3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the academic year 2018-19.

Sl. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
1	Preprocessing of historical manuscripts using phase congruency and gaussian mixture model	Sachin Bhat	Electronics & Communication Engineering	Far East Journal of Electronics and Communication	2019	0973 - 7006	http://www.pphmj.com/index.php	http://www.pphmj.com/abstract/12357.htm	Yes
2	Restoration of Characters in Degraded Inscriptions using Phase Based Binarization and Geodesic Morphology	Sachin Bhat	Electronics & Communication Engineering	International Journal of Recent Technology, Elsevier	2019	2277 - 3878	https://www.ijrte.org/	https://www.ijrte.org/portfolio-item/f2669037619/	Yes
3	Text extraction and a deep CNN based model for character classification in Kannada documents	Sachin Bhat	Electronics & Communication Engineering	Journal of Innovative Technology and Exploring Engineering, Elsevier	2019	2278 - 3075	https://www.ijitee.org/	https://www.ijitee.org/wp-content/uploads/papers/v8i8/H7418068819.pdf	Yes

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4	Agri Robo	Nagaraja Rao	Electronics & Communication Engineering	International Journal of Engineering Research in Electronics and Communication Engineering	2019	2394 - 6849	https://ijerece.com/	https://www.technoarete.org/common_abstract/pdf/IJERECE/v6/i5/Ext_03256.pdf	Yes
5	A novel medical image fusion by combining TV-L1 textures based on adaptive weighting scheme	C S Asha	Electronics & Communication Engineering	International Journal of Engineering Science and Technology (Elsevier)	2019	2215 - 0986	https://www.sciencedirect.com/journal/engineering-science-and-technology-an-international-journal	https://www.sciencedirect.com/science/article/pii/S2215098618316379	Yes
6	Multi-modal Medical Image Fusion With Adaptive Weighted Combination of NSST Bands Using Chaotic Grey Wolf Optimization	Asha C S	Electronics & Communication Engineering	IEEE Access (IEEE)	2019	1803 – 7232.	https://ieeexplore.ieee.org/	https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8678905	yes
7	Auto Removal of Bright Spot from Images Captured Against Flashing Light Source	Asha C S	Electronics & Communication Engineering	IEEE DISCOVER	2019	1803 – 7232.	https://ieeexplore.ieee.org/	https://ieeexplore.ieee.org/document/9007933	Yes

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8	DC-DC Buck converter using sliding mode control	Shareen Noronha, Ranjith Bhat, Raghavendra Rao, Rajashree Nambair, Laxmi Shetty	Electronics & Communication Engineering	JETIR	2019	2349 - 5162	https://jetir.org/index.html	https://www.jetir.org/papers/JETIRCJ06004.pdf	Yes
9	Design and Analysis of 8-T and 5-T based XOR and XNOR gates using Soft Computing Tools	Sowmya Bhat,Sandesh Kumar, Avinash N J,Kusuma Prabhu,Renita Pinto	Electronics & Communication Engineering	IJERT	2019	2278 - 0181	https://www.ijert.org/	https://www.ijert.org/design-and-analysis-of-8-t-and-5-t-based-xor-and-xnor-gates-using-soft-computing-tools	Yes
10	Smart Traffic System	Arun Upadhyaya	Electronics & Communication Engineering	International Research Journal of Engineering and Technology (IRJET)	2019	2395 - 0072	https://www.irjet.net/	https://www.irjet.net/archives/V6/i5/IRJET-V6I51024.pdf	Yes
11	Application of steganography in image processing frame work	Ganesh shetty	Electronics & Communication Engineering	International Journal of Education and Research	2019	2320 -592	https://www.ijern.com/Journal.php		Yes

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12	The Computation Of Stiffness Derivative For An Ogive In The Hypersonic Flow	Renita Sharon Monis	Mathematics	International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)	2018	2249 - 6890	https://www.tjprc.org/journals/journal-of-mechanical-engineering	https://www.tjprc.org/view_full_paper.php?id=10520&type=html	Yes
13	Evaluation of stiffness derivative for a delta wing with straight leading edges in unsteady flow	Renita Sharon Monis	Mathematics	International Journal of Engineering and Advanced Technology (IJEAT)	2019	2249 – 8958	https://www.ijeat.org/	https://www.ijeat.org/wp-content/uploads/papers/v8i3S/C11610283S19.pdf	Yes
14	An Effect Of Sweep Angle On Roll Damping Derivative For A Delta Wing With Curved Leading Edges In Unsteady Flow	Renita Sharon Monis	Mathematics	International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)	2019	2249 - 8001	https://www.tjprc.org/journals/journal-of-mechanical-engineering	https://www.tjprc.org/view_paper.php?id=11086	Yes

