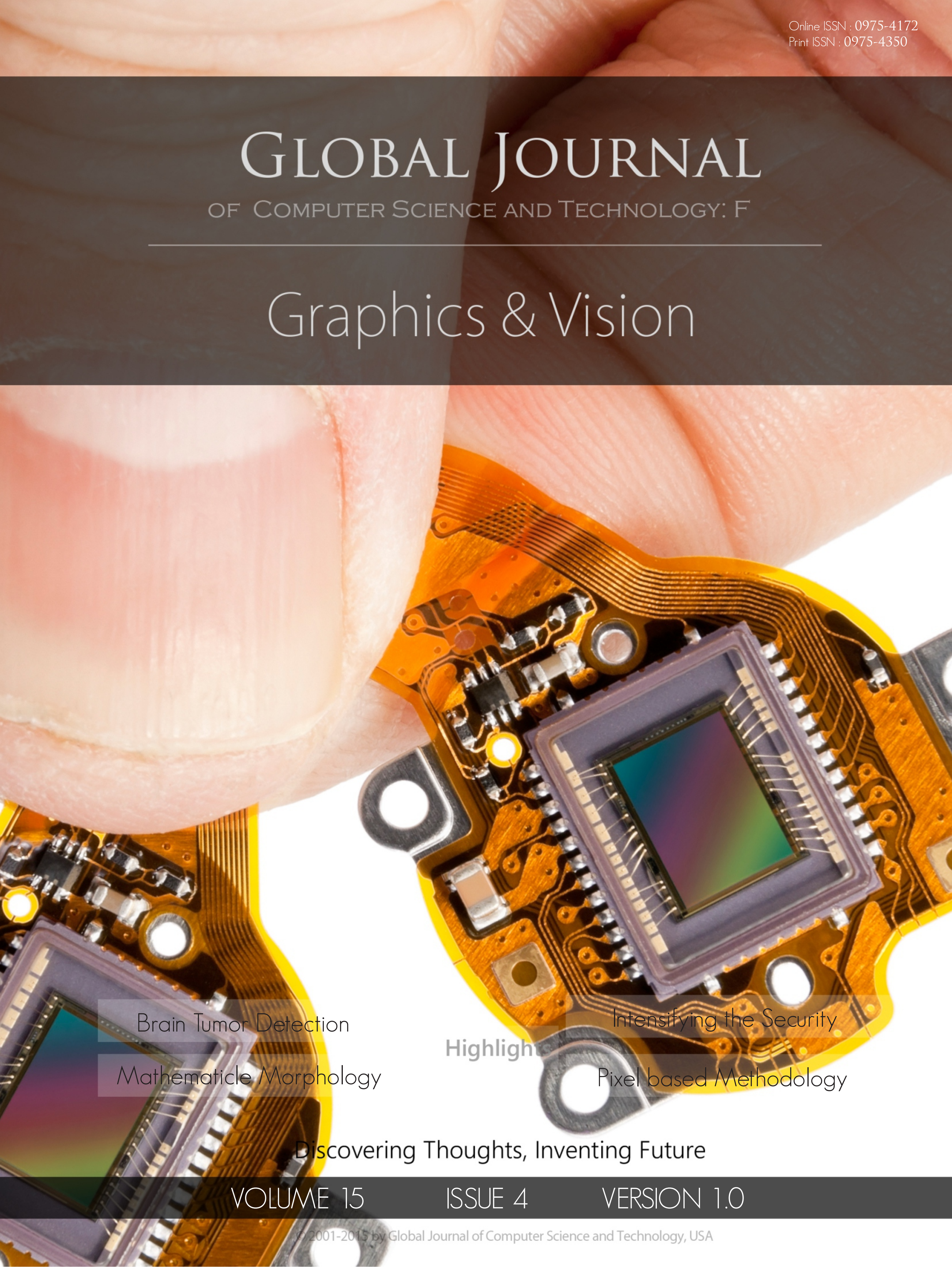

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Highlights

Brain Tumor Detection

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Intensifying the Security

Pixel based Methodology

Discovering Thoughts, Inventing Future

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Intensifying the Security of Multiomodal Biometric Authentication System using Watermarking

By Shashi Choudhary & Naveen Choudhary
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Abstract- In Multimodal biometrics system two or more biometric attributes are combined which makes it far more secure than unimodal system as it nullifies all the vulnerabilities of it. But with the prompt ontogenesis of information technology, even the biometric data is not secure. There is one such technique that is implemented to secure the biometric data from inadvertent or deliberate attacks is known as Digital watermarking. This paper postulate an approach that is devise in both the directions of enlarging the security through watermarking technique and improving the efficiency of biometric identification system by going multimodal. Three biometric traits are consider in this paper two of them are physical traits i.e. ; face, fingerprint and one is behavioral trait (signature).The biometric traits are initially metamorphose using Discrete Wavelet and Discrete Cosine Transformation and then watermarked using Singular Value Decomposition. Scheme depiction and presented results rationalize the effectiveness of the scheme.

Keywords: discrete cosine transform (dct), discrete wavelet transform (dwt), singular value decomposition, multimodal biometrics, watermarking.

GJCST-F Classification: D.4.6

INTENSIFYINGTHESECURITYIFMULTIOMODALBIOMETRICAUTHENTICATIONSYSTEMUSINGWATERMARKING

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Intensifying the Security if Multiomodal Biometric Authentication System using Watermarking

Shashi Choudhary [α] & Naveen Choudhary [σ]

Abstract- In Multimodal biometrics system two or more biometric attributes are combined which makes it far more secure than unimodal system as it nullifies all the vulnerabilities of it. But with the prompt ontogenesis of information technology, even the biometric data is not secure. There is one such technique that is implemented to secure the biometric data from inadvertent or deliberate attacks is known as Digital watermarking. This paper postulate an approach that is devise in both the directions of enlarging the security through watermarking technique and improving the efficiency of biometric identification system by going multimodal. Three biometric traits are consider in this paper two of them are physical traits i.e. ; face, fingerprint and one is behavioral trait (signature).The biometric traits are initially metamorphose using Discrete Wavelet and Discrete Cosine Transformation and then watermarked using Singular Value Decomposition. Scheme depiction and presented results rationalize the effectiveness of the scheme.

Keywords: discrete cosine transform (dct), discrete wavelet transform (dwt), singular value decomposition, multimodal biometrics, watermarking.

I. Introduction

In this span of Electronic advancement and Information technology, electronic access/verification of individuals to service or work place is becoming crucial so as to prevent any act of compromise to the integrity of the organization or individual. Authenticating the identity of an individual is imperative for completion of all personal or commercial transactions. We can obviate forgery and fraudulent activities if one initiates its identity with conviction which is unattainable in case of traditional authentication system that are either knowledge based or token based. This has shepherd in the emergence and genesis of a new technological area known as biometric recognition, or merely expressed as biometrics [1]. Biometric is a unique feature, a measurable trait or characteristic which is utilized in electronically identifying or verifying the identity of a human being. Biometrics which is an ominous combination of modern science and technology with human attributes can be used to protect and secure our material information/data and property. Biometrics system is referred to as the automated means of identification of individuals based on their physiological characteristics like fingerprints, iris, hand geometry, face recognition etc. or behavioral characteristic that include voice, gait recognition, keystroke scanning, signature-scan. Biometric attributes of the user are abiding and also these characteristics are unique for every individual and cannot be altered or lost easily. Thus biometrics is believed to be an authentic technology and more advanced in comparison to other contemporary techniques. Biometric authentication systems have inherent advantages over conventional personal identification techniques [2]. However, the security of biometrics data is preeminent and must be shielded from external intrusion and tampering as they are not endowed with security themselves [1]. It is therefore of utmost importance to provide security to the biometric templates of individuals at all times.

