# 3.4.4 Number of books and chapters in edited volumes / books published, and papers in national/international conference proceedings year wise

# Enclosed first page of conference paper/book/ chapter

# (A.Y. 2018-2019)

2019 | OriginalPaper | Chapter

# Efficient Image Segmentation Using an Automatic Parameter Setting Model

Authors: D. Baswaraj, Puja S. Prasad

Published in: ICCCE 2018

Publisher: Springer Singapore

(2) 18-19

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Puja Sahay Prasad

# A survey of fingerprint recognition systems and their applications

| | |
|---|---|
| Authors | Puja S Prasad, B Sunitha Devi, M Janga Reddy, Vinit Kumar Gunjan |
| Publication date | 2018/1/24 |
| Conference | International Conference on Communications and Cyber Physical Engineering 2018 |
| Pages | 513-520 |
| Publisher | Springer, Singapore |
| Description | Recognition for authentication using biometrics is an intricate pattern recognizing technique. The process is really hard to architect and design, and choosing precise algorithms competent of fetching and extracting significant features and then matching them correctly, particularly in the cases where the quality of the fingerprint images are poor quality image capturing devices are used. Problems also occur where minutia are clearly visible on very small fingerprint area that are not exactly capture by camera. It is a false assumption that fingerprint recognition is a completely settled area regarding the authentication of a person just because it always give the correct identity of an individual. Fingerprint identification remains a very complex and intricate pattern-recognition system for authentication of a person. |
| Total citations | Cited by 21 |

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Puja Sahay Prasad

# Image enhancement for fingerprint recognition using Otsu's method

Authors: Puja S Prasad, B Sunitha Devi, Rony Preetam

Publication date: 2018/1/24

Conference: International Conference on Communications and Cyber Physical Engineering 2018

Pages: 269-277

Publisher: Springer, Singapore

Description: The internal surfaces of human hands and feet of have minute ridges with furrows between each ridge. Fingerprints have very distinctive features and have been used over a long period of time for the identification of individuals and are now considered to be a very good authentication system for biometric identification. For successful authentication of fingerprint, features must be extracted properly. The different types of fingerprint enhancement algorithms used in image processing all provide different performance results depending on external and internal conditions. External conditions include types of sensors and pressure applied by the subject etc. Internal conditions include the body temperature of a subject and skin quality etc. In this paper, we enhance an image using Otsu's method, which is one of the segmentation steps of image processing. This algorithm can improve the clarity of ridges and furrows ...

Total citations: Cited by 3

2019 2020

Scholar articles: Image enhancement for fingerprint recognition using Otsu's method
PS Prasad, B Sunitha Devi, R Preetam - ... Conference on Communications and Cyber Physical ..., 2018
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# DESIGNING OF DIGITAL CIRCUITS USING VEDIC MATHEMATICS FOR ENGINEERING APPLICATIONS

**Ganti Sreelakshmi**

**Abstract**

Digital architectures were proposed in this paper to improve the performance by mainly exploiting the properties of Vinculum number system and Vedic mathematics. These designs can be used in performing computational calculations like addition, subtraction and multiplication operations. In this paper we proposed a new approach in designing adders, subtractors and multiplier architectures. Analysis and comparison using Xilinx 14.2i was done and results shows that proposed digital architectures are faster when compared to conventional architectures found in the technical literature.

Key words: Vinculum number system, Vedic mathematics, Arithmetic operations

## 1. Introduction:

An Intelligent System is a combination of hardware and its software. Its performance is determined by the devices that are used in that system and the algorithms or software we are using. Same system gives better performance if we use latest software or by using efficient architectures. In digital circuits hardware plays an important role for performance parameters like Area, delay and power. Hence efficient digital architectures are required. As an example Arithmetic and Logical Unit of any processor requires hardware modules like arithmetic unit and logical unit. Arithmetic unit performs basic operations like addition, subtraction, multiplication, division operations and Logical unit consists of AND, OR, NOT, XOR operations. Therefore high performance system requires efficient Adders/Subtractors/Multipliers etc. Not only these hardware modules by using efficient algorithms we can improve the performance of system. Vedic Mathematics is one which permits to thinks in different ways for solving the problems easily and accurately. We took this and tried digital circuits for addition, subtraction and multiplication.

