

A Novel Scheme for Medical Image Compression using Huffman and DCT with Water Marking

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Abstract

Image compression is one of the data compression applications in which we convert the original data into a few bits. In image compression we can simply preserve the data needed by removing unwanted data to be proficient to record or refer data in a functioning form. Hence the image compression reduces the communication time and increases the communication speed. We mainly use lossy & lossless technics to remove this type of problem. There is no data loss when we compress images with a lossless image compression technique while some of the unnecessary data losses in lossy image compression technique. By using these processes, we can reduce the data size, which we can save more data in less memory. Here we have done the uses of Huffman & DCT techniques for image compression. In order to analysis medical image we have used the DWT feature extraction technique. Here for security we have done watermarking tool in medical image.

Keywords-Image Compression, Lossy & Lossless techniques, Huffman & DCT coding, DWT feature extraction technique and Watermarking.

I. INTRODUCTION

Image compression is an application of data compression in which we convert the original image to some bits. With the help of image compression, we compress the medical image to facilitate transfer of this from one place to another [1]. In image compression we can reduce the dimensions of the original data to reduce the size of the original data. When we compress a medical image, our purpose is to make sure that none of the original image is the lost of the required data. Compression technics are technically advanced to allow large files to be compressed easily. By quick improvement in a suitable way via impressive procedures a huge scope of image data ought to store those images typically outcomes in the compressing images. There are some algorithms used to complete these. Types of compression in several actions such as lossless and lossy. The image that needs to be compressed to a pixel range of grayscale, ranging from 0 to 255. While compressing any data it must be kept in mind that any data required will not be lost in the body [2]. Also, low bits are needed in saving data in digital media and sending. Compression to some range shows that there is a section of data whose size is required to decrease. Now this JPEG format is absolute option for digital image. The Joint Photographic Expert Group (JPEG) which depends on discrete cosine transform (DCT) is a very extensively second choice formula for compression. Image compression is one of the incredible familiar way in image operation. In this way we can have many basis ideas and play a significant role in the actual storage and transmission of images. In image compression, in the proposed model to reduce unnecessary data we will use less sample to facilitate sending and saving of this. The main goal of reducing the number of bits per large base to compress images is to decrease the transmission time to display this image and broadcast the image and regenerate once again by Huffman encoding [3].



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Volume 40, Issue 2, March 2019, P.

Original Article

Detection of Seizure Event and Its Onset/Offset Using Orthonormal Triadic Wavelet Based Features

G. Chandel ^a, P. Upadhyaya ^b, O. Farooq ^c, Y.U. Khan ^d

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<https://doi.org/10.1016/j.irbm.2018.12.002>

Highlights

- The use of *triadic* wavelet based features for seizure detection.
- Long-term EEG signals were analysed.
- The method obtained 99.45% of accuracy and 98.3% of specificity.
- The efficiency compared with existing conventional methods.

Abstract

Background

Epileptic seizures are unpredictable in nature and its quick treatment of patients. In last few decades researchers have focused on onset and offset detection of seizure using Electroencephalogram (EEG) signals.

Methods

In this paper, a combined approach for onset and offset detection of seizure using wavelet decomposition based features. Standard deviation of wavelet decomposition extracted as significant features to represent different EEG signals.

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ABSTRACT

Repeated rib elements are used as roughness medium to increase heat transfer. An experimental and numerical analysis has been performed to study the influence of

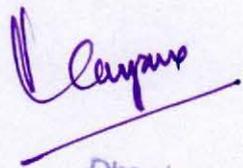
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Chromatic Dispersion Induced Semi Optical Pulse Stretching Approach to Beam Steering Applications of Phase Array Antenna

Chandan Kumar  & Sanjeev Kumar Raghuwanshi*Wireless Personal Communications* **115**, 949–960 (2020)71 Accesses | [Metrics](#)

Abstract

A semi optical technique based on chromatic dispersion induced pulse stretching effect of single mode optical fiber has been utilized to demonstrate the beam steering of phase array antenna. In the proposed study 1×4 antenna array has been fabricated at desired specifications before applying the photonic feeding concept. In the beginning of the paper detail, fabrication process of antenna array has been demonstrated followed with establishing relationships between the phase shifts introduced between two consecutive antenna elements. The purpose of this paper is to design and fabricate a novel Rectangular Microstrip antenna array. The Resonant frequency of antenna is 13 GHz. The proposed rectangular patch antenna has been designed using FR4 with dielectric constant ($\epsilon_r = 4.4$), loss tangent ($\tan\delta$) equal to 0.02. The individual


