

Review Article

Review of Image Watermarking Technique for Medical Images

Kamalpreet Kaur

PCET Group of Institutes, Baddowal, Ludhiana

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Corresponding Author:

Kamalpreet Kaur

E-mail Id:

kamalpreetkaur@pcte.edu.in

Orcid Id:

<https://orcid.org/0009-0003-5498-9205>

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A B S T R A C T

This article looks at using watermarking methods in medical images to make them safer and easier to manage. The idea is to protect trustworthiness, honesty, and safe sharing of health records. This paper looks at cases where watermarking has been used well in healthcare systems. Experts stress the main worry of keeping medical records accurate. Watermarking of medical images is an effective way to keep important health data safe and helpful for checking diseases and referencing information in the healthcare system. It explains current health image marking methods, focusing on the Region of Non-Interest (RONI) while keeping the key area safe. As nanoscience and nanotechnology progress, their use in medicine gets more common. Nano technology medical imaging gear gives clear and correct images of people's organs. This is key for finding out what is wrong in medicine. In today's world medicine and changing computers, scientists look at what is inside living things to find illness early and make science-based treatments. Medical images used in research often need to be shared or sent online for many uses like remote care. Telemedicine uses phone and computer science to give healthcare from far away, especially in places that do not have quick medical help. Telemedicine systems often use parts of images called regions of interest (ROI) and areas that are not important (RONI). The ROI is needed for doctors to make decisions about a patient's health. This paper focuses on about why watermarking medical images is important to keep information safe.

Keywords: Medical Images, ROI, RONI, Security.

Introduction

The development of nanotechnology as well as nanoscience is so rapid that has been used widely in every sector of life, especially in the applications of biomedical. The medical equipment with nanotechnology can provide first-hand information with high resolutions and accurate images of the internal structure of human organs which are very helpful for the diagnosis of medical. Medicine development and the way of information technology are improving continuously, observers are dedicating their studies to

finding the earlier diagnosis of disease by the study of the internal structure of biology and they are hoping to the establishment of therapy of reasonable and scientific. Biomedical images are precious objects for research, but for various requirements like the application of telemedicine, the images need to be shared or transmitted online.

By the use of telecommunication along with information technology, telemedicine is able to provide health care in remote areas. It developed the reach of medical services also the far-end rural areas. For the consultation of

physicians, people from rural areas do not need to travel for their diagnosis as it can be done by telemedicine. The medical images consist of two parts, one is ROI or "Region of Interest" which has one or more than one important area called RONI or "Region of Non-Interest" which is the remaining part of the image. For the diagnosis, the Region of Interest content is very important as it helps make the diagnostic decision. Digital representation of the content of multimedia offers many advantages. Some of the themes are easy and broadly distributed, and some of them are main content with perfect replications. Mainly, this survey focused on hiding and preservation of medical information. Many situations demand other content that serves a legal purpose. Other situation demands changes, that are spiteful intentionally and may affect the content interpretation inadvertently.

All the medical images and important data or information need to be arranged or stored or organized in such a way that whenever it is needed it can be found easily as well it is very important that all the information be organized properly to avoid misplacing the data and reduce the data loss quantity. The transformation of a huge number of data is done by using the channels of Commercial Information Transmitting, separately, such as the Internet. In the case of excessive utilization of memory, the internet helps to increase the transmission of time as well as cost, it also helps in accessing the data to unauthorized groups of people. The technique of data hiding helps to preserve all the information and medical images of patients to overcome the problem of capacity and to decrease the cost of storage and transmission. Different methods of authentication of images have recently gone through a verification process, which judges the authenticity and integrity of its images. It detected the level of tempering presence, which shows that localization and recovery of tempering are important.

There are two types of Authentication methods that are organized. The first one is the schemes of digital signatures and schemes of digital watermarks. The first scheme or digital water scheme used when the detection of an image is needed and it needs to be modified. Water marketing methods are also divided into two categories, the first one is reversible and the second one is irreversible. The main job of the reversible technique is to avoid the deformation of irreversible images. It can happen through the extraction of the main image from the receiver. Watermarking in medicine is the most common and important concept, which needs some methods to reduce the misdiagnosis, which can be caused due to distortion. Watermarking images in the case of reversibility, is not totally distortion less, but this distorted image helps in caring for the data that can be embedded, not for the purpose of diagnosis. The final image is a recovered image that does not cause much loss.