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15	Investigation of Dry Sliding Wear Properties of Multi-directional Forged Mg-Zn Alloys	Gajanan Anne	Mechanical Engineering	Journal of Magnesium and Alloys,	2019	2213-9567	https://www.sciencedirect.com/journal/journal-of-magnesium-and-alloys	https://www.sciencedirect.com/science/article/pii/S2213956719300623	Yes
16	Influence of Heat Treatment on Cr and Fe-rich precipitates in thermally aged Duplex Steels	Dr. Gajanan Anne	Mechanical Engineering	Emerging Materials Research	2019	2046-0147	https://www.emeraldgrouppublishing.com/journal/jemmr	https://www.icevirtuallibrary.com/doi/epdf/10.1680/jemmr.18.00004	Yes
17	Improving Surface Roughness of Burnished Components using Abrasive Particles	Mr. Pavana Kumara	Mechanical Engineering	International Journal of Automotive and Mechanical Engineering	2019	2229-8649	https://journal.ump.edu.my/ijame	https://journal.ump.edu.my/ijame/article/view/80/65	Yes
18	Machinability and related properties of austempered ductile iron: A review	Dr. Anand Hegde	Mechanical Engineering	Journal of Mechanical Engineering and Sciences	2018	2289-4659	https://journal.ump.edu.my/ijame	https://journal.ump.edu.my/jmes/article/view/1098/207	Yes
19	Mechanical Characteristics Evaluation of Dual Phase and related Hardening techniques on AISI 4340 steel	Dr. Anand Hegde	Mechanical Engineering	Journal of Mechanical Engineering and Sciences	2018	2289-4659	https://journal.ump.edu.my/ijame	https://journal.ump.edu.my/jmes/article/view/1080/170	Yes

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20	Effects of Combined Multiaxial Forging and Rolling Process on Microstructure, Mechanical Properties and Corrosion Behavior of a Cu-Ti Alloys	Dr. Gajanan Anne	Mechanical Engineering	Materials Research Express	2019	2053-1591	https://iopscience.iop.org/journal/2053-1591	https://iopscience.iop.org/article/10.1088/2053-1591/ab0764	Yes
21	Influence of Multi-Directional Forging on Microstructural, Mechanical and Corrosion Behaviour of Mg-Zn Alloy	Dr. Gajanan Anne	Mechanical Engineering	Journal of Materials Engineering and Performance	2019	1544-1024	https://link.springer.com/journal/11665	https://link.springer.com/article/10.1007/s11665-019-04007-0	Yes
22	Investigations on Effect of Different Ball Burnishing Conditions on Surface Roughness Using Response Surface Methodology	Mr. Pavana Kumara	Mechanical Engineering	Journal of Modern Manufacturing Systems and Technology	2019	2636-9575	https://journal.ump.edu.my/jmmst	https://journal.ump.edu.my/jmmst/article/view/1800/318	Yes
23	Experimental and Numerical Investigations on Heat Transfer Characteristics of Open Cell Al6061 Alloy Foam	Dr. Raja Yateesh Yadav	Mechanical Engineering	International Journal of Research	2019	2236-6124	https://ijrpublisher.com/	https://app.box.com/s/f0bk0ho9i1rsuxdwnltt4d8ri8rk1lk2	Yes

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24	Properties of glass fiber hybridized woven Flax and sisal fabric hybrid composites	Mr. Ganesh R Kalagi	Mechanical Engineering	International Journal of Research and Analytical Reviews (IJRAR),	2019	2349 - 5138	https://www.ijrar.org/	https://www.ijrar.org/papers/IJRAR19J1267.pdf	Yes
25	Investigation of Antiallergic and Antipruritic activity studies of Shorea robusta oleoresin and Wrightia tinctoria bark extracts by animal models	Prof. Dr. K K Srinivasan	Chemistry	Saudi Journal of Medical and Pharmaceutical Sciences	2018	2413 - 4929	https://saudijournals.com/journal/sjmps/home	https://saudijournals.com/media/articles/SJMPS_412_1427-1434_c.pdf	Yes
26	Experimental and Theoretical Evaluation of Rutin as Eco-Friendly Corrosion Inhibitor for Aluminum 6063 Alloy in Acidic Medium	Reena Kumari P. D	Chemistry	Journal of Failure Analysis and Prevention	2018	1854 - 1245	https://link.springer.com/journal/11668	https://link.springer.com/article/10.1007/s11668-018-0473-x	Yes
27	Synthesis of novel Schiff base benzamides via ring opening of thienylidene azlactones for potential antimicrobial activities	Dr. Subbulakshmi N Karanth	Chemistry	Research on Chemical Intermediates	2018	1568 - 5675	Home | Research on Chemical Intermediates (springer.com)	https://link.springer.com/article/10.1007/s11164-018-3362-8	Yes