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# A Low Power Test Pattern Generator for Minimizing Switching Activities and Power Consumption

Jugal Kishore Bhandari, M. Krishna Chaitanya, G. Venkat Rao

**Abstract— For all integral self-test circuits linear feedback shift register (LFSR) is employed to come up with the test vectors to be applied. the standard or conventional model of test pattern generator (TPG) could generate some perennial check patterns, and also all possible combinations of test patterns that unnecessarily will increase the test power while not contributive abundant to the fault coverage. Based on TPG style, the chip space additionally will increase, tributary for the overall power consumption of the IC. This paper presents approach known as low power-positioned complements bits test vector generation (LP-PCBTVG) technique with partially fixed bits sequence and bit insertion (either 0 or 1) techniques. Hence, the application of ultimate output vectors of LP-PCBTVG circuit over device/circuit under test decreases the total test power compared with LFSR-based BIST. And also by complementing of few output bits of LP-BCTVG in an exceedingly arranged and nominal order, we will scale back the massiveness of TPG which can contribute in reducing size of IC. The obtained simulation results prove that this method will scale back the test power consumption in conjunction with higher fault coverage in comparison with LFSR-based BIST.**

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# Robust Intuitionistic Fuzzy c-means Clustering Algorithm for Brain Image Segmentation

Achalla Monalisa, Dasari Swathi, Yepuganti Karuna and Saritha Saladi

***Abstract*—The segmentation of the human brain magnetic resonance imaging (MRI) plays a highly decisive role in diagnosing numerous diseases like tumors, Alzheimer's disease, edema, dementia etc. But it is a very challenging task because of presence of noise in the MRI images and also because the boundaries between different tissues of the brain cannot be easily distinguished. Standard fuzzy c-means clustering (FCM) method is proposed to segment the brain MRI accurately and to handle the noise. There are many variants of FCM and one such variant is the Intuitionistic fuzzy c-means clustering algorithm (IFCM). It incorporates the advantages of intuitionistic fuzzy set theory. The IFCM handles the uncertainty, but is not robust to noise as it does not consider any local spatial information. Hence, in this paper a novel approach, namely the Robust and improved intuitionistic fuzzy c-means clustering algorithm (RIIFCM) is proposed. This algorithm is robust to noise as it considers local spatial information. We have demonstrated the efficiency of the RIIFCM algorithm compared to six other algorithms used for the brain image segmentation. The segmentation is carried out on a simulated MRI brain image and we demonstrate that the RIIFCM algorithm outperforms the other existing algorithms by calculating the similarity indices, false positive ratio (FPR) and false negative ratio (FNR).**

***Index Terms*—Brain image segmentation, Fuzzy c-means, Intuitionistic fuzzy c-means, Magnetic Resonance Imaging.**

## I. Introduction

THE human brain is arguably the most essential and the most complicated organ in the human body. It is often difficult to diagnose any disease related to the brain and tools like MRI scan provide us with insights into the protected brain and non-brain regions. For better understanding of each tissue of the brain and for isolating the abnormalities or diseased parts, segmentation of the brain image needs to be done with utmost care. The brain MR image is majorly segmented into three tissues: cerebrospinal fluid (CSF), gray matter (GM), white matter (WM). This MRI image segmentation [1] allows the physician to correctly diagnose many dreadful disease tumors, Alzheimer's disease, edema, dementia, Schizophrenia and causes of many different headaches etc. But as the human brain is a very intricate organ, there are no well-defined boundaries between different tissues. Also, the MRI images are often affected by different types of noises. These two reasons make the segmentation of MRI images a very challenging task. Many different methods have been proposed for the segmentation in literature. Some of them are threshold based segmentation methods [2], atlas guided method [3], artificial neural networks (ANN) [4], clustering methods [5- 6] etc. Clustering methods are considered to be the most efficient for brain MRI segmentation. The basic idea of clustering methods is to group similar pixels. Various clustering algorithms have been proposed in literature like k-means [5-7], fuzzy c-means clustering methods [8], expectation-maximization [5]. K-means clustering aims to partition data pixels into different clusters, in which a pixel belongs to the cluster whose center has least distance from that pixel. In expectation-maximization, clustering is done by finding statistical measures like maximum likelihood of a pixel in a cluster. The fuzzy clustering methods use the fuzzy set theory for clustering. The main difference between k-means and fuzzy c-means is, k-means does not give the optimum solution, whereas c-means does. Among these methods, the standard fuzzy c-means clustering algorithms and its variants are widely used for image segmentation and pattern recognition[9-13].

