

Securing Medical Information using watermarking and selective access control mechanism

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Abstract-Nowadays, security of medical information is more essential because of all the sensitive data of patients are there. To secure that data we provide some securities like watermarking, QR code, etc. In recent years image based information hiding technology has been studied. Recently in hospital we have to send our document to each and every doctor individually. So In this case the communication cost increases. To reduce this cost we will apply selective access control. Using this selective access control we will have to send only one document to hospital and every doctor will decrypt the data based on the key he have. This data will be sending in the form of image using watermarking technique. So no one can easily understand that the data is behind the image and safely we can send it. In watermarking technique we use LSB technique. In Existing LSB technique RGB color format use so in this all Red, Green and Blue color pixel value change. In our modified LSB technique only blue color pixel value is change. If we use modified LSB technique than the image distraction is less and the image look like original image. After that here use QR code generation method. User scan the QR code and get the data safely.

Keywords: Information Security, Watermarking, Access control, EHR, LSB technique, Encryption, QR Code.

I.INTRODUCTION

In Hospital there are records may include every sensitive information starting from patient's personal data, vital signs, Diagnosis reports, laboratory reports etc. Health records are created, saved for future retrieval and maintained, as patients see doctors within the hospital. The hospital uses health records to diagnose, provide treatment and prescribe medicine to patients. The records may also be used to manage the hospital effectively and to account for work achieved, not achieved and still in process.

There are many access-control challenges in medical record systems that the healthcare sector is experiencing, which may negatively affect service delivery to citizens. Medical records are often vulnerable and at risk, since they carry important patient information such as patient identity, treatment they are currently on, history of employment, and income.

These records are also subject to other challenges such as fraud, loss of files, creation of duplicate files, wrong treatment, wrong prescriptions, incorrect billing and medical identity theft. EHealth records need to be safeguarded so that they are accurate, complete and reliable while free from errors. Medical records need to be readily available whenever required. To secure this all information here we will apply watermarking on the data file. Here we use LSB technique for hide data. And apply QR code on it. we send our document to all departments vies doctor. So here we use Access control system. Now only in one document the all information of the patient are there and it will send to hospital admin and every doctor get the data by their decryption key.

II. RELATED WORKS

Here [1] describe why security is required for health care information system. In today's advance technology the information technology and privacy in the health care sector is an important issue. The paper based patient records are transformed in electronic format, stored in centralized databases in the form of electronic health records (EHR). So extra security is required for this EHR system.

In this paper [2] the advanced development of web technology has enabled to use medical images and Electronic Patient Record (EPR) in the healthcare sector for the purpose of sharing patient information between network hospitals and healthcare centers. As an EPR may carry sensitive information so it requires the best security. Watermarking is one of the technique for secure the healthcare information. In this technique the EPR information is embedding in the medical image.

This paper [3] presents a new idea to hide a message within an image of any dimension by encrypting the message through Data Encryption Standard algorithm and hide the message by applying LSB encoding technique in a spiral manner thus enhancing the difficulty of the decoder. Here they use DES algorithm that uses a 64-bit block of data every time and applies cipher key to modify the normal text into a code text.

In this paper [4] LSB technique is used for embedding any secret data into gray scale images with different pixel sizes and formats. Here cover images are in three different pixel size are 256*256, 512*512, and 1024*1024, and with three different image formats which are JPG, PNG and BMP are considered. And also calculated PSNR and MSE value.

This paper [5] introduces a new method for data communication over an unsecure medium. In this using encryption and decryption method and apply RSA to keep data secret and increase security level. The information is embedded using LSB method. The main goal of this research is to hide more data and increase security of image and text without distortion.

In this paper [6] image watermarking must ensure the confidentiality of information. Actually, private medical data inserted into the image should be undetectable and can only be retrieved by authorized persons. In this paper they have classified the digital reversible watermarking into three categories; histogram alteration, Expensing based and compression based watermarking. Histogram modification and contrast mapping based reversible watermarking can be robust to some expance. The prediction error expansion based reversible watermarking improves the imperceptibility and a computationally less exhaustive.