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28	Sentimental Analysis of Student Feedback using Machine LearningTechniques	AdeshN. D	Computer Science & Engineering	International Journal of Recent Technology and Engineering (IJRTE),	2019	2277 - 3878	https://www.ijrte.org/	https://www.ijrte.org/wp-content/uploads/papers/v8i1s4/A11810681S419.pdf	Yes
29	Ambient Assisted Living: A Research on Human ActivityRecognition and Vital Health Sign Monitoring using Deep Learning Approaches	Manoj T	Computer Science & Engineering	International Journal of Innovative Technology and Exploring Engineering	2019	2278 - 3075	https://www.ijitee.org/	https://www.ijitee.org/wp-content/uploads/papers/v8i6s4/F11110486S419.pdf	Yes
30	A Comprehensive Review of Neural Network AssistedMachine Vision System for Automatic Fruit Sorting and Grading	Vasudeva	Computer Science & Engineering	Global Journal of Engineering Science and Researches	2019	2348 – 8034	https://www.gjesr.com/	https://www.gjesr.com/Issues%20PDF/ICRTCET-18/40.pdf	Yes
31	Dew Point Temperature Estimation: Application of Artificial Intelligence Model Integrated with Nature-Inspired Optimization Algorithms.	Sujay Raghavendra Naganna	Civil Engineering	Water	2019	2073 - 4441	https://www.mdpi.com/journal/water	https://www.mdpi.com/2073-4441/11/4/742	Yes

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32	Multiple AI model integration strategy—Application to saturated hydraulic conductivity prediction from easily available soil properties	Sujay Raghavendra Naganna	Civil Engineering	Elesiver (Soil and Tillage Research)	2019	0167-1987,	https://www.sciencedirect.com/journal/soil-and-tillage-research	https://www.sciencedirect.com/science/article/abs/pii/S0167198719301795?via%3Dihub	Yes
33	Experimental Investigation on Utilization of Waste Shredded Rubber Tire as a Replacement to Fine Aggregate in Concrete	Sujay Raghavendra Naganna	Civil Engineering	Springer	2019	2366-2557	https://link.springer.com/	https://link.springer.com/chapter/10.1007/978-981-13-3317-0_49	Yes

Total count as per the SOP of the metric given by NAAC i.e paper per teacher = 33+8 = 41

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PREPROCESSING OF HISTORICAL MANUSCRIPTS USING PHASE CONGRUENCY FEATURES AND GAUSSIAN MIXTURE MODEL

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Abstract

Epigraphs are important sources of reshaping our history and culture. It is the necessity of the day to preserve them for the use of future generation. Modern paleographers find it difficult to decipher the information in the epigraphs these days because of number of reasons. It is due to the erosion of document material over the period of time, due to the existence of different types of noises and unknown character sets of ancient time. To read the information in these types of documents, first characters have to be extracted. Here, we are proposing a model for the extraction of characters through binarization and removal of background noise. This consists of phase feature based preprocessing and Gaussian model based background elimination using expectation maximization (EM) algorithm. Enhancement and preprocessing are carried out using different types of specialized

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Keywords and phrases: inscription, binarization, phase congruency, expectation maximization.

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Restoration of Characters in Degraded Inscriptions using Phase Based Binarization and Geodesic Morphology

Sachin Bhat, Seshikala G

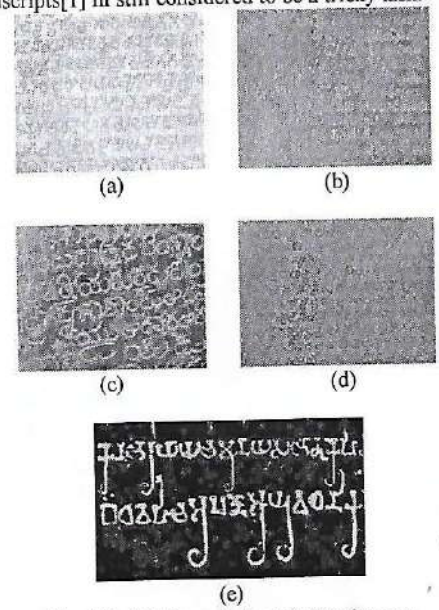
Abstract: *It is the requirement of the time to store and conserve the ancient manuscripts for the use of next generation. Epigraphists find it hard to decrypt the information present in inscriptions due to variety of reasons including erosion of letters, noise and many more. Here, we present a new binarization and postprocessing technique to efficiently extract and reconstruct the foreground text from heavily degraded documents. The proposed method uses combination of phase based feature maps and geodesic morphology with anisotropic filtering. Phase feature maps will binarize the text by removing background noise and geodesic operators will reconstruct the deteriorated characters. Statistical performance evaluation is done on different datasets and efficiency of the proposed method is demonstrated by comparing with many state of art algorithms.*