Among the variants of the FCM, the Intuitionistic fuzzy c-means (IFCM)[14-18] method is proved to be better than other methods, as it can handle the uncertainty in the brain tissues. But it is sensitive to noise and hence in this paper we have presented an algorithm, namely the Robust and Improved intuitionistic fuzzy c-means (RIIFCM) algorithm, which can handle the uncertainty as well as noise[19-21].

This paper is further structured in the following way: Section II describes different variants of the FCM method. Section III describes the basics of the intuitionistic fuzzy set (IFS) theory and the fuzzy set theory (FS). Section IV describes RIIFCM algorithm in detail. The results obtained and the observations are mentioned in Section V Section VI concludes the paper.

## II. Related Works

The standard FCM [8] is an iterative clustering algorithm, it allows one data point to belong to two or more clusters. It works by minimizing an objective function, given by the

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# Brain MR Image classification using DWT and Random forest with AdaBoostM1 Classifier

Garrepally Gopi Krishna, Ashwin.S, Yepuganti Karuna and Saritha Saladi

***Abstract*—This paper proposes automatic and error-free classification of brain Magnetic Resonance Imaging (MRI) for analyzing and understanding human brain. We incorporated four steps for classification process, they are level-3 2D Discrete Wavelet Transform, feature vector normalization, PPCA (Probabilistic Principle Component Analysis) and last ADBRF (AdaBoost Random Forest Classifier).First, we use 2D-DWT is for extracting features of the brain MR image. Then feature vector normalization is used for normalizing the features and PPCA to minimize the dimensionality of the normalized feature matrix. Finally the reduced feature matrix is given as an input to the ADBRF classifier to identify the MR brain as a normal or abnormal images. We applied the proposed scheme for dataset-66(DS-66) and dataset-160(DS-160). DS-66 consists of 18 normal and 48 abnormal and 20 normal and 140 abnormal in DS-160. We used a 5X5 CV (Cross Validation) for better performance of the proposed method. Three types of performance metrics, the accuracy, sensitivity and specificity are used for evaluating the performance of our proposed method.**

***Index Terms*—Classification, Feature Extraction, MRI (Magnetic Resonance Image), T2-weighted brain MRI.**

## I. Introduction

MRI is a low risk, fast imaging technique that provides high quality images of the anatomical structure of the human brain. Radio waves and magnetic fields are used to get the high quality brain images. The magnetic fields and radio waves used by in MRI scanners are less harmful compared to X-rays waves which uses ionized radiation. MRI gives clear image of soft brain tissues like CSF, Grey matter and White matter helps in clinical diagnosis and for research work. There are many other modalities like PET scan, CT scan, but MRI provides superior contrast of brain tissues. Earlier many manual methods were used for diagnosis which are time consuming and not accurate because of large imaging data. MRI is a non-invasive technology.

Firstly, we extract the features of the brain MRI and employing techniques like Independent component analysis, Fourier transform and Wavelet transform. But presently many Researchers use wavelet [4, 19] because it provides time and frequency analysis whereas Fourier transform provides only Frequency transform. And we used ADBRF (AdaBoost Random Forest) a machine learning algorithm for classification into normal and abnormal brain images.