Encryption is a way to address this issue [3, 4]. Encryption does not subscribe to the much needed mutually integrated security and is futile once the data is decrypted after it is being transmitted over the network. Cryptography uses methods of encryption to generate secure information. As encryption and cryptography are not fully competent of creating security throughout the life of the work [4], digital watermarking has emerged as a plausible solution. A segment of information termed as watermark, is embedded into the cover image using a secret key, in such a way that the data of the cover image are not amend to the extent that are perceptible to the Human Visual System is termed as biometric watermarking. There are two type of biometric system one is unimodal and other is multimodal biometric system. The unimodal biometric modalities may not fulfill the demand of challenging applications in terms of acceptability, collectability, circumvention, universality, uniqueness, performance, permanence. These factors paved a way for the development of multimodal biometric authentication system. More than one biometric character is used in order to identify an individual in multimodal biometric system. Multimodal biometric systems provide higher recognition rate in compare to unimodal systems [5]. The physical biometric modalities, such as fingerprint, face and iris are widely used conventional and effective modalities [6].

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This paper emphasizes on watermarking face image, fingerprint image and with signature image by using a robust watermarking scheme, for intensifying the security and performance of multimodal biometrics authentication system. It also emphasizes on comparing both the images with the original images in order to verify that it does not affect the recognition capacity of the overall system by watermarking and extraction procedure.

II. Background Details

a) *Watermarking*

To authenticate image and prevent it from forgery watermarking is being used for centuries. Watermarking [7,8,9] is the technique of embedding data into elements such as an image, audio or video file for authentication purpose. Presently, watermarks are embedded in digital images so that authorized person can propound ownership and confirm the validity of their data values. There are numerous applications where security is a vital issue so in those cases embedded watermark must be invisible, robust and should have a high capacity .Generally watermarking is used for hiding information imperceptibly in digital text for shielding its integrity. The necessity for watermarks in varied scenarios differ as per their need. Embedding a single watermark into the content at the source of distribution is sufficient for identification of the origin of content [11]. Unique watermark is required for tracing illicit copies, based on the identity or location of the recipient in the network.

Recently, a number of watermarking schemes have been developed using two of the most popular transforming techniques which are Discrete Cosine Transform (DCT), and Discrete Wavelet Transform (DWT). The generic model of watermark embedding and extraction is shown in Fig. 1.

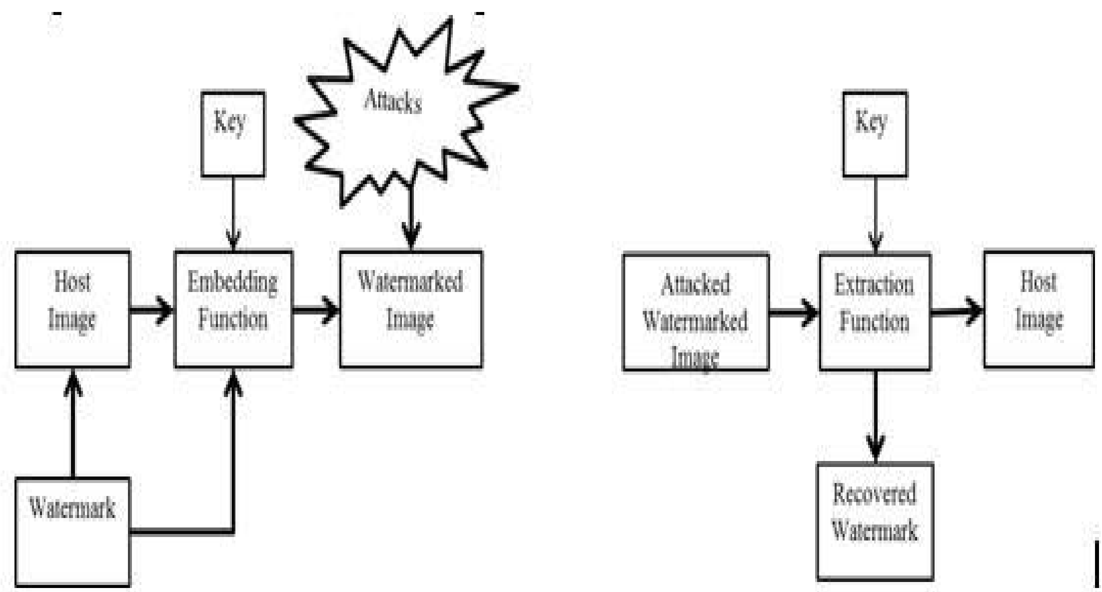

Fig.1: Model for Watermark embedding and extraction

Initially, in embedding module first of all the host image is watermarked with the data/message image using a embedding function and secret key. Then the watermarked image is stow in Database or relay through the network where there is a feasibility that it may be attacked or confronted. While in extraction procedure the extraction part the watermarked image which might have been confronted is enhance to the extraction function beside with the secret key and the watermarked image is extracted from it.

b) *Discrete Wavelet Transform*

Wavelet Transform uses a wavelet of finite energy. The *discrete wavelet transform* (DWT) is an contraption of the *wavelet transform* using a *different* set of the *wavelet* scales and translations heed some *defined* rules. The key abstraction of Discrete Wavelet Transform is that a 1-D signal is cleave into two parts i.e.; one is low frequency band and another is high frequency band. Then the low frequency band is farther split into two parts and the same process pursue until the desired level is reached.

For M*N 2-D images, applying DWT corresponds to processing the image by 2-D filters in each dimension and results in the generation of four M/2*N/2 coefficients. The filters split the input image into four non-overlapping multi-resolution coefficient sets (LL1), (HL1), (LH1) and(HH1). Where (LL1) is a lower resolution approximation image,(LH1) vertical high frequency band,(HL1) horizontal high frequency band, and (HH1) diagonal high frequency band. Low frequency band having the information of an image near to the original image. In DWT decomposition, input signal must be a multiple of 2^n[15]. Where, n is equivalent to the number of levels. Moreover, DWT provides ample information to scrutinize and unify the actual signal and also requires less computation time. Fig. 2 present the two-level DWT decomposition of an image.

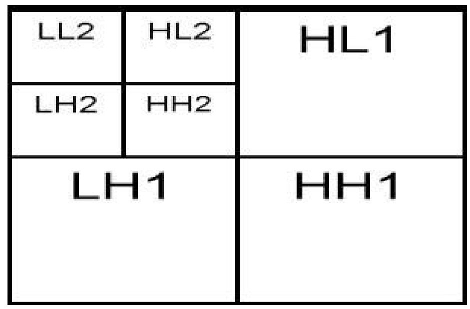

Fig. 2 : Two level DWT decomposition

c) Discrete Cosine Transform

DCT is one of the most prevalent transform domains watermarking techniques.DCT transform spatial or time domain signal to frequency domain and the image is amend into a form of an even functions[15]. DCT is more robust in comparison to spatial domain. Algorithms based on DCT are vigorous against recurrent image processing operations like adjustment, brightness, blurring, contrast, low pass filtering, and so on. One-dimensional signals like speech waveforms can be sort out with one dimensional DCT. For scrutiny/perusal of 2D signals like images, we need 2-D DCT.

The 2D DCT of any given matrix gives the frequency coefficients in context of another matrix. The highest frequency coefficients are depicted at the Right bottom most corner of the matrix while the lowest frequency coefficients are depicted at the left top most corner of the matrix.

