Review of a Technique to Protect Secret Image Using Image Fusion Method

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Abstract— An algorithm for protecting the secret image whose confidentiality needs to be maintained, and also to authenticate the distributor who distributes that secret image to multiple users is proposed. The fingerprint of the dealer for authentication purpose would be fused the secret image. Fusion of the finger print will be done by using image fusion technique to generate a single image consisting of the secret image as well as the finger print image of the dealer. The fused image will be divided into number of shares based on the threshold secret sharing technique. This provides both confidentiality of the secret image and as well as the authentication of the dealer who has sent the image. The verification will be done during reconstruction of the secret image.

Keywords— "Dealer, Image Fusion, Secret Sharing, Hash Code, finger print"

I. INTRODUCTION

Nowadays, For data sharing is a more popular pathway due to rapid growing technologies the digital communication media. To share information at touch of a button and everyone wants to connect. However, this electronic media is prone to unwanted interception to send and receive information over long distances. Data communication is security and one of the most significant factors of information technology. In this context, they have been proposed different approaches to deliver secret information safely between remote users over an insecure channel but still safe and sound communication is a critical factor in information technology that continues to create challenges with increasing levels of sophistication. Although researchers constantly creating enhancement to current security systems. However, A complete secure system is a dream but two techniques could be used to secure the secrete data over open channels in modern world of digital communication. These mechanisms are cryptography and steganography. The necessary elements for secure communication namely privacy, confidentiality, key exchange, authentication, and non-repudiation in Cryptography addresses. For converting the secret data into unintelligible form but explain the fact that a message in cipher text might arouse suspicion on the part of the recipient it scrambles a message by using certain cryptographic algorithms. Steganography takes security a step farther from cryptography by hiding the continuation of the information. Basically, Steganography can be used to cloak hidden messages in image, audio, video and even text files.

In which multiple images of same scene from visual sensor networks are fuse together to form single fuse image by Image fusion technique. The important features in the fused image without introducing inconsistencies in this image and it extracts the relevant information from input images and highlights the useful data. which are processes and fuses multiple images of scene from different viewpoints into a single image by Visual sensor networks is a network

formed of spatially distribute cameras. which are capable of processing and fusing the image data obtain from multiple cameras by the network also contains central computers. which fuses several images of scene capture with focus on various object using different sensors and then these images are fuse to from a resulting image which focus all the objects in the scene by a single image cannot focus on all the objects in a scene in many situations thus multi-focus image fusion technique is used.

II. LITERATURE REVIEW

A. Discrete Cosine Transform based fusion of multi-focus images for visual sensor networks by Phamila and Amutha (2013) [1]. They presented multi focus image scheme, treated out throughout Discrete cosine change (DCT) based on higher highly valued alternating coefficients (AC), is usually a apparent and efficient plan referring to cellular image sensor devices built with learning resource limited, high-risk atmosphere including battlefields for example because complex arithmetic floating point operations like mean or variance calculations are not used in this method and battery pack driven graphic receptors utilized in security. AC-DCT method overcomes the actual calculation and power limitation of low power devices.

B. Review on technology of pixel-level image fusion by Li and Dong (2013) [2]. This paper presented pixel level image fusion. which offers improve perception of a scene by Pixel level image fusion describes the particular processing along with synergistic combination of information collected coming from source images. The demand for important and spatial correct combination of all available image datasets arises with the advancement of sensors. In many application areas such as in machine vision, airborne and space borne remote sensing and medical imaging etc. use in pixel level image fusion technique.

C. Development of Image Fusion Algorithm for Impulse Noise Removal in Digital Images using the quality Assessment in Spatial Domain by S P Krishna Chaitanya and L Ganesh (2007) [3]. They have been presented To remove noise from digital images through image fusion techniques. In satellite communication Remote sensing plays a very important role. Which are corrupted during acquirement by satellite produces images in digital format, transmission or due to wrong memory locations in hardware. Atmospheric variations and noise communication channels is depending on various factors in density of noise .It is significant to remove the noise from images for further processing. The different impulse noise images and for removal of impulse noise is captured by different sensors image, median filters are used. Firstly noisy images are refined using various types of vector median filters and then these refined images are joined to form single image by image fusion technique calculating on the quality assessment in spatial domain. Then fused image assemble is again refined using absolute derivation vector median which gives more noise free image.

D. An evaluation on different image fusion techniques by Jasmeet and Rajdavinder (2014) [4]. This paper presented different image fusion techniques. Image fusion is the process of organize the details through different images of a single scene into single image which is more applicable for human measurement and additional image processing. Image fusion techniques based on Discrete cosine transform (DCT) domain are apposite to provide valuable data in fused image and is time maintaining in real- time systems for still images or videos.