In previous years many researchers used variety of techniques for MRI classification. The WE (wavelet entropy) using SWP (spider web plots) for extracting features [1] and they evaluated entropies of low frequency components (approximation) coefficients of DAUBECHIES4. The mother wavelet preferably till level-8 and PNN (probabilistic Neural Network) for MRI classification, achieves superior accuracy rates with lower dimension datasets. The 2D-DWT(Discrete Wavelet Transform) approximation coefficients as feature vector matrix [2] and uses PCA for reducing feature vector matrix dimension, used FP-ANN (Feed Forward Artificial Neural Network) and K-NN (K-Nearest Neighbor) to classify as normal and abnormal and achieve an accuracy of 97% and 98% respectively. The Proposed[3-4] many hybrid methods to classify brain MRI and achieved superior accuracy, they used level-3 DWT for extracting features in all three existing approaches, for reducing feature matrix dimensionality they use PCA and BPNN(Back Propagation Neural Network) with SCG(scaled conjugate gradient). The coefficients of level-3 approximations of 2D-DWT [5] were used for extraction of features where DAUB4 used as mother wavelet [6-20] in 2D-DWT. They used Self-Organizing Maps and Support Vector Machines as classifiers and achieved 94% and 98% respectively. The hybrid methods to classify brain MRI and achieved superior accuracy[6], they used level-3 DWT for extracting features in all three existing approaches, for reducing feature matrix dimensionality they used PCA and utilized FNN(feed forward neural network) with ACPSO(adaptive chaotic particles warm optimization). The updated version of DWT[7] for extraction of features is used Slantlet Transform and used Back Propagation Neural Network for MRI classification and achieved enormous accuracy of 100%.In[8] they used many hybrid methods to classify brain MRI and achieved superior accuracy, they used level-3 DWT for extracting features in all three existing approaches, for reducing feature matrix dimensionality they used PCA and utilized KSVM(kernel SVM) with various kernels : LIN(linear), HPOL(homogeneous polynomial), IPOL(in-homogeneous polynomial) and GRB(Gaussian radial basis). The new feature extracting tool called Ripplet Transform, PCA (Principle Component Analysis) [9] used for minimizing the dimension of feature vector and used Least Square SVM (LS-SVM) for identification of brain MRI.

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# MS Lesion Segmentation for Single and Multichannel MRI Images using MICO Technique

R.V. Sai Raghavendra, Yepuganti Karuna and Saritha Saladi

*Abstract*—**We Implement multiplicative intrinsic component optimization technique to single and multichannel MRI images for segmenting multiple sclerosis lesions. This technique solves the problem of intensity inhomogeneity by estimating and correcting bias field. In segmentation it has more advantages over other MS lesion segmentation techniques in terms of precision. In multichannel segmentation, distinct weights are given for different channels to regulate the effect of each channel output. We use T1-w and FLAIR images in the multichannel segmentation of MS lesions. we provide higher weight to FLAIR images as they regulate in enhancing the segmented lesions. we were able to solve the problem of intensity inhomogeneity through bias field estimation and correction and followed by lesion segmentation. Our technique showed better and promising results when compared to ground truth images.**

*Index Terms*—**Bias field, Lesion segmentation, MRI images, Multiplicative intrinsic component optimization(MICO)**

## I. Introduction

Multiple sclerosis(MS) disease has become common in the juvenile population these days. This disease involves in the damage nerve fibers (AXONs) myelin sheath, a fatty white substance that surrounds the axons it plays a vital role in functioning of nervous system [1] and damage to this myelin sheath causes impairments in vision and coordination of body parts. The magnetic resonance imaging (MRI) became the significant tool in the field of medical sciences and is used for treating diseases like tumors, MS lesions, glioma etc. Many segmentation algorithms are available [2], they can be performed as either fully automated or semi-automated methods on brain MRI images for segmenting brain disorders. The MRI scanner is capable of detecting lesions with high accuracy and sensitivity without any harmful radiations.

These lesions usually appear with low intensity levels in T1-weighted MRI images and as high intensity levels in T2-w and FLAIR images, these levels reflect in the increased brain tissue water content [3,4]. The fluid attenuated inversion recovery(FLAIR) image is distinguished from T2-w images by observing CSF, is suppressed more [5,6] and make FLAIR images unique for treating diseases. We use only T1-w image in single channel and FLAIR and T1-weighted MRI images in multichannel. Quantitative analysis of MS lesions from different patients gives much needed information for diagnosis and in evaluating different set of therapies [7]. However manually segmenting MS lesions is more time consuming and also it differs in expert variability.