Formula for 2-D DCT:

$$F(m,n) = \sum_{i=0}^{N-1} \sum_{j=0}^{N-1} C(m)\,C(n)\,f(i,j)\cos\left[\frac{\pi(2i+1)m}{2N}\right] * \cos\left[\frac{\pi(2j+1)m}{2N}\right]$$

Formula for 2-D inverse DCT:

$$F(i,j) = \sum_{i=0}^{N-1} \sum_{j=0}^{N-1} C(m)\,C(n)\,F(m,n)\cos\left[\frac{\pi(2i+1)m}{2N}\right] * \cos\left[\frac{\pi(2j+1)m}{2N}\right]$$

Where,

$$C(m), C(n) = \begin{cases} \sqrt{\frac{1}{N}} & | m, n = 0 \\ \sqrt{\frac{2}{N}} & | m, n = 1 \text{ upto } N-1 \end{cases}$$

d) Singular Value Decomposition

SVD is powerful mechanism for image transformation. SVD is based on a theorem from linear algebra which states that a rectangular matrix A can be cleave into the product of three matrices; U - an orthogonal matrix, S- a diagonal matrix, and V - the transpose of an orthogonal matrix.

The theorem is represented as:

$$A_{m*n} = U_{m*m}\ S_{m*n} V^T_{n*n}$$

Where;

$$U^TU = I;\ V^TV = I;$$

The columns of U are orthonormal eigenvectors of AA^T, The columns of V are orthonormal eigenvectors of A^TA, and S represent the diagonal matrix that hold the square roots of eigen values from U or V in descending order.

III. The Proposed Method

One biometric data is watermarked with another biometric data using SVD based hybrid watermarking scheme. In the propound scheme face image is used as the host image or cover image which is watermarked using the fingerprint and signature image. The Hybrid watermarking technique is delineate algorithmically as well as schematically.

a) Watermark Embedding Algorithm

First of all we take face image as a cover image, weinput the Cover image I and exert DWT on the Cover image I, DWT crumble image into four sub-bands LL, HL, LH and HH Moreover after decomposing into four sub-bands DCT is applied to all the high frequency bands and SVD is also applied to all the high frequency bands to attain the matrices SH1_I, SH2_I and SH3_I. Both Watermark images W1,W2 is given as input then DWT is applied on the Watermark images W1,W2 which crumble into two pair of four sub-bands LL1, HL1, LH1, HH1, LL2, HL2, LH2, HH2. DCT is applied to all high frequency bands further SVD is applied to all the higher frequency bands and acquire the relevant matrices .Deploy the singular values of Watermark images the singular values of the cover image are modified. Modified SVD matrix is constructed by this. Inverse DCT is applied to all high frequency bands then inverse DWT is utilize to obtain the final watermarked image.

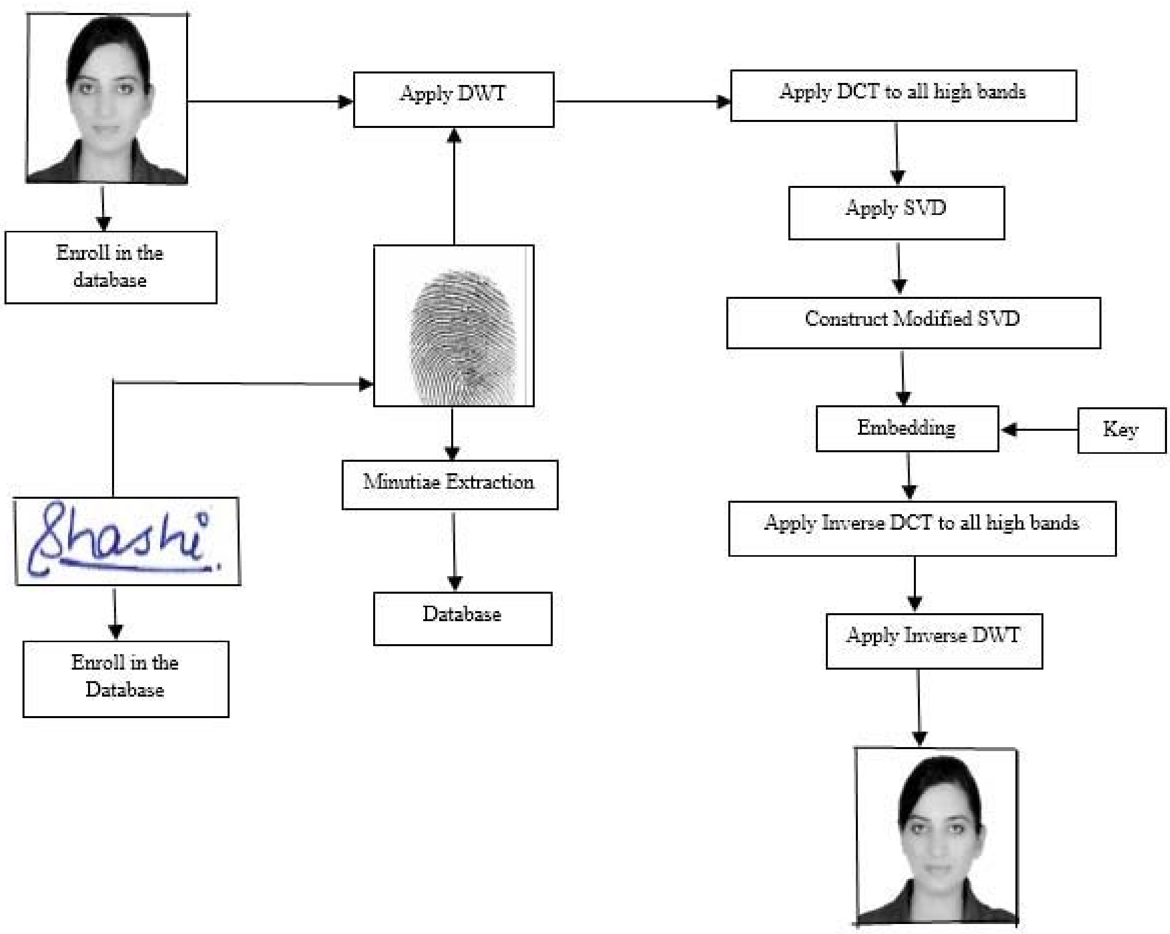

Fig.3 : Watermarking Embedding Machanism

b) Watermark Extraction Algorithm

Input Watermarked image is taken as W_I. DWT is utilize on the Watermarked image W_I; it decomposes image into four sub-bands LL_W, HL_W, LH_W and HH_W. All high frequency bands are stipulated and DCT is applied to all high bands. Then SVD is applied to all the high frequency bands to obtain the matrices SH1_WI, SH2_WI and SH3_WI.SH1_WI, SH2_WI and SH3_WI are altered. Modified SVD matrix is constructed. To all high frequency bands Inverse DCT is applied. Inverse DWT is applied to obtain the final extracted watermark image.