III. PROPOSED METHODOLOGY

Currently security of the medical data is more essential. In hospital all the sensitive information of the patients are there. In this system firstly take the user document. Now divide the documents based on the doctor whom it will be send. After that the all documents are encrypt with the use of the encryption key. And this encryption key will be given to the doctor which he requires for decrypt the document. Still so many risk of stolen the data by the unauthorized person. So we combine the all documents and we hide the all information behind the image is call watermarking technique. Watermarking technique is use in this system for better security. Before we use watermarking technique we check the image which is used for watermarking technique. If the image is adequate to store data then go for next step otherwise choose the new image. Now in the watermarking technique we use LSB algorithm and modify it. And apply QR code on that. After this the Access control mechanism is used. Finally doctor gets the data securely.

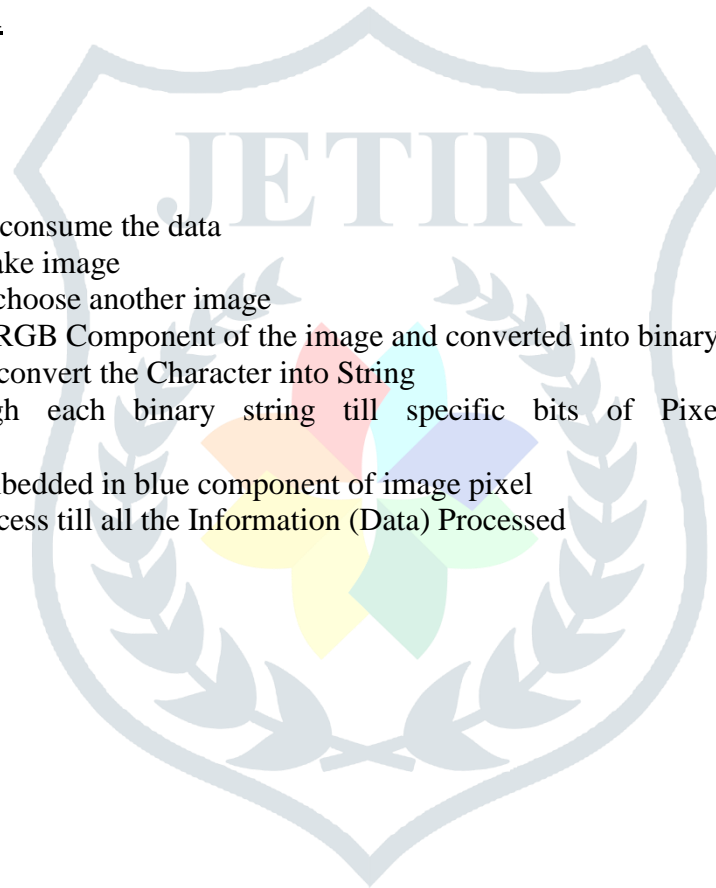
Basic Implementation Steps:

