

A REVIEW OF MEDICAL IMAGE USING DIGITAL WATERMARKING

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Abstract

The authentication and security of medical image is very critical issue due to transmission of data and management of medical image. For security and management issue of medical image used digital watermarking methods. The digital watermarking methods secure the medical image and store in proper manner in database. The current decade of watermarking technique faced a problem of geometrical and some other attack. The minimization of security attack in watermarking technique is major issue. For the minimization of geometrical attack various transformed based technique are used. The transform based watermarking technique used some well know function such as DWT, DCT and combination of more wavelet-based transform function.

Keywords: Watermarking, DCT, DWT, DFT, Gabor Transform.

Introduction

Digital watermarking of sight and sound substance has transformed into an especially exceptional research zone over the range of the most recent a noteworthy drawn-out timeframe. A general

structure for watermark presenting and recognizing verification/unraveling is appeared near to an investigation of a touch of the estimations for various media types portrayed in the creation[1, 2]. They incorporate a piece of the capabilities subject to application, for example, copyright assurance, endorsement, change unmistakable evidence, and information stowing interminably and separates in headway and framework necessities for various media types, for instance, electronic pictures, video, sound and substance. The investigation mastermind has seen much movement in the zone of modernized watermarking as an extra mechanical assembly in anchoring propelled substance and various mind-boggling father pers have appeared in uncommon issues, and what's more dedicated gatherings and workshops[3, 4, 5]. New associations gave to watermarking advancement are rising furthermore, things like Digimarc's Media-Bridge are showing up. As opposed to encryption, which is helpful for transmission at any rate does not give an approach to manage look at the primary information in its ensured shape, the watermark stays in the substance in its unique edge and does not prevent a client from looking at, seeing, inspecting, or controlling the substance[6]. In the rest part of this manuscript, section II-literature survey, section III - Problem Domain, section IV - Support Vector Machine and finally section V-conclusion discussed.

II. Literature Survey

Et al.	Author	Title	Approach	Result
[1]	Nuñez-Ramirez, Diana, Manuel Cedillo-Hernandez, Mariko Nakano-Miyatake, and Hector Perez-Meana.	Efficient Management of Ultrasound Images using Digital Watermarking	A promising solution is the use of digital watermarking techniques applied to medical images considering in the design requirements of imperceptibility-robustness of the field of medical imaging. Aa digital watermarking method for an efficient administration of ultrasound images is proposed. To avoid the detachment between the record and images, they use an invisible	PSNR 41dB SSIM 0.93 BER 0.0114

			watermarking in the frequency domain of the image.	
[2]	Thakur, Sriti, Amit Kumar Singh, Satya Prakash Ghreera, and Mohamed Elhoseny.	Multi-layer security of medical data through watermarking and chaotic encryption for tele-health applications	a robust and secure watermarking approach using transform domain techniques for tele-health applications. The patient report/identity is embedding into the host medical image for the purpose of authentication, annotation and identification. For better confidentiality, they apply the chaos-based encryption algorithm on watermarked image in a less complex manner.	NC 0.9983 PSNR 35.52 dB
[3]	Cedillo-Hernandez, M., A. Cedillo-Hernandez, M. Nakano-Miyatake, and H. Perez-Meana.	Improving the management of medical imaging by using robust and secure dual watermarking.	Two methods of zero watermarking algorithms for medical image authentication is proposed, discussions on the two methods one involving singular-value decomposition and the other using composite CT-SVD domain were presented.	Payload 65,800 PSNR 36.88db
[4]	Kavitha, C., and S. Sakthivel.	An effective mechanism for medical images authentication using quick response code	two methods of zero watermarking algorithms for medical image authentication is proposed, discussions on the two methods one involving singular-value decomposition and the other using composite CT-SVD domain were presented.	payload of 0.5bpp
[5]	Dagadu, Joshua C., and Jianping Li.	Context-based watermarking cum chaotic encryption for medical images in telemedicine applications	they the system couples an IWT-LSB watermarking and an encryption based on random permutation and chaos, to ensure confidentiality, integrity, authentication and nonrepudiation of medical images. they use IWT due to the sensitive nature of medical images and the need to retain diagnostic quality after image reconstruction.	-
[6]	Thanki, Rohit, Surekha Borra, and Deven Trivedi.	Security of Biometric and Biomedical Images Using Sparse Domain Based Watermarking Technique	Hybrid watermarking techniques are also proposed by combining various image transforms. In these techniques, cover image is converted into its transform coefficients before being modified by watermark image to get modified coefficients. Compressive sensing (CS) theory is combined with sparsity property of DWT to propose a secure method for watermarking of human related images. The proposed technique is tested and analysed using different kind of biomedical images and biometric images.	payload of 0.4bpp
[7]	Ahmed, Ahmed Shihab, Hussein Ali Salah, Jalal Q. Jameel, and	A robust Image Watermarking Based on Particle Swarm	The important target of proposed algorithm is to select best cover by using practical swarm optimization, the security of the watermark will be	-