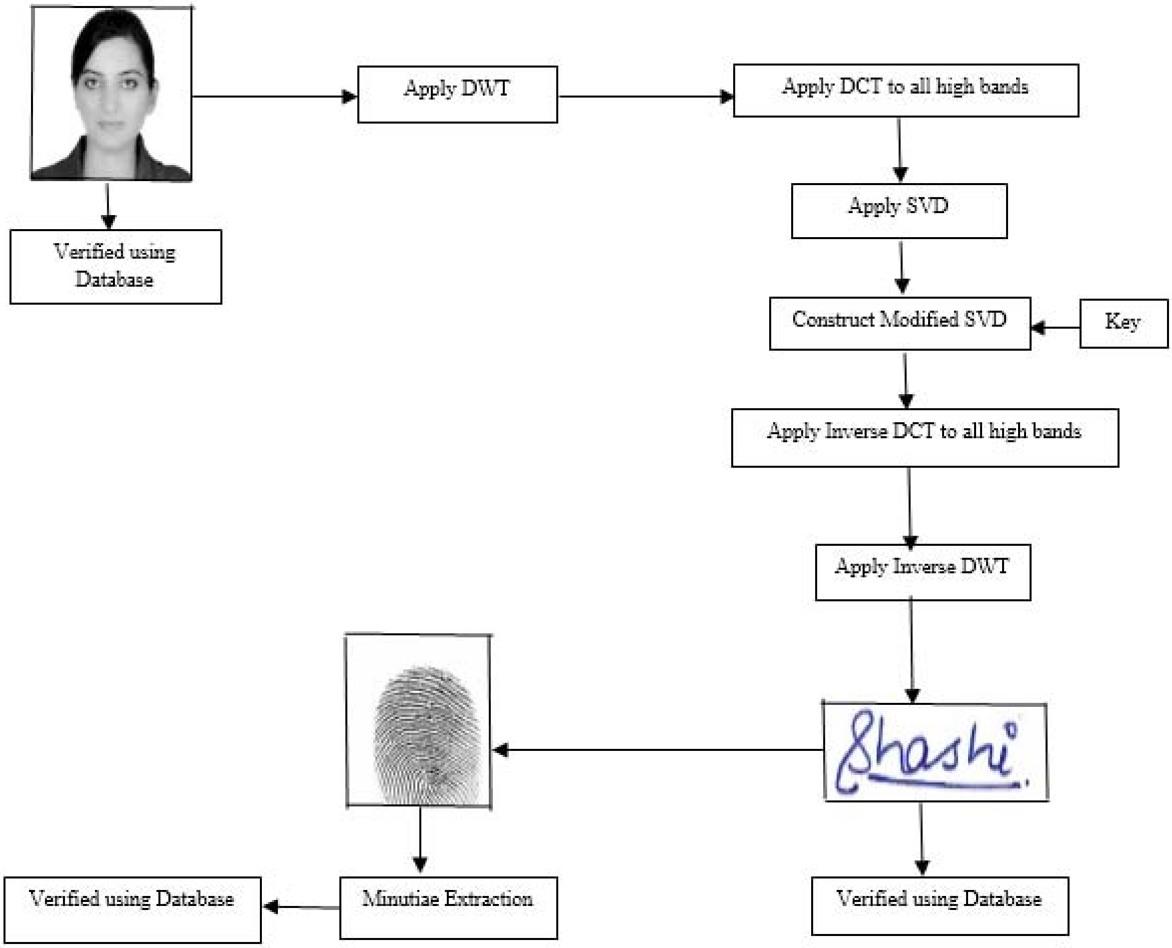

Fig.4: Watermarking Extraction Mechanism

IV. Implementation and Results

"Watermarking is the process that embeds data called a watermark or tag into any object such that watermark can be detected or extracted later to make an assertion about the data". Watermarking algorithm can be evaluated by Its Performance, Robustness and imperceptibility. Imperceptibility means the perceived quality of cover image should not be distorted by presence of watermark.

Peak Signal to Noise Ratio is used in perceptible analyzing the concealing capacity of the algorithm. Peak Signal to Noise Ratio (PSNR) is calculated between original and watermark image. The larger the value of PSNR is, the better the imperceptibility of watermark. Peak Signal to Noise Ratio (PSNR) is determine by:

$$PSNR = 10\log_{10}\left(\frac{255^2}{MSE}\right)$$

The unit is decibels (dB).The correlation or similarity between the original watermark and the extracted watermark is computed by utilizing Normalized Cross-Correlation [12].

The formula for Normalized Cross-Correlation (NCC) is

$$NCC = \sum_i \sum_j \frac{w(i,j)\,w'(i,j)}{\sum_i \sum_j |w(i,j)|^2}$$

The value of Normalized Cross-Correlation lies between [-1, 1]. If the Extracted watermark absolutely tally with the original image, the Normalized Cross-Correlation (NCC) =0.9987. Otherwise NCC is between 0 and 1.

Simulation is done on MATLAB2013b and by simulating the experiment performance of the algorithm is tested. 256x256 pixels of gray-level cover image and watermark image are chosen for the purpose of simulation of the algorithm. The original cover image, watermarked images and the extracted watermark images are shown in Fig.5.

Original cover image Original Watermak1 Original Watermark2

Fig.5: [A] Original Cover Image and Watermark image

Watermarked image Extracted watermak1 Extracted watermark2

Fig.5: [B] Watermark image and Extracted Watermarks

The watermarked image look like the original image in vision impression to a large expanse. Generally there is no clearly visible difference between the images for the Human Visual System. Therefore, this algorithm is quite good in hiding watermark. By this algorithm weobtain PSNR value between the original cover image and watermarked image which is 52.51 dB, which is reckoned as a quite good value. Along with that, the Normalized Cross-Correlation (NCC) of the original watermark image and extracted watermark is 0.9998, which shows that the two images are strongly correlated. Fig.6 shows the comparison of PSNR.