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Characterization and experimental investigation of rheological behavior of oxide nanolubricants

Harsh Gupta, Santosh Kumar Rai, Piyush Kuchhal & Gagan Anand ✉

Published online: 07 Aug 2020

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Abstract

Nanolubricants are nano fluid, colloidal nanoparticle suspension, which are specially used for machine lubrication of the engine. Nanolubricants exhibit special tribological properties that have potential applications in mainly automotive industries. Performance of an engine is a function of the lubricant being used. A study of rheological behaviors of nanolubricants has been beneficial in understanding the influence of nanolubricants on shear rate and shear stress. This study is concerned with characterization and rheological behavioral studies of five nanolubricants, i.e., SnO₂, TiO₂, Fe₃O₄, CuO and ZnO mixed with engine oil at 1% volume by weight concentration. In this study, the result showed that the shear rate was independent of viscosity confirming the Newtonian behavior of these nanolubricants. Non-linear decrease in the shear viscosity. with the rise of the temperature. was observed as well

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Kshatrapal Singh ✉, Ashish Kumar & Manoj Kumar Gupta

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Abstract

The Composition Vector method is a type of alignment-free methods for sequence comparison. The proposed method is based on modified k-string method, which uses the ratio of frequencies of all possible sub-words of length k in a DNA sequence to compare two sequences. We have proposed a scheme based on modified formulas for sequence comparison considering principle of maximum entropy. There exist several formulas for the purpose however the one maximizing the entropy was selected for the study. It leads to a unified approach for sequence comparison. The obtained results have been analyzed and compared with existing composition vector and K-string methods by drawing phylogenetic trees. The results show that the proposed scheme performs better in comparison to existing methods.

Q Subject Classification: 60A99

Q Keywords: DNA Alignment free sequence comparison k-string composition vector method

maximum entropy principle phylogenetics

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Mechanical and Fracture Peculiarities of Polypropylene-Based Functionally Graded Materials Manufactured via Injection Molding

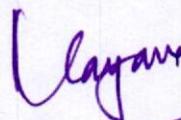
A. K. Singh, Siddhartha and S. Yadav

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A. K. Singh^{1*}, Siddhartha², S. Yadav¹

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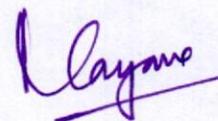
²Department of Mechanical Engineering, NIT Hamirpur (HP), India

Mechanical and Fracture Peculiarities of Polypropylene-Based Functionally Graded Materials Manufactured via Injection Molding

This research presents the investigation of mechanical and thermal characteristics as well as fracture toughness of Polypropylene (PP) based functionally graded materials (FGMs) and compares them vis-a-vis PP based homogeneous composites and neat PP. FGMs and homogeneous composites are fabricated with 15 wt.% and 30 wt.% glass fiber reinforced PP. The gradient of fiber distribution in functionally graded materials is verified by scanning electron microscope analysis and ignition loss test. Findings of this work reveal that FGMs outperform neat PP and homogeneous composites. Tensile, flexural and compression strength of FGMs are found to be better as compared to neat PP and homogeneous composites. Fracture toughness and thermal conductivity are also found higher for FGMs. The performance of fabricated composites is optimized by using the ViseKriterijuska Optimizacija i Komornisno Resenje (VIKOR) method.

1 Introduction

The inclination towards fabricating and assessing the potential of novel materials which may outperform conventional materials has increased vastly due to the pressing demands of recent advents in technology. Composite materials are examples of the first category. Composite materials are multi constituent in nature and the physical and mechanical properties of the matrix and the reinforcements can be suitably altered to meet the desired functionality for a particular application. Thermoplastic composites are most commonly used in the automobile industry due to their good impact strength, easy recyclability and fast processing time. Plastics have shown a higher annual growth rate as compared to steel and aluminum in the last



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Development and investigation on transmission efficiency of functionally graded material-based polybutylene terephthalate spur gears

Akant K Singh , Siddhartha

First Published November 7, 2019 Research Article

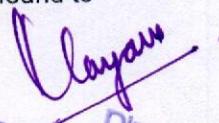
<https://doi.org/10.1177/1350650119886233>