The schemes of image watermarking in the medical field are divided into two categories. The first one is the "authentication schemes" which include recovery and the detection of temper. The other one is data hiding schemes which help to hide the data of patient records, this scheme is also combined with the hiding of data and authentication of data. Scheme of authentication helps in identifying, from where the image is collected or simply the source of data. Watermarks of temper detection help to detect the specific location or pixel of an image, in which the tempering was already done. Sometimes the area where the temperament is already done can be recovered. The scheme of data hiding is more important to hide huge number of information from the medical images and it keeps imperceptibility high. Based on the work of image watermarking, it can be authentication or it can be hiding the data or it can be both, the technique is chosen.

Literature Review

Jeffery H. K. Wu et al there are two methods for recovery and tamper detection of medical images. With the help of a mammogram of 1024 1024 x-ray author and his team tried to test the detection of temper and its recovery. There are some stages of doing this. In the first stage, medical images need to be broken into several pieces or blocks. Each block should try to adopt strong methods for watermarking digitalization, it was connected to the operational module. This method helps in hiding authentic messages and information. The author tried to interpret in this article was, water marketing can adapt strong digital methods combined with the operation of modulo256, which helps to hide important information and authentic images

Keshi Chen et al, the DPCM method by using entropy code is used for medical image compression. The author uses a source model for this method. This source model includes more than one context and arithmetic coding, it helps in the enhancement of the compression performance. This "entropy-coded DPSM method" analysis with the help of Magnetic Resources and Ultrasound reports or images. These images show that the provided compression of 8 big images is in between the four to ten range with a "Signal-to-noise ratio" of 50dB. Found that many contexts can be improved to achieve twenty-five percent to thirty percent and thirty to thirty-five percent for Magnetic Resource images and Ultrasound images respectively. A comparison between "Percutaneous Endoscopic Gastrostomy" and "entropy-coded DPCM method" shows that the DPCM method should provide at least seven to eight dB "Signal-to-noise ratio" for better compression performance.

Tjokorda Agung B.W et al detect the localized areas that are tampered with, medical images have a fragile system of watermarking. Although, by the extraction of the average intensity a tampered image can be fixed as original. This

paper analyses the test of the scheme of watermarking by using LSB Modification. It can detect the tamper as well as ROI recovery. For a reversible scheme of watermarking, the most commonly used RLE for embedding is the main LSB to get an embedding capacity in RONI. It has been identified that its system can detect as well as localized tamper and perform recovery up to 100% respectively until in tampered area of ROI is 20%.

Nisar Ahmed Memon and Syed Asif Mehmood Gilani introduced various methods it for the authenticity of images of medical. To analyze the algorithm the image which has been preferred is the CT scan image. In the wavelet domain, the implementation of the data embedding technique with the method of adaptive data hiding has been done to be highly undetectable. It has been noticed in experimental results that in terms of "Peak Signal to Noise Ratio" and MSE the suggestive schemes surpass prior works. It is very easy to make adjustments in digital medical images for illegal purposes. Like, in the chest, a CT scan image to find a malignant nodule on the lung parenchyma is a very important clue for diagnosis, but it can be easily changed or removed from the image intentionally for purposes like insurance or can be added to the CT scan image of the chest intentionally.

Osamah M. Al-Qershi, Bee Ee Khoo: shows the watermarking technique is used to attend the ultrasound representation. The suggested process reveals the competence information in a dissimilar way on its vast expansion. This process is handled not to disclose the information of the medical experiments with the deceased people and also help to keep the possibilities of them to be recovered from their illness. The outcome of the method gives a reflection on the real overview and it appears as a replica through the watermark. As the main problem can be detected by the way, the affected place can be easily observed and the recovery of the area is much easier by the specialist. The manner of watermark holds the authenticity of the investigation of the place that needs to be checked by some therapeutic fitness.

Sang-Kwang Lee et al: suggested a reversed confirmation of the depiction of the way of watermarking approach. After getting the depiction of the reflection of the detected place the figures and the facts can be drawn out from the parent field. The bar graphs can be easily taken out by the way of working and improves the digital output from the resources and it is one of the most important trustworthy sets of rules. The watermarking process gives the minimum boundation of the range of the resemblance is of 51.14 decibel. This process is very much uncomplicated as the aftermath of the process is understanding to everyone. In order to implement the system, the timespan is within the range so to execute this the consumption of the hour is

a handful to everyone. The detection of the moderate copy can be easily grasped by the watermarking way.

Jun Tian: In recent days, the watermarking method captures the attentiveness of generation in the way of attaining medical statistics. The parent material of that copy can be reinstituted with its full fetch as the process is a reformable way. Within this study the presentation of the information in the computerized form is well established in the medical perspective. In this way of gathering statements, this process helps to gain the untwisted form of the information and the chance of getting the wrong statement is very little.