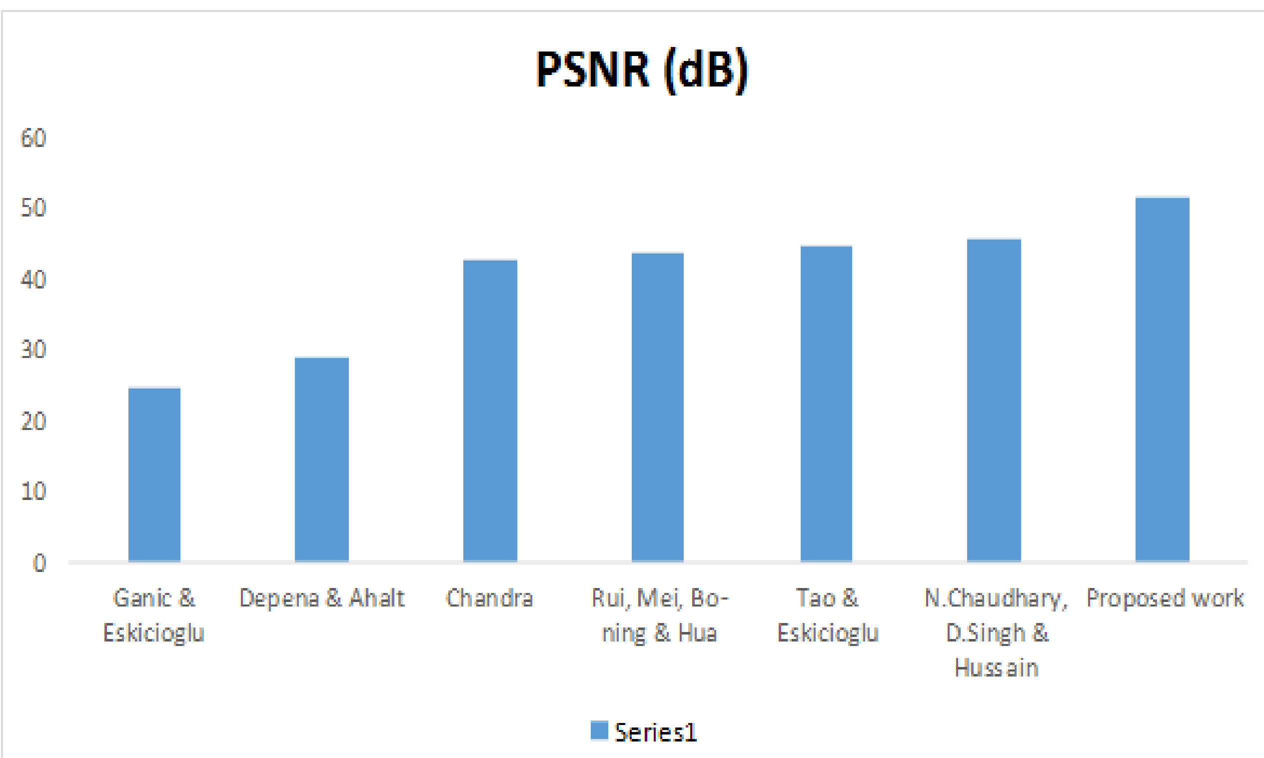

Fig. 6 : Graph showing the comparison of PSNR

V. Conclusion

In this paper, a robust watermarking algorithm is proposed. Two watermarks images, a fingerprint and a signature is watermarked over a cover image i.e.; face image. This paper propound a discrete wavelet transform and discrete cosine transform based watermarking algorithm for biometric data. Watermarking signals are embedded in the high frequency parts of wavelet transformation domain by using Singular Value Decomposition. And before the embedding, procedure is stalked by the watermark image is also transformed using both DWT and DCT. Quantitative results show that the fingerprint, face and signature images are of good quality, after extraction of watermark the quality of host image remains quite good, also it robust against many image processing operations. This algorithm is very efficient in embedding signals.

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Moving Object Tracking using Color Feature in a Video

By K. Srinivasan & Dr. P. Balamurugan
Anna University, India

Abstract- Video processing is one of the most challenging areas in image processing. It deals with identifying an object of interest. Motion detection has been used in many fields either directly or indirectly. In this paper an efficient approach to motion detection in video sequence using color feature extraction operator. Using this approach we improve the background subtraction and detecting the moving object with greater accuracy. In this paper, background modeling is done in order to make the update of background due to light illumination and change in the weather condition. Foreground detection is done before updating the background model. Color feature extraction is done in order to avoid the dynamic background such as moving leaves, rain, snow, rippling water.

Keyword: motion detection, background subtraction, color feature extraction, background modeling, dynamic background.

GJCST-F Classification: H.5.1

MOVINGOBJECTTRACKINGUSINGCOLORFEATUREINAVIDEO

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Moving Object Tracking using Color Feature in a Video

K. Srinivasan α & Dr. P. Balamurugan σ

Abstract- Video processing is one of the most challenging areas in image processing. It deals with identifying an object of interest. Motion detection has been used in many fields either directly or indirectly. In this paper an efficient approach to motion detection in video sequence using color feature extraction operator. Using this approach we improve the background subtraction and detecting the moving object with greater accuracy. In this paper, background modeling is done in order to make the update of background due to light illumination and change in the weather condition. Foreground detection is done before updating the background model. Color feature extraction is done in order to avoid the dynamic background such as moving leaves, rain, snow, rippling water.

Keywords: motion detection, background subtraction, color feature extraction, background modeling, dynamic background.

I. Introduction

Video sequence can be analysis manual, semi-autonomous or fully-autonomous. Manual video sequence involves analysis of the video content by a human. Such systems are currently in widespread use. Semi-autonomous video analysis involves some form of video processing but with significant human intervention. Typical examples are systems that perform simple motion detection. Only in the presence of significant motion the video is recorded and sent for analysis by a human expert. In fully-autonomous system, there is no human intervention and the system does both the low-level tasks, like motion detection and tracking, and also high-level decision making tasks like abnormal event detection and recognition. The design of an advanced automatic video system requires the application of many important functions including, but not limited to, motion detection, classification, tracking, behavior, activity analysis, and identification. Motion detection is one of the greatest problem areas in video as it is not only responsible for the extraction of moving objects but also critical to many computer vision applications.

Motion detection has been used directly in control application like object avoidance and automatic guidance system. Most of the surveillance based application like security camera, traffic monitoring, people counting use the motion detection technique. Motion detection has been used indirectly in various fields such as Human machine interaction, face recognition, remote image processing, detection for foreign bodies in human, event recognition of human action. Many intelligent video analysis system uses motion detection technique.

In this paper, we aimed to design an efficient algorithm to extract moving objects in videos. The key of background subtraction is to build and maintain an adaptive background model to represent the background of a video, which is a challenging task owing to that backgrounds of scenes in real-life are usually dynamic, including noise, illumination changes, swaying trees, rippling water and so on.

II. Related Work

Background subtraction is a crucial step in many automatic video content analysis applications. Numerous methods for background subtraction techniques have been proposed over the past years. Codebook model (Kim, 2005) [1] is a method for real time foreground-background segmentation. Sample background values are quantized into codebooks which represent a compressed form of background model for a long image sequence. This method is able to model multi modal background pixels and also is applicable to compressed video such as MPEG. Jain et. al. [2] used simple intensity differencing followed by thresholding. Significant differences in intensity from the reference image were attributed to motion of objects. Greiffenhagen et. al. [3] proposes the fusion of color and normalized color information to achieve shadow invariant change detection. All these algorithms don't use regional information to validate local results. In [4], a frame level component is added to the pixel-level operations. Its purpose is to detect sudden and global changes in the image and to adapt the background frame accordingly. Median and Gaussian models can be combined to allow inliers (with respect to the median) to have more weight than outliers during the Gaussian modeling, Horprasert et. al. [7] use brightness distortion and color distortion measures to develop an algorithm invariant to illumination changes. Li and maylor [8] use the fusion of texture and color to perform background subtraction. The texture based decision is taken over a small neighborhood. A texture based model proposed by M. Heikkil¨a [10] [9] was popular in recent years. The authors used Local binary patterns (LBP)[10]

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to describe textures, and built a model based on LBP histograms over circular regions for a given pixel. The LBP based model is robust to backgrounds made of animated textures. Two extended texture-based models were proposed to improve the performance; S. Zhang et al. extended this model to temporal and proposed Spatiotemporal LBP based background model [13], and G. Xue et al. used spatial extended center-symmetric LBP (SCSLBP) [12] to build background model.

III. Proposed Method

In proposed system, the video sequence first converted into frames as a preprocessing technique. In traditional way there will be need of standard background as a reference frame. With this approach, it is possible to detect new objects in the scene even if they suddenly stop moving. It is also possible to detect objects that have removed from the scene. However, the fixed reference background may be not applicable to the scene along with the illumination variation. Therefore, the accurate background image and a high-quality and illumination tolerance background updating mechanism becomes necessary for moving object detection. After that update the background for each subtraction made for the frames.

a) *Color Feature Extraction Operator*

In real world videos, the color of foreground objects is usually different from the color of background, thus besides the intensity, color information is another important factor to distinguish foreground and background.