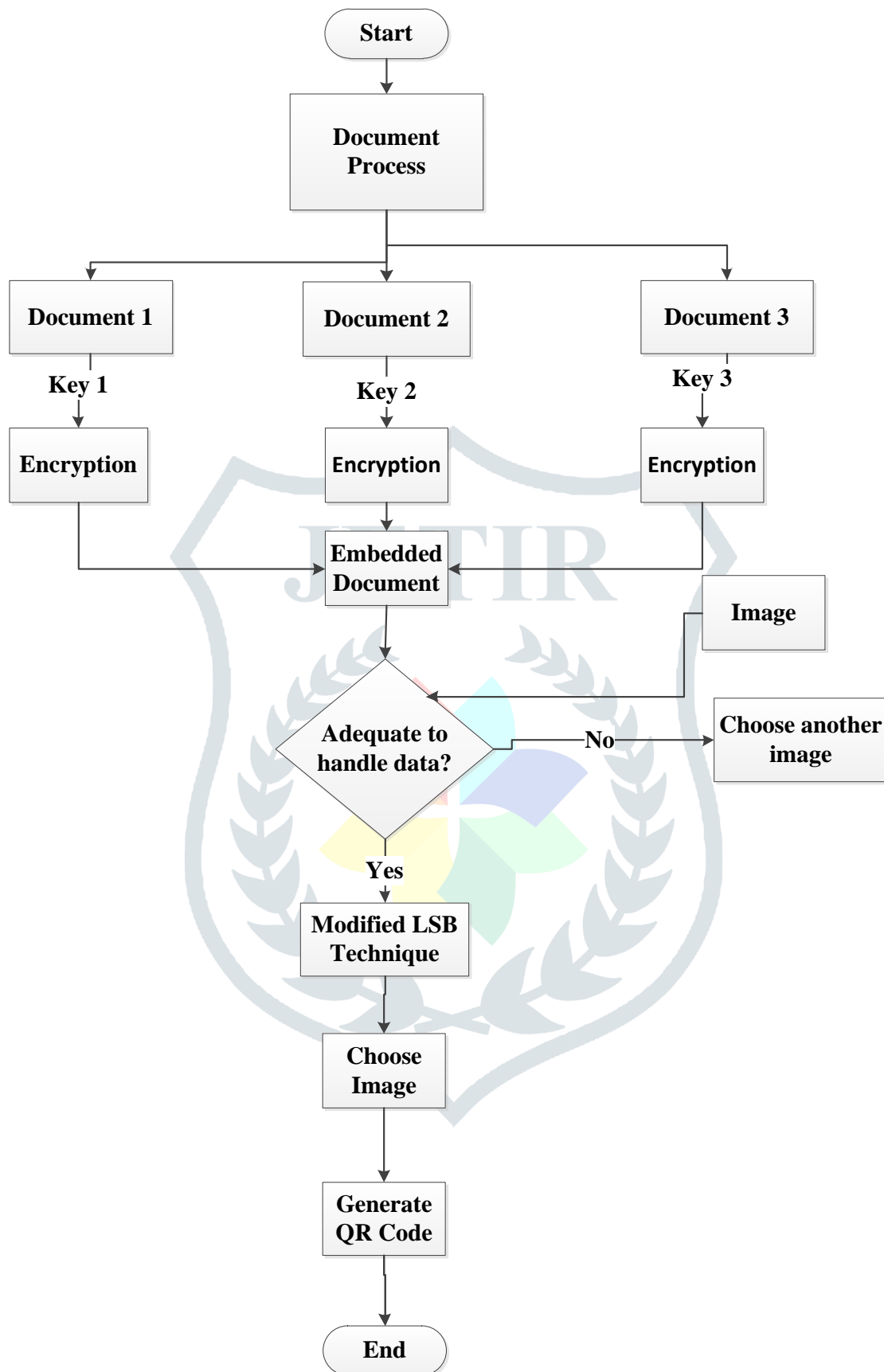
Step 1: Start

- Step 2:** Take a process document of the patient information
- Step 3:** Divide the document in some parts according to doctor's requirements
- Step 4:** Perform the encryption process on each document with the use of their own key
- Step 5:** Embedded all documents.
- Step 6:** Get the image and check
 - If image is adequate to handle the data
 - Then go for LSB technique
 - Otherwise choose another image till the requirement is not satisfied
- Step 7:** Apply modified LSB technique
- Step 8:** Apply QR Code generation
- Step 9:** Apply access control mechanism
- Step 10:** Stop

Modified LSB Method

- Step 1:** Get the Image
 - Get the data
- Step 2:** Check,
 - If the image is capable to consume the data
 - Then take image
 - Otherwise choose another image
- Step 3:** Get the Value of RGB Component of the image and converted into binary string
- Step 4:** Get the Data and convert the Character into String
- Step 5:** Iterate through each binary string till specific bits of Pixel value for only Blue Component
- Step 6:** The data to be embedded in blue component of image pixel
- Step 7:** Complete the Process till all the Information (Data) Processed