Abstract

Application of polymer composite gears is increasing due to their superior properties. They have lower inertia, less weight, and run much quieter than their metal counterparts. In the present work, functionally graded material-based glass fiber reinforced polybutylene terephthalate gears are fabricated with a novel horizontal centrifugal casting technique using an injection molding machine. Conventional technique is used to fabricate homogeneous polybutylene terephthalate gears. Polybutylene terephthalate reinforced with 15 and 30 wt% glass fibers is used to fabricate gears. Unfilled polybutylene terephthalate gear is also manufactured for comparative study. Gradation in functionally graded material gear is verified by scanning electron microscope analysis, and Shore D hardness is measured in three different locations of the fabricated functionally graded material gears. Gradation in functionally graded material gear is also verified by ignition loss test method. Continuous gradation is observed in functionally graded material gear by scanning electron microscope and confirmed by hardness test and ignition loss test. The objective of present work is to investigate and compare the transmission efficiency of homogeneous and functionally graded material gears during operation. A polymer gear test rig is used for the experimental work. Experiments are conducted at various torque and speed combinations for 0.2 million cycles. Life span of fabricated gear is also tested for 10 million cycles. The range of the torque is 0.8–2.6 N m and the range for rotational speed is 500–1400 r/min. The transmission efficiency of the fabricated gears is found to be sensitive to the operating torque.

Keywords

Polybutylene terephthalate, glass fibers, injection molding, functionally graded material gear, scanning electron microscope, hardness, ignition loss test, transmission efficiency


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Materials Today: Proceedings

Volume 18, Part 7, 2019, Pages 4893-4900

Transmission Efficiency of Functionally Graded Material Based HDPE Spur Gears

Akant Kumar Singh ^a , Siddhartha ^b, Sanjay Yadav ^a, Prashant Kumar Singh ^b

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Abstract

Polymer gears are replacing the metal gears in various applications due to some of their inherent properties. Polymer gears have lower inertia, less weight and operate much quieter in comparison to metal gears. In this work, glass fiber reinforced functionally graded material based High-Density Polyethylene (HDPE) gears is fabricated using injection molding machine for the investigation of transmission efficiency. Glass fiber filled HDPE materials in the punch are rotated at 1800 rpm for 2 min. for the gradation of the fibers. Homogeneous and neat HDPE gears are also fabricated for comparative study. Polymer gears are running at different speed (600, 800, 1000 and 1200 rpm) and torque (0.8, 1.2, 1.6 and 2 Nm) to investigate the transmission efficiency. Gears are operated for 1.2×10^5 cycles. The experiments are carried out using a power absorption type polymer gear test rig. It is concluded from this work that transmission efficiency of these polymer gears is significantly affected by torque. Speed has less significant effect on transmission efficiency of polymer gears.

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Keywords

Polymer gears; Polymer gear test rig; DMA; Transmission efficiency

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Article

Mechanical peculiarity of nano BN filled polyester based homogeneous nanocomposites and their FGMs – A comparative study

February 2020 · *Materials Today: Proceedings* 25(10)
DOI: 10.1016/j.matpr.2020.02.134

Authors:



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Abstract

The aim of this work is to find out the influence of nano BN (Boron Nitride) filler and fabrication technique on the mechanical properties of filler filled polyester composites. Nano BN filled polyester based homogeneous nanocomposites (HNC) and their functionally graded materials (FGMs) are fabricated using stirring and centrifugal casting technique, respectively. HNCs and FGMs are fabricated with the reinforcement of 5 wt% and 10 wt% of nano BN fillers respectively. Unfilled polyester is also fabricated for the performance comparison with HNC and FGMs. Result finding shows that hardness of nano BN filled FGMs is higher as compared to HNCs and unfilled polyester. Hardness increases with increase in the amount of nano BN filler for FGMs as well as HNCs. Same trend is also observed for flexural and compressive strength. However tensile strength increase with the addition of 5 wt% of nano BN filler and further decreases with 10 wt% for both, FGMs and HNCs.

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Energy Efficient Charging for Electric and Solar Assisted Vehicles

Pushendra K. S.*, M. A. Ansari, N. S. Pal, Aruna Pathak, Monika Jain, Nivedita Singh

Abstract

The need of a battery charging facility has become protruding to alleviate the range anxiety problematic of electric vehicle (EV) drivers and solve the limited operation – electric drive range of the current EVs.