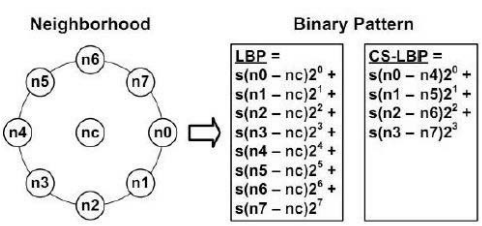

Figure 1 : LBP and CS-LBP features for a neighborhood of 8 pixels, from [10]

Rc, Gc and *Bc* are the three color channels for each pixel *(xc, yc)*. By adding color information, the length of binary bits grows which will lead to exponential growth of patterns, i.e. the dimension of histograms, and will seriously affect the efficiency of algorithm. So we cut down patterns by using center-symmetric Local binary patterns CS-LBP[11], choosing a small number N and dropping one of the three color bits. In fact, the three color bits are highly correlative, dropping one of them is not critical. The final spatial-color binary patterns (SCBP) we used in this paper are defined as:

$$SCBP_{2N,R}(xc, yc) = \text{CS-LBP}_{2N,R}(xc, yc) + 2^{N+1}f(Rc,Gc \mid \gamma) + 2^{N+2}f(Gc,Bc \mid \gamma),$$

If we set $N = 4$, the total number of SCBP patterns is 64, which is just appropriate. The SCBP histogram computed over a circular region of radius R_{region} around the pixel is used as the feature vector to represent a pixel, and background model is built based on these feature vectors, here R_{region} is a parameter set by the user.

b) *Background Modelling*

In background modeling, moving average is calculated for all N frames in order to estimate the background. By using the formula

$$B_t(x, y) = B_{t-1}(x, y) + \frac{1}{t}(I_t(x, y) - B_{t-1}(x, y))$$

Where $B_{t-1}(x, y)$ is the previous background model, It$(x, y)$is the current incoming video frame, t is the frame number in the video sequence. This initial computation is done in order to reduce the frame storage computation.

c) *Rapid Matching*

This rapid matching is done in order to determining whether the pixel values for the incoming video frame It(x, y) are equal to the corresponding pixel values of the previous video frame $It-1(x, y)$.

d) *Background Updating*

Background pixel of $B_t(x, y)$will then be supplied to every frame of the background model $B_t(x, y)$. Based on the best possible background pixels are then updated for the background model.

e) *Background Subtraction*

First computes the feature vector, i.e. the SCBP histogram, and then calculates the similarities between the feature vector and the pixel's model. Similarities larger than the threshold T_p indicate match, and finally both the histograms and weights are updated differently according to the matching status. In the foreground detection module, a pixel is classified into foreground if there is no match occurs between feature vector and the background histograms, otherwise the pixel is labeled as background. The output of the detection module is a binary image showing foreground pixels.

Threshold $T_p(x, y)$, which is initialized as global value Tp. At each time, after updating the background model, the threshold is updated similarly:

$$T_p(x, y) = (1 - \alpha)\, T_p(x, y) + \alpha(s(x, y) - 0.05)\,,$$

where $s(x, y)$ is the largest similarity between feature vector and background histograms, and α is a learning rate close to one. In this way, the thresholds for static pixels will increase and decrease for dynamic pixels. Thus our background subtraction method is more sensitive in static region and more tolerant in dynamic region.

f) Foreground Detection

Foreground detection is done before updating the background model. Let us denote the local binary pattern (LBP) histogram of the given pixel computed from the new video frame by ~h. At the first stage of processing, ~h is compared to the current K model histograms using a proximity measure. The histogram is compared against the current B background histograms using the same proximity measure as in the update algorithm. If the proximity is higher than the threshold T for at least one background histogram, the pixel is classified as background. Otherwise, the pixel is marked as foreground.

g) Refinement

Histograms are computed based on the texture over surrounding regions, though that each pixel is modeled identically, it's still block-wise. On one hand, it's robust to dynamic background such as waving trees and rippling water; on the other hand it has common drawbacks of block-wise models. A major problem is that the contour of detected object is illegible. Because of using histogram over regions, not only the real foreground, but also the background pixels near the edges of foreground will be classified into foreground, and thus the contour of foreground objects is obscured. To reduce the false detection, pixel wise masking Ωi According to the above modeling, color modeling. is applied to the output of the background and intensity of each pixel is considered and find the mean and standard deviation are calculated for masking. We calculate the mask Ωi for *ith* pixel by the following formulation:

$\Omega i = 1$, *if* $[di \geq \xi stdi]\&[di/\ gi \geq \varepsilon 1]$,

1, *if* $||(ri, gi, bi) - (ri, gi, bi)||2 \geq \varepsilon 2$,

0, otherwise

Here, $di = abs(gi - gi)$ is the absolute deviation of intensity from average. Given the three color channels R, G and B, (r, g, b) are chromaticity coordinates calculated by $r = R/(R+ G + B)$, $g = G/(R + G + B)$ and $b = B/(R + G + B)$. We set parameters $\xi = 2.5$ and $\varepsilon 1 = \varepsilon 2 = 0.2$ empirically in this paper. Another advantage of this formulation is that it can suppress shadow by constraining $di/\ gi \geq \varepsilon$.

Then the average and standard deviation are updated for background pixels identified by is *foreground FG*.

$gi = (1 - \beta)\ gi + \beta gi$,

$stdi = (1 - \beta)std2i + \beta(gi - gi)2$,

The chromaticity coordinates $(ri,\ gi,\ bi)$ are updated the same as *gi.*

IV. Conclusion

In this paper, we aimed at subtracting background and detecting moving objects from videos. A novel motion detection method is proposed based on color and texture information. In this paper background modeling is done as first step in order to overcome the light illumination and change in the weather condition. This will help to detect the moving object with greater accuracy. Color extractor operator is used to avoid the unwanted dynamic background in the video.

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Brain Tumor Detection using MR Images Through Pixel based Methodology

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Abstract- Brain tumor, a notorious disease, has affected and devastated many lives. This disease has been the centre of attention of thousands of researchers for many decades, around the world. Researchers have combined their knowledge and efforts from many areas ranging from medical to mathematical sciences, to better understand the disease and to find more effective treatments. The key objective of this paper is to form a methodology to detect & extraction of brain tumor from a patient's MRI. This method incorporates with some noise removal functions, segmentation and morphological operations which are the basic concepts of image processing. Proposed methodology will detect tumor and finally the fractional area of tumor will be calculated. All of this processing will be done by MATLAB software.

Keyward: MRI, MATLAB, binary image, grayscale image, brain tumor.

GJCST-F Classification: I.3.3 I.4.0

BRAINTUMORDETECTIONUSINGMRIMAGESTHROUGHPIXELBASEDMETHODOLOGY

Strictly as per the compliance and regulations of:

Brain Tumor Detection using MR Images Through Pixel based Methodology

Md. Abdullah Al Mahmud [α], A.H.M Zadidul Karim [σ] & Md. Mashiur Rahman [ρ]

Abstract- Brain tumor, a notorious disease, has affected and devastated many lives. This disease has been the centre of attention of thousands of researchers for many decades, around the world. Researchers have combined their knowledge and efforts from many areas ranging from medical to mathematical sciences, to better understand the disease and to find more effective treatments. The key objective of this paper is to form a methodology to detect & extraction of brain tumor from a patient's MRI. This method incorporates with some noise removal functions, segmentation and morphological operations which are the basic concepts of image processing. Proposed methodology will detect tumor and finally the fractional area of tumor will be calculated. All of this processing will be done by MATLAB software.

Keywords: MRI, MATLAB, binary image, grayscale image, brain tumor.

I. Introduction

In human body there a lot of diseases. Brain diseases are common in human body. It comes in different forms. Infections, trauma, stroke, seizures, and tumors are some of the major categories of brain diseases. Brain tumor, a notorious disease has affected and devastated many lives. This disease has been the centre of attention of thousands of researchers for many decades, around the world [1].

Brain Tumour : There are mainly two types of brain tumor. Those that start in the brain (primary) and those that spread from cancer somewhere else in the body (metastasis). Primary brain tumors, such as a glioma, happen less often, and when they do, they are mostly malignant (cancerous). A malignant tumor is a mass or clump of cancer cells that keeps growing; it doesn't do anything except feed off the body so it can grow [2].