In recent years many MS lesion segmentation techniques are suggested in the literature. the expectation maximization, atlas-based algorithms to segment MS lesions [8-9]. normal brain tissues are indicated according to the voxel categorization and the lesions are indicated as eccentricities from the normal brain tissues. The other lesion segmentation technique [10] used MNI registered atlas in the initialization of the standard brain tissue probabilities along with Gaussian mixture model and EM algorithm in segmenting T1 and T2-w MRI images. Based on the standard brain tissue classification more probable MS lesions are detected from T2-w MRI sequences. The statistical k-NN algorithm [11] which is based on intensities and combined templated-driven algorithm along with partial volume correction and segmented the MS Lesions accordingly. The adaptive geometric brain model and modeled topological properties of the MS lesions and brain tissues for segmenting lesions in white matter [12]. The automated Lesion segmentation is done using Active contour model (ACM) [13], to find the best initial values of the model parameters and used adaptive mixture method(ADM) along with Markov random field (MRF) for finding the probabilities of individual class. After estimating Model parameters, probabilities [14] and using Bayesian's classification the normal brain tissues and lesions are segmented. The lesion contrast filter and intensity normalization technique [15] is adapted to enhance region of interest. Also, they used support vector machine for classifying MS lesions, level set based active contour and filtering to achieve higher accuracy in detecting MS lesions.

Here We propose a new MS lesion segmentation technique by using MICO, solves the issue of intensity inhomogeneities through bias field estimation and correction followed by lesion segmentation simultaneously. In a single channel, T1-w images are used whereas in Multichannel FLAIR and T1-w

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# An Improved Type 2 Fuzzy C Means Clustering for MR Brain Image Segmentation based on Possibilistic Approach and Rough Set Theory

N.T.J Preetham Kumar, Achalla Sriram, Yepuganti Karuna and Saritha Saladi

***Abstract*—It is necessary to extract various attributes from an image especially in the field of neurological pathology. Magnetic Resonance Imaging (MRI) is a popularly used scanning technique for soft tissues like brain as it provides a detailed view of the tissue. It requires highly accurate segmentation algorithms to cluster a brain image into its constituent tissue regions. In consideration to this necessity, fuzzy set theory proves to be suitable to achieve tissue clustering on the brain MR images. However, the need to obtain better segmentation makes clustering efficiency more demanding. This fact encourages us to propose an advanced clustering algorithm known as Improved Rough Possibilistic Type-2 Fuzzy C Means that includes Skull Stripping and Median Filtering to enhance the performance. The proposed algorithm addresses various issues experienced by several other clustering algorithms and its superiority over them is quantitatively validated through authentic performance metrics like Jaccard Index, Accuracy and Adjusted Rand Index.**

***Index Terms*—Brain images, Fuzzy set, Possibilistic, Rough, Segmentation, Skull stripping, Type-2 Fuzzy C Means**

## I. Introduction

IN the past few decades, research has shown a significant development in the field of *Neuroimaging* and paved ways to a new dimension in analyzing and understanding the brain anatomy. *Neuroimaging* uses disparate techniques like Computed Tomography (CT scan) and Magnetic Resonance Imaging (MRI) etc. to capture the anatomical structure of the brain. However, MRI is being popularly preferred by doctors around the globe for a better and accurate diagnosis of the brain related diseases like tumors, lesions etc. The main advantage of MRI is, it can provide a detailed 3-D view of the soft tissue without exposing the subject to any kind of harmful radiation. The MRI scan yields a better understanding in the domain of neurological pathology to help diagnose the condition of the subject. The brain MRI segmentation [1] is the primary function in pathology as it decides the further course of action in the diagnosis process. One of the efficient ways of segmentation is to determine those components of a data set which naturally belong together in a particular set known as Clustering. It is an autonomous technique popularly used to discover underlying patterns in data and to group the data based on their similarity.

The rest of the paper is organized into V sections. Section III consists of the methods and materials, section IV deals with the proposed methodology. Section V deals with the results and discussions followed by the conclusions in section VI and references in section VII.

## II. Literature Survey

The most widely used methods like k- means [2] and Fuzzy C Means (FCM) form the basis for many advanced clustering algorithms. K-means is a hard classification clustering method as it categorizes input data into k clusters and enforces each data point to explicitly belong to a particular cluster. Whereas FCM is a soft classification clustering method, assigns a membership value to each data point based on its Euclidean distance from multiple cluster centers. Thus, it corroborates the fact that a pixel can belong to more than one cluster simultaneously and its membership values sum up to 1.This impediment results in inferior performance of FCM over noisy data.