III.IMAGE FUSION TECHNIQUES

There are three levels of image fusion which are pixel level, feature level and decision making level. Pixel level image fusion is similar to the pixel location which associate the ocular information from input images into single image based on the primary pixel location. Feature level image fusion use various features like regions or edges and combines source images presenting to these features to form a fused image. Decision level fusion techniques merge image details precisely such as in the form of relational graphs. Pixel level fusion preserves more significant information as compare to feature level and decision level fusion.
There are generally two types of image fusion methods which are,
- Spatial domain fusion.
- Temporal domain fusion

Spatial domain consolidation offers virtually with the pixels of origin graphics. It fuses entire graphics applying local spatial features counting gradient, spatial volume as well as local familiar deviation. Temporary domain combination consists of your shift of unified graphics straight into frequency domain. In this approach source images influence to be projected on to localized bases which are designed to determination for your sharpness as well as edges associated with an image. Most of these converted coefficients help in obtaining pertinent features from input images to form fused image.

A. spatial domain Fusion Techniques:
- Average Method
- Principal Component Analysis
- IHS Transform
- High Pass Filtering

Average Method:
The average value achieved is given to the correspondingly pixel of the output image. Fast functioning speed is the main advantages of this method. But the disadvantage is that clear article are not seen by using this method.

Principal Component Analysis:
PCA is a technique associating numerical procedure of transforming interacted variables into uncorrelated variables called principal components. Application areas for using PCA are image arrangement and image confining.

IHS Transform:
IHS technique is based on a principle of restoration one of the three ingredients (I, H or S) of one data set with another image. largely the actual high intensity route is actually recovered. IHS transform is done on the low spatial resolution images and then the intensity element is replaced by the high spatial resolution image.

High Pass Filtering:
The high frequency information from the high resolution panchromatic image is combined to the low resolution multispectral image to achieve the resultant image. It is operate either by refining the High Resolution Panchromatic Image (HRPI) with a high pass filter or by taking the original HRPI and subtracting LRPI(Low Resolution Panchromatic Image) from it.

B. Temporal domain fusion techniques:
- Discrete Wavelet Transform
- Stationary Wavelet Transform
- Discrete Cosine Transform

Discrete Wavelet Transform (DWT):
Discrete wavelet transform is based on wavelet idea in which the transformation is expected upon set of wavelet functions. It provides good resolution both in time domain and frequency domain.
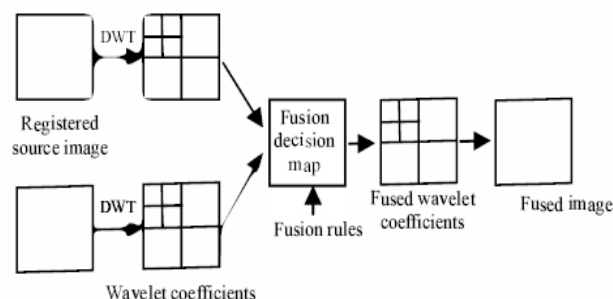

Fig. 1 Image fusion using DWT

Discrete Stationary Wavelet Transform (DSWT):
DWT lacks the translation invariance thus stationary wavelet transform is advanced to overcome this. DSWT removes the down-samplers and up-samplers in DWT and up-sample front line filtration by simply entering zeroes in between to separate out coefficients.

Discrete Cosine Transform (DCT):
DCT based fusion methods need limited energy as compare to the DWT techniques thus it is convenient to use DCT fusion methods for resource constrained devices. In this technique input images and fused images both are coded in JPEG (Joint Photographic Experts Group) format.

IV. CONCLUSIONS

The Internet has become a popular communication network where the distribution of multimedia content, confidential data such as military information, financial documents, etc. has become a common practice. But, over Internet the information is viewed to many users. Hence, now the security of visual information has become more and more important in many real applications. To fulfil such an increasing demand of security, many security contribute tools are there in this scenario and cryptography is one of them. In this proposed scheme use of Symmetric key is advocate in first level of encryption process of secret image which will offer additional security. And then we are going to use novel secret sharing with steganography for the creation of shares of this encrypted image which will be meaningful shares instead of having noise like shares. So, because of meaningful shares attacker may fails to guess whether these images contain any secret information. To best of our knowledge this scheme can be a very effective solution in providing security to secret images from illicit attacks. Use of secret key makes it more secure and reliable.

In this paper different image fusion techniques have been analyzed. Each technique has its own advantages and disadvantages. These techniques advance the clarity of the image to some expansion but it has been found that most of the techniques suffer from the problem of colour artefacts and roughness of edges of the image.

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