This paper presents a charging strategy for an EV battery which is reliable and robust for a Lithium ion

battery. Here, we have designed bi-directional charger in Matlab Simulink environment. The Changes in

on board converters applied to electric vehicles for better charging and also for finding the better way to

charge a lithium ion battery, on board circuit is designed for charging facilities for EV 's and solar assisted

vehicle so that there is only need of just plug into ac power source as used in various applications the

motive behind designing the charger is to make charging in an easier way so that it provides a positive

impact on the advancement of electric vehicles free of pollution in future.

Pushendra K. S.
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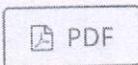
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A Novel Scheme for Industrial Safety and Security with GSM

Ankit Kumar Rai1*, M. A. Ansari1, Pragati Tripathi and Astha Sharma, Aruna Pathak, Monika Jain

Abstract

In this paper, we tried to upsurge the level of safety and security system by conjoining new techniques and added new perceptions to develop low cost GSM based industrial safety and security system. In industries, safety, security and automation is a principal concern. Industrial automation, safety and security system design is developing these days. The designing of this safety & security system is simple hardware circuit. It allows every user to use this wireless security system by combining PIR motion sensor, smoke sensor, fire/ flame sensor, IR sensor, laser sensor, temperature sensor and other failure detector at industrial level.



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A Novel Approach for ECG Signal Analysis using LabVIEW Techniques

Shivam Pandey, M. A. Ansari, Nidhi Singh Pal, Aruna Pathak, Monika Jain, Astha Sharama, Pragati Tripathi

Abstract

Electrocardiogram (ECG) plays an enormous role in the medical field. An electrocardiograph is a device used in cardiology, which records heart's electrical signals over time. ECG can be used to determine various heart diseases or damages to the heart along with the pace at which the heart beats as well as the impacts of medications or gadgets used to control the heart. The interpretation of the ECG signals is an application of pattern recognition. The technique used in this project integrates the study of the ECG signals, extraction and denoising it. Different noises analyzed and removed by different methods using LabVIEW. Analysis of ECG signals is done using LabVIEW and bio medical workbench. The study includes investigation of ECG signal by LABVIEW, also plotting of ECG signals and comparison between different denoising techniques of ECG signal

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Novel Method of Secure Communication using Logistic Map

Supriya Khaitan, Rashi Agarwal, Mandeep Kaur

Abstract: Significant research efforts have been invested in recent years to export new concepts for secure cryptographic methods. Many mathematicians are attracted by Chaos functions as it has sensitive nature toward its initial conditions and their colossal suitability to problems in daily life. Inspired by new researches, a new chaotic cryptography algorithm is proposed in this paper. The key feature of this approach is that instantaneous key is generated at host independently that is used to determine the type of operations on each pixel. The information available in images is 24 bit RGB these value are modified mathematically using eight reversible operations. Also during encryption, the control parameter of the chaotic system is updated timely.

Index Terms: Chaotic Map, Encryption, Decryption, Security, Logistic Map.

I. INTRODUCTION

Chaos theory has been receiving enormous response in the last two decades by the scientific community. The logistic map is a dynamic population model that is non-linear in nature and was originally introduced by Pierre François Verhulst [5].

For distinct applications and the complexity of research done on various logistic map, anyone may refer to Ausloos [5], Bunde & Havlin [7], Crownover [8], Holmgren [10], Peitgen, Jurgens and Saupe [13] and [14].

The most promising application of chaotic maps in the area of cryptographic algorithms relies on the properties that chaotic are similar to noise and depends on initial parameters. Chaotic map fulfills the basic requirements of cryptography because of its sensitiveness towards the initial conditions. Therefore, the secret keys are usually the system parameters and initial conditions.

Many chaotic systems have been created so far. The highest acclaimed cryptosystems is formed on the ergodic property of chaotic maps. It has received lionized attentions in the past literature [1] - [4], [9], [11], [12], [22] and [23]. Pecora and Carroll showed application of chaos in masking the message for transmitting signals [12]. In 1998, Baptista

proposed a new cryptosystem [6] that encrypts the message into different iterations for chaotic map to purview a domain on a phase space that harmonize to the text.