To surpass this drawback, a new clustering algorithm known as Possibilistic C Means (PCM) was introduced [3,4], assigns typicality membership values instead of probabilistic membership values. The typicality matrix assigns low membership values for noisy data and automatically eliminates these outliers. But the typicality values can place a pixel in more than one cluster with equal belongingness resulting in coincidental clusters.

Later, Possibilistic Fuzzy Clustering was introduced [5], deals with the coincidental clusters by appending an inverse function of cluster centers to the objective function. This inverse function is responsible for a repulsive force between

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# Comparative Analysis of Various Enhancement Methods for Astrocytoma MRI Images

R.V.Suryavamsi, L.Sai Thejaswin Reddy, Saritha Saladi and Yepuganti Karuna

***Abstract*—Image processing plays a crucial role in obtaining information from brain images. Magnetic Resonance Imaging (MRI) techniques provide precious information to the doctors to diagnose various diseases. Artifact removal, skull stripping, Noise removal and enhancement are various procedures in pre-processing of the image. Easy detection of the tumor requires a pre-processed image. We propose analysis of three methods on astrocytoma MRI brain images called Histogram Equalization (HE), Contrast Limited Adaptive Histogram Equalization (CLAHE), Brightness Preserving Dynamic Fuzzy Histogram Equalization (BPDFHE).These methods are verified and the results are evaluated using performance metrices. (MSE, PSNR, RMSE).**

***Index Terms*—Astrocytoma Images, Bpdfhe, Clahe, He, MRI.**

## I. INTRODUCTION

ASTROCYTOMA is the major type brain tumor and found to be either malignant or benign. Pre-processed image helps in the automatic detection of the tumor. Pre-processing of the image, makes segmentation simple and accurate. Tumors should be detected properly in-order to classify them and extract the features. The performance of tumor segmentation depends on the image pre-processing. P.Karthikeyan Proposed a method to detect the edges and curves in a image by using curve let transform .This method helps us in reducing the noise in the image. Ajala Funmilola A proposed many different techniques in Image processing like Thresholding, Region growing, Clustering etc [1,2].Image enhancement, removal of noise and artifact, skull stripping are the stages in pre-processing of an image. Better quality of an image is obtained by contrast manipulation.

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Among various enhancement techniques HE is the easy and efficient method. In HE, all the pixels are distributed evenly and makes the resulted image intense than the given image. The three enhancement techniques (i) HE (ii) CLAHE (iii) BPDFHE are compared. The Performance metrics are used to analyze the quality of the image after enhancement. The paper is categorized as follows: In section II introduction of three image enhancement methods are described. In section III Performance metrics are described. In Section IV experimental results are provided and the conclusion and future work is provided in section V.

## II. IMAGE ENHANCEMENT METHODS

The three different enhancement methods named HE, CLAHE and BPDFHE are implemented on 10 MRI brain images and corresponding histograms has been calculated.

### *A. Histogram Equalization*

Histogram is a statistic probabilistic distribution of every gray level in a image [3-5].The algorithm used in this method helps to enhance the contrast of the given image [6-8] .In HE the required histogram is obtained using the following algorithmic steps[9].The output of HE and its histogram is shown in b and ii fig.1 and fig.2 respectively.

STEP 1:Calculate the probability distribution function(PDF). The given input images contains K discrete gray levels from [0, K-1]

$$P(X_L) = \frac{pixels\ with\ intensity\ X_L}{total\ number\ of\ pixels} \quad (1)$$

$$P(X_L) = \frac{n(X_L)}{Y \times Z},\ \text{for L} = 1,2, \ldots \ldots \text{k} - 1 \quad (2)$$

where Y -rows and Z - columns and $n(X_L)$- count of pixels with intensity $X_L$

STEP 2: Evaluate the cumulative distributive function(CDF).It is the summation of all the calculated PDF values.

$$A(X_L) = \sum_{b=0}^{l} P(X_b), \text{for L} = 1,2, \ldots \ldots \text{k} - 1 \quad (3)$$

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# Automated classification of brain images using DWT and biogeography-based optimisation

