Japan,pp.563-566

[14]. Udayakumar R., Khanaa V., Saravanan T., "Analysis of polarization mode dispersion in fibers and its mitigation using an optical compensation technique", Indian Journal of Science and Technology, ISSN : 0974-6846, 6(S6) (2013) pp. 4767-4771.

[15]. S. Lee, C.D.Yoo, and T. Kalker, "Reversible image watermarking based on integer-to-integer wavelet transform," IEEE Trans. Inf. Forensics security, vol, 2, no.3, pp.321-330, sep. 2007.

[16]. Dr. T.Nalini, Dr.K.Manivannan, Vaishnavi Moorthy, Efficient Remote Data Possession Checking In Critical Information Infrastructures Ensuring Data Storage Security In Cloud Computing, International Journal of Innovative Research in Computer and Communication Engineering, ISSN (Online): 2320 – 9801,pp 12-18, Vol. 1, Issue 1, March 2013

[17]. Dr.K.P.Kaliyamurthie, Cervical Cancer Screening and Classification Using Acoustic Shadowing, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 1659-1662, Volume 1, Issue 8, October 2013

[18] Dr.K.P.Kaliyamurthie, Automated Information Retrieval System Using Correlation Based Multi- Document Summarization Method, International Journal of Innovative Research in Computer and Communication Engineering, ISSN(Online): 2320-9801,pp 4328-4335, Vol. 1, Issue 7, September 2014

[19] Dr.K.P.Kaliyamurthie, D.Parameswari, Modelling Cloud Storage, International Journal of Innovative Research in Computer and Communication Engineering, ISSN: 2249-2651,pp 1-5, Volume1 Issue3 Number2–Dec2011

[20] Dr.K.P.Kaliyamurthie, D.Parameswari, Implementation of Customized Greencall Algorithm for Energy-Efficient Of Wireless LANs, International Journal of Innovative Research in Computer and Communication Engineering, ISSN: 2249-2615,pp 15-21, Volume1 Issue 1 Number2-Aug 2011