Wong examined Baptista's approach and found some limitations like the dissipation of the cipher-text is not homogeneous. A random number sequence is generated for every block of text. After examining the drawbacks, a solution was proposed by Wong that gave a much deflated distribution of cipher-text using the same logistic map [22]. After that, scientists proposed a time efficient chaotic-cryptographic algorithm that uses a dynamical look-up table that updated continuously depending on the plaintext instead of static one [23].

Rani and kumar gave a new kind of iteration called superior iteration in analyzing, generating and studying the behavior of fractals and chaotic maps [18] - [21]. In 2009, Rani and Agarwal have increased the stability of logistic map using superior iterations in the map [15] and also generate beautiful fractals [16]. Also, the above same authors have shown superior fractals are more stable under high strength of dynamic noises as compared to classic fractals [17]. Many have used [24][25] a bit scrambling algorithms with chaos concept to change position of pixels.

Seeing the applications of chaos and fractals, we proposed a new encryption method based on it. This method is based on multiple, dynamic and one time usable keys generated from logistic map without involving the exchange of key.

In Section 2, we describe the iteration technique that we use in our proposed model using example. In Section 3, we have given the analysis and applications of the proposed model followed by Section 4 that presents the conclusions related to security and utility of the chaotic model.

II. PROPOSED METHODOLOGY

A. Chaos Theory

Chaos is a non deterministic method based on non linear system. It focuses on behavior of dynamic systems; those are highly sensitive to initial condition.

Mathematically, the extensively simple looking one-dimensional logistic map is given by the equation

$$x_{n+1} = r * x_n (1 - x_n), \quad (1)$$

Where x_n is any value between 0 and 1 and it represents the population for a particular year n. Therefore, x_0 epitomize the initial population and r speaks to a positive joined rate for proliferation and starvation [5] and [8].

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A compact dual-band zeroth-order resonator antenna loaded with meander line inductor

Monika Singh, Navneet Kumar ✉, Santanu Dwari, Harish Parthasarathy, Pradyot Kala

First published: 27 March 2020

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Abstract

A novel zeroth-order resonator (ZOR) meta-material (MTM) antenna with dual-band is suggested using compound right/left handed transmission line as MTM. In this article, suggested antenna consists of patch through series gap, two meander line inductors, and two circular stubs. The MTM antenna is compact in size which shows dual-band properties with first band centered at 2.47 GHz (2.05-2.89 GHz) and second band is centered at 5.9 GHz (3.70-8.10 GHz) with impedance bandwidth of ($S_{11} < -10$ dB) 34.69% and 72.45%, respectively. At ZOR mode (2.35 GHz), the suggested antenna has overall dimension of $0.197\lambda_0 \times 0.07\lambda_0 \times 0.011\lambda_0$ with gain of 1.65 dB for ZOR band and 3.35 dB for first positive order resonator band which covers the applications like Bluetooth (2.4 GHz), TV/Radio/Data (3.700-6.425 GHz), WLAN (5-5.16 GHz), C band frequencies (5.15-5.35, 5.47-5.725, or 5.725-5.875 GHz) and satellite communication (7.25-7.9 GHz). The radiation patterns of suggested structure are steady during the operating band for which sample antenna has been fabricated and confirmed experimentally. It exhibits novel omnidirectional radiation characteristics in $\phi = 0^\circ$ plane with lower cross-polarization values.

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Review Article |  Free Access

Vehicle detection in intelligent transport system under a hazy environment: a survey

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Abstract

Developing an intelligent transportation system has attracted a lot of attention in the recent past. Moreover, with the growing number of vehicles on the road most nations are adopting an intelligent transport system (ITS) for handling issues like traffic flow density, queue length, the average speed of the traffic, and total vehicles passing through a point in a specific time interval and so on. ITS by capturing traffic images and videos through cameras, helps the traffic control centres in monitoring and managing the traffic. Efficient and unfailing vehicle detection is a crucial step for the ITS. This study reviews different techniques and applications used around the world for vehicle detection under various environmental conditions based on video processing systems. This study also discusses the types of cameras used for vehicle detections, and the classification of vehicles for traffic monitoring and controlling. This study finally highlights the problems encountered during surveillance under extreme weather conditions.

1 Introduction

Nowadays, traffic detection is attracting a lot of researchers' attention in computer vision and intelligent transportation systems [1, 2]. The rapid upsurge in several vehicles in the last few years has posed serious problems in the management of the transportation system vividly.