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*Abstract*—**Diagnose the abnormalities is the hardest step in the whole medical process. Early detection of abnormalities can save lot of time, efforts and resources. The wavelet transform is one of the better methods, to achieve excellent results in terms of accuracy. So, we proposed this new method for automated classification of MRI (Magnetic resonance imaging) brain images as normal or abnormal. PPCA is used for the feature reduction process as to get decrease the computation time and complexity.SVM (support vector machine) is a classifier and to optimise the weights of the SVM, BBO (biogeography based optimization) was used. The results we obtained in terms of accuracy is superior to the previously proposed methods.Three factors accuracy,precision and sensitivity from the confusion matrix are considered into account for the evaluation of the proposed method.**

**Keywords—Support Vector Machine(SVM)-Biogeography based Optimisation(BBO)-Magnetic Resonance Image-(discret wavelet transform)Probabilistic Principle component analysis(PPCA).**

## 1.INTRODUCTION

MRI(Magnetic Resonance Imaging),is a powerful non invasive medical technique used in radiology .It uses strong magnetic fields,radiowaves and with the help of computer technology produces good quality image of the brain.We have Xrays ,CT scan ,but MRI is far superior compared to them as it does not uses any radiations which are harmful to human body.MRI provides detailed presentation of the image which further makes it easy to analyse .Hence classification of the images is done in a proper and easy way as normal or abnormal.This classification adds values to this technique as with the very early stage we can understand and with less use of money,capital and human resources can solve the brain abnormalities .

The classification of normal and abnormal images is very important and this is one of the biggest challenges among all the procedures in the medical field. For this, it is required to generate large set of information and going with MRI brain images.MRI brain images are associated with anatomy and deals with soft tissues and large information sets.

This paper consists of seven sections-section 2 explaining the related works,section 3 regarding the proposed methodology and block diagram with detailed explaination of each blocks,section 4 explains the data sets used and the description of the simulation results,section 5 shows the comparison of the results obtained with different types of the classifiers in terms of accuracy,precison and sensitivity and section 6 is about the simulation results analysis and conclusion.

## 2.RELATED WORKS

In the past, authors have applied Discrete wavelet transform(DWT) to detect the abnormalities in the brain,[1] used the approximate coefficients obtained and applied Self-Organizing Map(SOM) neural network and Support Vector Machine (SVM)[2].Advanced version of DWT is the slantlet transform [3]and positions had been chosen using logic and they applied BPNN (back-propagation neural network). Then to improve the results 3-level DWT had been applied [4]and the redundancy is reduced using Principle Component Analysis(PCA) and used Feed Forward Back-Propagation Artificial Neural Network (FP-ANN) and KNN (K-nearest neighbour) classifier. Different researchers came up with Fast-Fourier transform based Gaussian model[5] for the classification of brain tissue of MRI images . Kernel SVM [6] suggested with three new kernels.They are polynomial, inhomogeneous polynomial and other is based on Gaussian radial basis. Similarly like PCA to reduce the features, other researchers have used spider web plots[7] for the feature reduction.Other researchers have used Ripplet transformation and applied many feature reduction techniques for the better results. PCA[8] used as a feature reduction technique and Least square-SVM for the outputs of Ripplet transform (RT). PSO is one of the recent optimization techniques used to train the KSVM[9] with accuracy of 97.11% for the data set of 90 MRI brain images. Discrete Wavelet Packet Transform (DWPT) and GEPSVM (generalized eigen value proximal SVM) as classifier [10] in combination with FPCNN (feedback pulse coupled neural network),DWT(for feature extraction),PCA(for Feature reduction) and FBPNN for classification.

After analyzing the results two major drawbacks are found and they are (1) Storage problem as the coefficients storing takes large amount of space [11] and (2) Improvements in the classifier training and the accuracy can be improved. So, to rectify the drawbacks in the existing work ,we propose PPCA feature reduction technique and this reduces the storage issues. We are optimizing the weights of DWT using the BBO ,to increase the accuracy and thus decreasing the computational time.