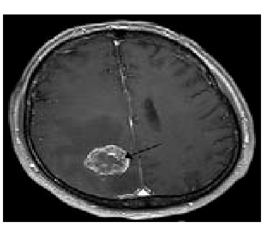

Figure 1: Brain tumour

MRI: Magnetic resonance imaging (MRI) of the brain is a safe and painless test that uses a magnetic field and radio waves to produce detailed images of the brain and the brain stem. An MRI scanner consists of a large doughnut-shaped magnet that often has a tunnel in the center. Patients are placed on a table that slides into the tunnel. During the exam, radio waves manipulate the magnetic position of the atoms of the body, which are picked up by a powerful antenna and sent to a computer. The computer performs millions of calculations, resulting in clear, cross-sectional black and white images of the body. These images can be converted into three-dimensional (3-D) pictures of the scanned area. This helps pinpoint problems in the brain and the brain stem when the scan focuses on those areas [3].

In this paper a fully automatic method to detect brain tumor is proposed. Proposed system will consider MR Image as an input. Then it will be processed using image processing tool of MATLAB. If any type of tumor is available then it will be automatically detected and finally the percentage of tumour affected area will also be calculated. Again if any types of tumour aren't available system will tell the users that "there is no tumour".

II. Methodology

The algorithm has three stages, first is pre processing of given MRI image second is perform morphological operations third is showing the performance parameter and finally calculating the tumor affected area . Steps of algorithm are as following [4].

- Taking an MRI image as an input
- Convert it to gray scale image and obtain the maximum intensity.
- Adjusting the MRI image using the max intensity level in order to avoid excess data.
- Detecting the boundary of head cross section by converting MRI image to binary image.
- Calculating the area of the head cross section
- Detecting the boundary of head cross section after converting the adjusted image to binary image.
- Eliminating the boundary and detecting the tumor affected region
- Showing the performance parameter of tumor affected image and normal image
- Calculating the area of tumor.

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a) Taking an MRI image as an input

To read an image for processing we have used the 'imread' command. The example reads one of the sample images 't.bmp' and stores it in an array named I.

I = imread ('t.bmp');

If the file (sample image) is not in the current folder, then the full path with the filename will have to specify. The text string 'bmp' specifies the format of the file by its standard file extension. For example, 'gif' is specified for Graphics Interchange Format files. , The 'informate' function can be used to see a list of supported formats, with their file extensions. If imread cannot find a file named 'filename', it looks for a file named 'filename.fmt'.

b) Convert it to gray scale image and obtain the maximum intensity

Using 'rgb 2 gray' command in MATLAB MR Images are converted into gray scale image.

J = rgb2gray (I)

'rgb ' means Red, Green and Blue. The brightness level for this color is represented in decimal from 0 to 255 or binary from 00000000 to 11111111. In grayscale image black color is represented by R=G=B=00000000 and white color is represented by R=G=B=11111111. This image processing technique is called 8-bit gray scaling.

c) Adjusting the MRI image using the max intensity level in order to avoid excess data

In order to adjust (eliminate excess data) the gray scaled image we have used the built-in function imadjust:

K1 = imadjust(J,[0.55 0.8],[]);

Which actually adjust the intensity values in grayscale image J to new values in k1 such that 1% of data is saturated at low and high intensities of J. This increases the contrast of the output image k1.

d) Converting MR Image to binary image in order to detect the boundary

K2 = imadjust(J,[0.1 0.5],[]);

BW_K2=im2bw (K2, level);

Converting the adjusted grayscale image K2 to a binary image the output image BW_K2 replaces all pixels in the input image with luminance greater than level with the value 1 (white) and replaces all other pixels with the value 0 (black). Specifying level in the range [0, 1], regardless of the class of the input image. The function 'graythresh' can be used to compute the 'level' argument automatically. Specifying level=. 5 for the function im2bw. Using 'imfill' command for filtering image K2. 'imfill' command displays the binary image BW on the screen and lets us define the region to fill by selecting points interactively by using the mouse. To use this interactive syntax, BW_K2 must be a 2-D image.

e) Calculating the area of the head cross section

Using 'regionprops' command in MATLAB that measures a set of properties for each connected component (object) in the binary image, BW_k2.

stats= regionprops(BWfill,'Area');

The image BW_k2 is a logical array; it can have any dimension. For–loop in MATLAB will calculate the total volume of head. Using 'bwperim' command that returns a binary image containing only the perimeter pixels of objects in the input image. A pixel is part of the perimeter if it is nonzero and it is connected to at least one zero-valued pixel. For loop will calculate the total head area cross-section. It will show the boundary of the brain.

```
head_area =0;
for i = 1:kk
head_area=head_area+ stats (i).Area;
end
```

f) Detecting the boundary of head cross section

BW_K1 = im2bw (K1, level);

Again leveling the [.55 .8] adjusted image K1 to binary image BW_K1. Using 'ceil' command in MATLAB it rounds the elements of new adjusted binary image to the nearest integers greater than or equal to 'Bw_k1.' For complex 'Bw_k1', the imaginary and real parts are rounded independently. For morphologically opening binary image we use 'bwareaopen' command.

BW2 = bwareaopen(BW_K1, tuning+5);

It removes from a binary image all connected components (objects) that have fewer than tuning+5 pixels, producing another binary image, BW2.

g) Boundary elimination and tumour detection: Subtracting two processed image

sub1 = BW2 – BWsdil;

First one is when boundary area is open. Second one is when image is processed by imdilate command .

BWsdil = imdilate(BWoutline, SE);

It dilates the grayscale, binary, or packed binary image 'BW outline', returning the dilated image, 'BWsdil'. The argument 'SE' is a structuring element object, or array of structuring element objects, returned by the 'strel' function. If 'BW outline' is logical and the structuring element is flat, 'imdilate' performs binary dilation; otherwise, it performs grayscale dilation. If SE is an array of structuring element objects, 'imdilate' performs multiple dilations of the input image, using each structuring element in SE in succession.

BWoutline = bwperim(sub2);

By using 'bwperim' perimeter of objects in binary image are detected. By using 'strel'function

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images are converted to morphological structural element it creates a structuring element, SE, of the type specified by shape.

h) Showing the performance parameter of tumor affected image and normal image

For image processing technique image histogram and image profile both performance parameter are used. Image histogram of every processed image is shown by 'imhist' command of MATLAB. It is a chart that shows the distribution of intensities in an indexed or grayscale image. 'Imhist' function creates a histogram plot by making a number of equally spaced bins, each representing a range of data values. It then calculates the number of pixels within each range. Again 'improfile' computes the intensity values along a line or a multiline path in an image. It selects equally spaced points along the path is specified, and then uses interpolation to find the intensity value for each point. It also works with grayscale images and RGB images.

i) Calculating tumor affected area

Using 'max' command in MATLAB largest elements along different dimensions of an array of a tumor is calculated. A loop is used for calculating the area of tumor cross-section.

```
for i = 1: kk
tumor_area=tumor_area+stats(i).Area ;
end
```

'for' command executes block of code specified number of times and 'end' command terminate block of code, or indicate last array index.