	Reyadh Shaker Naoum.	Optimization and Discrete Wavelet Transform	improving by encrypted Logo image (watermark) acquired by Arnold Transform before Logo image embedding, and employed a dynamic blocking for determining the locating pixel embedded. These locations have a related according to robust edges, where it's acquired from sub bands of DWT (HH, HL and LH).	
[8]	Ayad, Habib, and Mohammed Khalil.	QAM-DWT-SVD Based Watermarking Scheme for Medical Images	a new semi-blind image watermarking system for medical applications. The new scheme utilizes Singular Value Decomposition (SVD) and Discrete Wavelet Transform (DWT) to embed a textual data into original medical images. In particular, text characters are encoded by a Quadrature Amplitude Modulation (QAM-16). In order to increase the security of the system and protect then the watermark from several attacks, the embedded data is submitted to Arnold Transform before inserting it into the host medical image.	-
[9]	Gul, Ertugrul, and Serkan Ozturk.	A novel hash function based fragile watermarking method for image integrity	In tamper detection phase, the detection of tampered block has been performed by comparing the hash value obtained from the three sub-blocks with the extracted watermark from the fourth sub-block of the watermarked image. The performance of the proposed method has been evaluated by applying linear and nonlinear attacks to the different regions of the watermarked images.	-
[10]	Qasim, Asaad F., Farid Meziane, and Rob Aspin.	A reversible and imperceptible watermarking scheme for MR images authentication	a novel reversible and imperceptible watermarking method to detect intentional and accidental alterations within brain Magnetic Resonance (MR) images. Authentication data is encoded into the informative part of the medical images using reversible watermarking based on the Difference Expansion (DE) method.	Their proposed scheme delivers highly imperceptible watermarked images, at 92.9 - 97.98 dB Peak Signal to Noise Ratio (PSNR),
[11]	Thakur, S., A. K. Singh, and S. P. Ghrera.	NSCT domain-based secure multiple-watermarking technique through lightweight encryption for medical images	The proposed scheme first partitions the host image into subcomponents and then calculates the entropy values for it. To the maximum entropy value, the NSCT is applied, followed by RDWT decomposition. Finally, SVD is applied to obtain a singular vector of RDWT-decomposed components.	The best PSNR and NC values achieved by their technique are 54.4978 dB and 0.9994, respectively.
[12]	Swaraja, K.	Medical image region-based watermarking for	A novel robust hybrid optimized multiple watermarking schemes has been proposed in this paper with the	-