RayachotiEswaraiah, Edara Sreenivasa Reddy: These writers show the extraction of the proper portrayal by using the watermarking process in the medical way. The way of investigation substantiates the uprightness of the statements that are gathered by this way in science. This process also gives the appropriate location of the problematic area of the strength of the affected problematic place. The way of indicating the proper place of infection helps the medical practitioner to decide the appropriate treatment for the issue of the body. Watermarking process helps in the differentiation of the main problematic area and the least affected place within the whole body that gives the clear depiction of the focused challenges of the body. This medical examination helps to navigate the proper place that will be the main concern of the doctors. The demonstration of the different way of the investigation actually penetrates the right way of locating the main problem and also helps to identify the unaffected place so that the treatment will be in an exact way. Thus, this helps to get the wellness of the problems that are facing the human body.

Kuo-Hwa Chiang et al: This paper evaluates the binary process that includes the exact identification of the problem and the process of saving the problematic place. The disturbing part of the body can be easily detected by the medical supervisor. With the problematic place there will be another non affected place that has to be completely cured by the practitioner. After getting the parent material the other copy of that reflection can be easily separated by the watermarking way of investigation. Despite the separation, the next copy is very much similar to the main statement. With the finding of the main place that has to be cured and that will be without any kind of deprivation and the other place will be completely segregated from the complications. Doctors can easily take the charge of moving the place into its better form at the time of the pain.

Sudeb Das and Malay Kumar Kundu: This watermarking way shows the visionless, easily broken statement of the conflicted portion and still it is one of the most beneficial drives to solve the worry. This way of solution provides the documentation of the presentation of physical fitness. In

this way to achieve the documents, the different types of bodily pictures can be obtained by the supervisor and with that there is some kind of mathematical proportion of the portion that is attached with the troublesome area. In order to manage some physically troubled areas and to keep the private within their own sphere this program me plays a vital role. This process implies a secured way of solution of the troubled areas of the human body so that the patients can rely on the medical man's decision.

Kyung-Su Kim et al: The way gives another aspect of thinking in getting the information related to the verified problems that are affecting the bodily part. It shows the similar problems that are facing the body and the problem-solving ways that are to be faced by the physic of a human. With the differentiation of the statement in a way that includes the range of 8, 12 and 16, the indication of the statement of the implementation of the spotted spot and the way to fix the problems in that area. In this methodological way of presentation of the clinical matter in question, another way to be flourished in its own way and that is the reason, it becomes very much famous and acceptable to all in the society.

Xiao Wei Li, Seok Tae Kim: This investigation gives a three dimensional way of presenting the statements that are happening in the body. The way that is following the process in delivering the facts of the diseased person is following at the first time the two-dimensional way and after that it followed the three-dimensional way to present the factors by the glass. Watermarking way of examining is the opposite way of inserting the statement into this. In this way of getting the details with the numerical syntaxes, it becomes very much easy to gather the various passages to implement the statement. In order to probe the many facts within the restricted place in the affected area the watermarking presentation draws a clear view picture.

Xiaohong Deng et al: Watermarking is another way to determine the root cause and the way that personalizes the marked body of the affected place. This plays an important role in the complications like probable interference, the satisfaction of the individual in a constrained way and to optimize the questions of them. With the use of digital numbers, the main statement can be segregated from the other one and that helps for the further investigation. The way this program me evaluates the information is completely in a contrary basis. The comparison in between the traditional method with this, the present way of investigation becomes much easier than that.

Rayachoti Eswaraiah and Edara Sreenivasa Reddy: The composers try to draw the attention to the squared form of some numerical statement that holds this way of investigation of problems. Within the whole place this way of indicating the fundamental problematic place and

help to care for the issued spot. This helps to divide the unaffected segments from the place and that creates a beneficiary to the specialists to bring the place in its former condition. As the damaged spot is pointed by this way of examination, the individual gets visible expected documents by the representatives. After getting that, the questions are getting a convincing answer that is very much desirable by the ill persons.

Conclusion

The mathematical formulas within the statement helps to metamorphose the problematic area from the whole and it becomes very much simple to the persons that are helping to be cured. The magnification of the particular affected place separates its statement from the other ways of examining the diseases. The evolution of this program me of observing the infected area of the body creates an ease to the people that are engaging themselves to create the historical changes. As the way is helping the statement to be segregated from the primary factors of the examining way, the watermarking creates its own place to a very large extent. The figures that are reached by the program me and the consequence of that helps to create a comparative line to its former programs. With this present scientific approach towards success the watermarking action helps the persons to regain their health after overcoming the flaws of the part. This action plays like a movement in creating another perspective of the healthy lifestyle and thus it magnifies the fact that at the present scenario each and every minor and major issue related with health is curable.

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