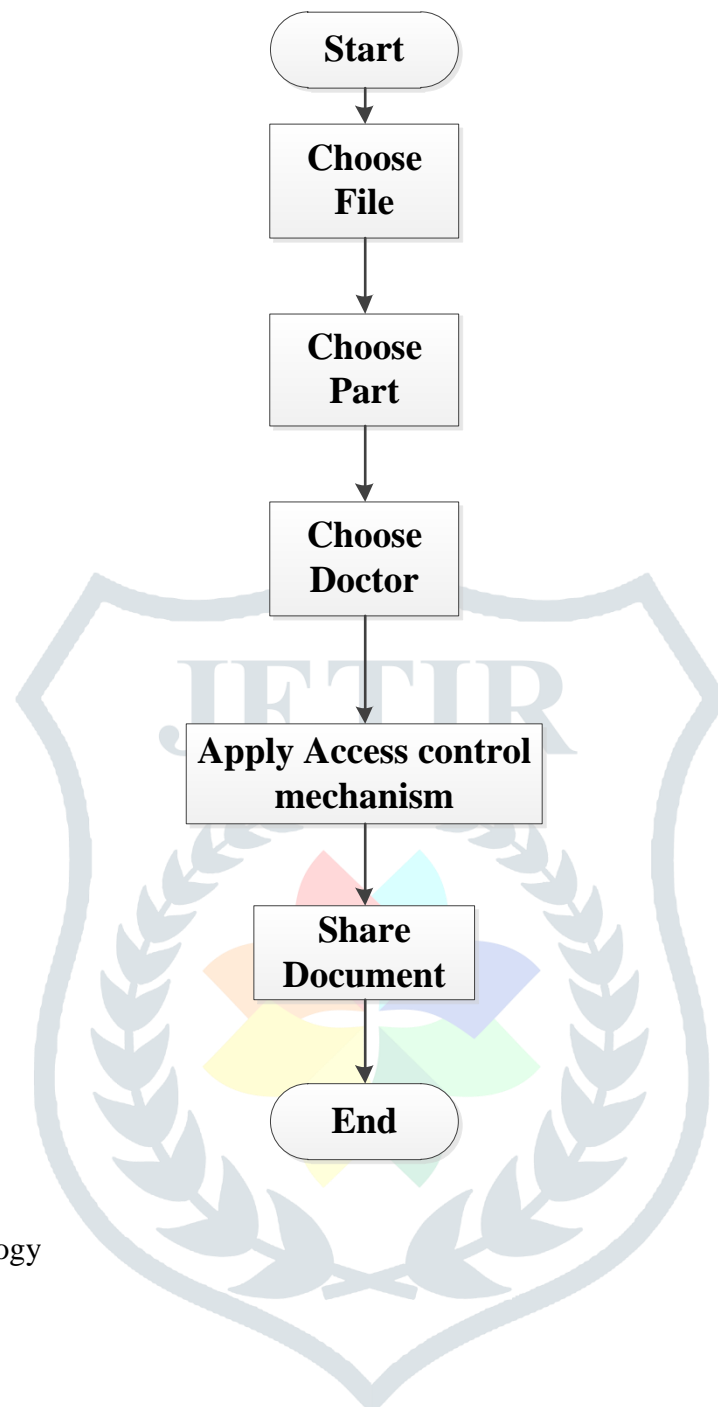


Fig.1 Proposed methodology

IV. Conclusion

From all the above discussion we conclude that sharing of the single file with the multiple users make great effect on the communication among more than one user. Watermarking technique help to hide the data into image. Instead of use of RGB color format if we change only in Blue color pixel it will distort the image very less. Modified LSB technique provides adequate security with better execution speed. Only the users who have access control can decrypt and use the part of data.

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