		secured telemedicine	amalgamation of DWT and Schur along with training of the optimized FA instead of applying DWT, Schur and FA independently or grouping of DWT-Schur/DCT-Schur.	
[13]	Fadoua, Sabbane, and Tairi Hamid	Medical Video Watermarking Scheme for Telemedicine Applications	a new reversible watermarking technique for the security of medical videos is proposed. The patient identity is embedded, as a watermark, into the host medical videos. An algorithm is adopted for selecting the optimal frames in each video shot. This approach includes the use of polynomial transform methods, in order to identify the best watermark embedding areas in the optimal frames.	-
[14]	Allaf, Abdehay Hassani, and M'hamed Aït Kbir.	Usage of watermarking techniques in medical imaging	This work concentrates on the development of transform based non-blind hybrid watermarking methods, combining three and four transforms such as Discrete Wavelet Transform (DWT), Contourlet Transform(CT), Discrete Cosine Transforms (DCT) and Singular Value Decomposition (SVD). The proposed methods are compared with the respective existing methods in terms of performance indices such as reliability, robustness and imperceptibility. The results show that these methods are more secure, reliable and robust. They are validated/benchmarked by applying the attacks such as filtering, cropping, compression and noise.	-
[15]	Shekhar, Sushant, and M. A. Ansari.	Image Analysis for Brain Tumor Detection from MRI Images using Wavelet Transform	Genetic programming (GP) module has been employed to develop a function in accordance with imperceptibility and watermarking capacity. Employment of intelligence in the system improves its imperceptibility, capacity, and resistance toward different attacks that can occur during communication and storing. The motion vectors are generated by applying a block-based motion estimation algorithm.	-
[16]	Rahman, Atta.	Optimum information embedding in digital watermarking	. This study implements a relative Visual Grading Analysis (VGA) evaluation of 117 brain MR images, modified by varying techniques and magnitude of image/pixel modification to determine where this perceptual boundary exists and relate the point at which change becomes noticeable to the objective measures of the image fidelity evaluation. The outcomes of the	The outcomes propose that, when applying digital watermarking to medical images, the modification of the images to a level of PSNR = 82 dB or greater, between the reference and

			visual assessment were linked to the images Peak Signal to Noise Ratio (PSNR) values, thereby identifying the visual degradation threshold.	watermarked images, is undetectable to all observers, and modification level to a PSNR = 80 dB should not be noticeable in the vast majority of cases. This translates to a watermark payload of 1.6 Kb (approx.)
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III. Problem Domain

In this section discuss the problem related to digital watermarking technique for medical image[7, 8, 9]. The digital watermarking technique provides the protection of copyright from forgery and illegal use of document. For the improvement of security used various algorithms such as DWT and some feature-based technique for the better embedding. This makes DWT based watermarking the future leading method. Without loss of generality, edge embedding maintains an excellent distortion free output whether it is applied in the spatial, DCT or DWT domains. However, the limited payload is its downfall. In order to eliminate the attack of comparing the original image file with the watermark-image, where a very simple kind of watermarking is essential, we can freshly create an image and destroy it after generating the watermark-image. Embedding into images available on the World Wide Web is not advisable as a watermarking devotee might notice and opportunistically utilize them to decode the watermark-image[10].

IV. Support Vector Machine

Support Vector Machine is supervised Machine Learning technique. Support Vector Machine initially used for the prediction of statically prediction of economics. Support Vector Machines (SVMs) are a set of related supervised learning methods used for classification and regression[11]. They belong to a family of generalized linear classifiers. In another terms, Support Vector Machine (SVM) is a classification and regression prediction tool that uses Machine Learning theory to maximize predictive accuracy while automatically avoiding over-fit to the data. Support Vector machines can be defined as systems which use hypothesis space of a linear functions in a high dimensional feature space, trained with a learning algorithm from optimization theory that implements

a learning bias derived from statistical learning theory[12, 13]. Support vector machine was initially popular with the Neural Information Processing Systems (NIPS) community and now is an active part of the Machine Learning research around the world. SVM becomes famous when, using pixel maps as input; it gives accuracy comparable to sophisticated neural networks with elaborated features in a handwriting recognition task. It is also being used for many applications, such as handwriting analysis, face analysis and so forth, especially for pattern classification and regression-based applications. SVMs were developed to solve the classification problem, but recently they have been extended to solve regression problems.

V. Conclusion

In this dissertation proposed a classification based watermarking technique for medical images. The feature based watermarking technique for image used Gabor transform function for feature extraction. The extracted features going through support vector machine classifier for classification of feature pattern. The classified feature pattern of host and watermark image, for the selection of coefficient used person coefficient selection method. The person coefficient selection is mathematical function that function estimate the correlation of two feature pattern one is host pattern and other is watermark symbol feature pattern. If the value of feature pattern difference 0 then watermark embedding process is done. In that fashion of watermarking technique, the watermark image is stronger instead of DWT and another technique of water marking process.

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