III. Result and Discussion

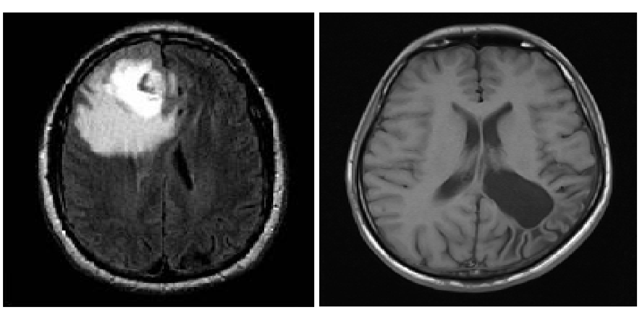


Figure 2 : MRI image of tumor affected and normal brain

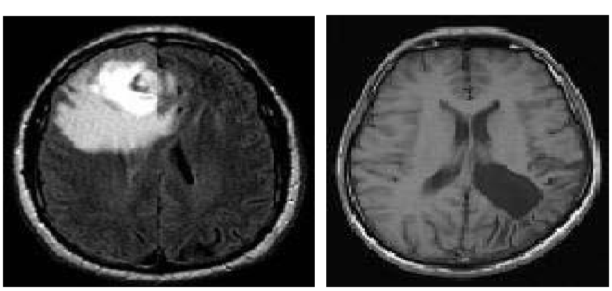


Figure 3 : Gray scale MR Image of tumor affected and normal brain

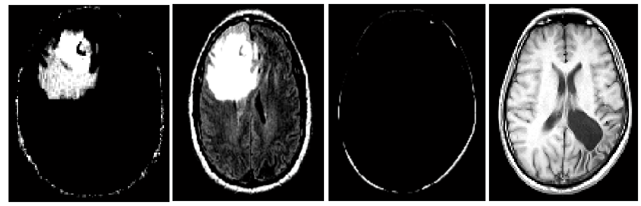


Figure 4: Adjusted the MRI image using the max intensity level

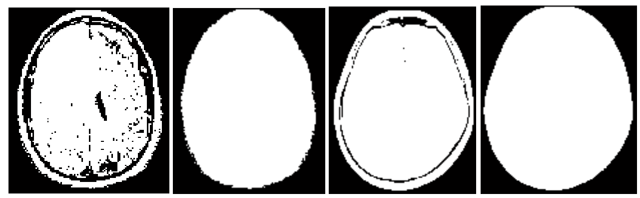


Figure 4: Conversion to binary Image

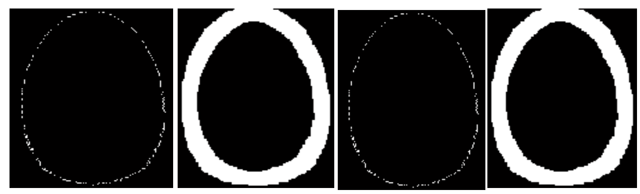


Figure 5 : Boundary detection

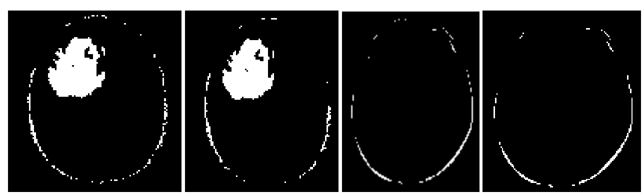


Figure 6 : Boundary elimination for tumor detection

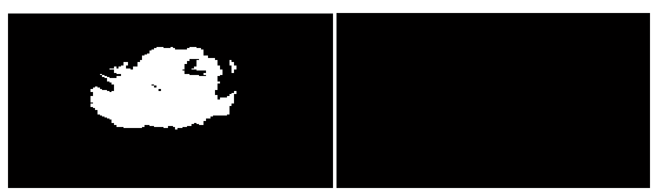


Figure 7 : Tumor detection

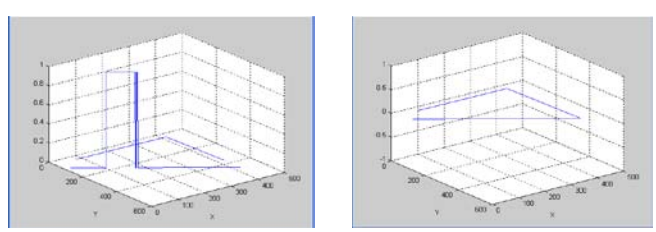
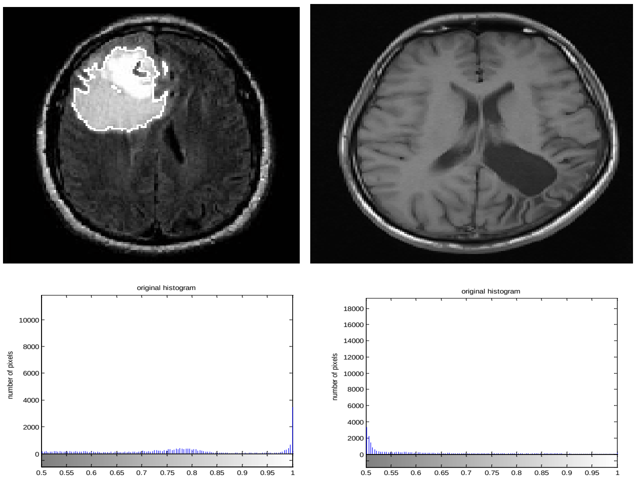


Figure 8 : Image profile for both type MR Images



Output of command window in MATLAB: The area of the tumor is:11.6712 percent of the area of the brain	Output of command window in MATLAB: There is no tumor.

Figure 9 : Final output of processed image and their histogram representation

IV. Conclusions

In this paper brain tumor detection technique using MRI has been investigated. Using MATLAB programme system was designed to detect tumor and two performance parameter like image histogram and image profile were used to identify tumor. On top of that tumor affected area of brain was also calculated and proposed algorithm is more efficient than previously suggested technique [4][5]. In future filtering method will be improved that has been currently used. Effective filtering will ensure the detection of tumor in efficient and accurate way. Future extension will able to detect the types of tumors (i.e. Benign tumor, Milligan tumor, Glioma). Again new extension will also be able to tell in which region (i.e. Fore brain, Mid brain, Hind brain) of the brain is affected by tumor.

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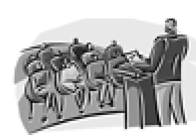

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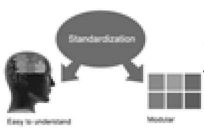

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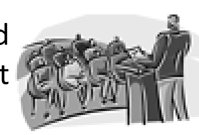

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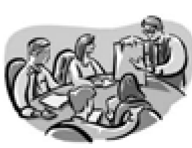

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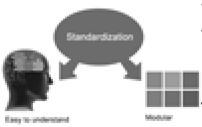

After nomination of your institution as "Institutional Fellow" and constantly functioning successfully for one year, we can consider giving recognition to your institute to function as Regional/Zonal office on our behalf.

The board can also take up the additional allied activities for betterment after our consultation.

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Note :

"

- In future, if the board feels the necessity to change any board member, the same can be done with the consent of the chairperson along with anyone board member without our approval.
- In case, the chairperson needs to be replaced then consent of 2/3rd board members are required and they are also required to jointly pass the resolution copy of which should be sent to us. In such case, it will be compulsory to obtain our approval before replacement.
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3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

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21. Arrangement of information: Each section of the main body should start with an opening sentence and there should be a changeover at the end of the section. Give only valid and powerful arguments to your topic. You may also maintain your arguments with records.

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

23. Multitasking in research is not good: Doing several things at the same time proves bad habit in case of research activity. Research is an area, where everything has a particular time slot. Divide your research work in parts and do particular part in particular time slot.

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

26. Go for seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. Think technically: Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

34. After conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print to the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects in your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

Writing a research paper is not an easy job no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record keeping are the only means to make straightforward the progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page
- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

Choose a revealing title. It should be short. It should not have non-standard acronyms or abbreviations. It should not exceed two printed lines. It should include the name(s) and address (es) of all authors.

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.

- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

- Report the method (not particulars of each process that engaged the same methodology)
- Describe the method entirely
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures
- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings - save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
- In manuscript, explain each of your consequences, point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation an exacting study.
- Explain results of control experiments and comprise remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or in manuscript form.

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.
- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.
- Do not give permission to anyone else to "PROOFREAD" your manuscript.
- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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