In the proposed work , by applying a single level DWT to an image it decomposes it into four subbands and they are low-low (LL), low-high (LH), high-low (HL), and high-high (HH).LL subband gives the approximation to the image and

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# Mechanical Properties of Hybrid Natural Fiber Reinforced Epoxy Matrix Composites with SiC as Filler

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## Abstract

Now a day's waste becoming an environmental impact globally, the focus of the researchers have to admin the problem caused by the waste. As a part of its bio-degradable materials research is a necessary task used for automotive applications. Natural fibers mostly known as extracted fibers from plants which are available in large scale may solve the requirements of industrial components as well as automotive needs. The replacement of plastics with natural fiber components is one good choice to avoid large dump of thermo and thermo setting plastics. To attain the standards of solving desires of plastic thing replacements researches wished within the vicinity of natural fibers to obtain the comparative properties of plastics. To expand composites with good mechanical, chemical amendment of fibre achieved to reduce the hydrophilic conduct of fibers and the absorption of moisture. There are many publications on review of fiber reinforced composites, a notable research has been done on natural fiber polymer composites but research on jute, hemp, hybrid of jute and hemp fiber, hybrid (jute/hemp) fiber with SiC particulates as filler at specific extent fractions primarily based polymer composites are uncommon.

In this paper, hybrid natural fiber reinforced epoxy matrix composites were fabricated using hand lay-up technique with different percentage of hybrid fiber and SiC filler have been studied and their mechanical properties such as tensile strength, compressive strength, flexural strength and hardness have been reported. It is observed that the tensile and compressive strength increases with hybrid fiber reinforcement and SiC filler. Failure mechanism of hybrid fiber composites has been discussed using scanning electron microscopy.

**Keywords:** Natural Fibers, Hybrid, Mechanical properties, hand layup Technique,

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# Report on Better Performance Engines

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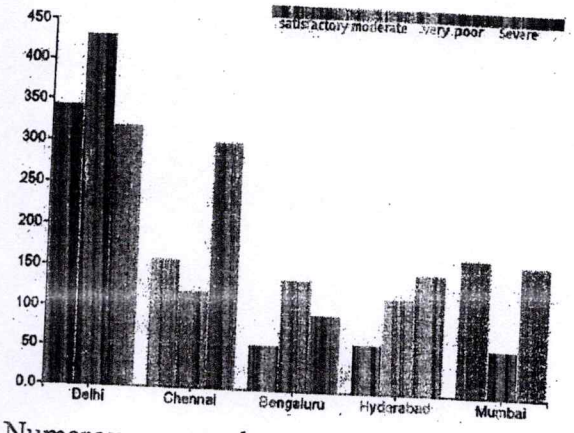
*Abstract*

**Release of carbon and other particulates from vehicles is one of the major cause of pollution, the problem is becoming severe day by day because of increase in the vehicular density. Numerous solutions have been proposed till date to overcome this challenge. In this paper, the effects of nature by engine under the alteration of strokes i.e., converting from 2-stroke to 4-stroke and vice-versa. Air from higher pressure is used to charge the engine independent of fuel mechanism enabling valves operation, Higher difference in pressures leads to downsizing of strokes and the same can be altered by degree of air reduction. Resulting in lowered fuel consumption rate and emissions. Introducing electric valve replacing the mechanical valve enables switching of strokes only by the electronic instruction. Location of the fuel nozzle directly in the combustion chamber and its operation independently from other valve enable use of different fuels along with catalytic converter incorporation lessens emissions through controlled operations. Thereby, Increases the overall performance of the engine.**

**Keywords: Engine, two-stroke, four-stroke, Valves.**

## I.INTRODUCTION

In today's world, Carbon overloading is major form of air pollution caused by burning fuel resources. With 2.51 million deaths in 2015, India has been ranked No. 1 in pollution related deaths, according to a report by The Lancet Commission on pollution and health. Cost escalation and increase in demand of the crude petroleum and failure to invent an alternative source of fuel. Statistical report on air quality index as of November 2017.




Numerous researchers around the world are involved in the field of developing alternate fuels and to reduce emission by external means like use of catalytic convertors and engine modifications. In this present research work a solution enabling the engine designed as a four-stroke engine to operate both as a two-stroke and a four-stroke engine. This means that the respective mode of operation, powerful or economic, can be chosen depending on the situation in the traffic. This engine can also operate either on petrol or Diesel as well as on the atmospheric or compressed air pressure or compressed natural gas. Introducing catalytic converter to mainly avoid toxic fuels release in to atmosphere by controlled emissions.

## II. THEORY ON STROKES OF ENGINE

The thermodynamic cycle used by a piston engine is often given by the number of strokes to complete a cycle, the most common designs for engine are two-stroke and four-stroke. Less common designs include five and six stroke engines and complete a power cycle every two strokes, which means a power



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