Index Terms: *Document Analysis, Image binarization, Morphological operators, Phase congruency*

I. INTRODUCTION

Currently, there is a huge growing pursuit in the domain of document image analysis. Many researchers are trying to develop the systems for the extraction of pertinent information from these documents. It is a dynamic research area being studied from years for tasks like optical character recognition (OCR).

Documentation existed even in the ancient ages without papers or gadgets. Information was created on palm leaves, clothes, metal plates or on stone surfaces. These writings are generally termed as inscriptions or epigraphs. It is the key tool used in history to be able to study the life of ancient time. Manuscripts like epigraphs attained across the globe expose the details of lifestyle, sociocultural environment, political position, fine art and even about the society regarding that time frame and location. These manuscripts became a crucial part of passing the information and procedures from one generation to another. To save this information for the future use to save our culture and heritage is necessity of the day. Preservation of any manuscript generally requires digitization, preprocessing, data extraction and recognition. Primary technique used in any document analysis is preprocessing and binarization which helps in the extraction of useful information from these manuscripts. Document image binarization(BZ) aims at segmenting the foreground characters of a manuscript from the noisy background during the preprocessing stage. manuscripts generally suffer from various degradations over time making BZ an intimidating task. Typically, an epigraph can be heavily degraded due to erosion of characters over time as they are exposed to different environmental conditions, low or varying contrast, stains, intra/inter variation between text and background, missing data noise due to variation of light during image acquisition. Thou' document analysis is being studied across-the-board in the recent past, BZ and postprocessing of highly degraded images is still a largely undiscovered problem which is mainly because of the difficulties in moulding different types of degradations and varying noise. As far as the field of inscriptions and olden manuscripts are concerned, no standard existing methods deal with the issues of foreground extraction, uneven noise removal and character reconstruction. The Document Image Binarization Competition (DIBCO) aims to cover this problem by bringing in datasets of handwritten degraded documents to assess the recent advancement in image binarization. However, enhancement and binarization of ancient manuscripts[1] in still considered to be a tricky task.



(a) (b) (c) (d) (e)

Fig 1(a)-(e). Sample inscription images

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International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075, Volume-8 Issue-8, June 2019

Text Extraction and a Deep CNN Based Model for Character Classification in Kannada Documents

Sachin Bhat, Seshikala G

Abstract: Pattern analysis in documents is one of the most interesting issues in the current research because of its wide are of of applications. It has leveraged its potential in reducing the manual work of converting the documents containing handwritten characters to machine-readable texts. The Deep Convolutional-Neural-Networks (DCNN) are successfully implemented for the recognition of characters in various languages. But due to high noise, degradation over a long time period, low contrast and intensity to separate the foreground text plays a spoiler in the extraction of characters from the document images. This paper proposes covers both the aspects including preprocessing of Kannada documents and a DCNN based architecture for the classification of Kannada language characters. Kannada is one of the 22 official languages in India spoken by more than 60 million people across the globe. This model is mainly developed to assist the character recognition of Kannada documents. A total of 84000 characters including both vowels and consonants have been included in the dataset. This architecture is showing a satisfactory test accuracy of 98.87% for the classification of 42 handwritten characters.

Index Terms: CNN, Document Analysis, Image Enhancement, Optical Character Recognition

I. INTRODUCTION

Writing information on papers, palm leaves, copper plates, stones existed from several centuries. This method was followed by hundreds of years not only in India, but all over the world. These types of writings are generally called as manuscripts. This is the main tool used in history to study the life of ancient time. Manuscripts became the important tool in transmitting the information and traditions from one generation to another. Document analysis is a technique to upgrade the calibre of a document to improve the human perception and to help later automated processing of images. This is also a major preprocessing step in the Optical Character Recognition(OCR). OCR is a process of converting the documents containing printed/handwritten characters into machine-readable format. In recent times, it has shown its potential of cutting down the manual work of digitizing the images of printed or handwritten text. Both preprocessing and OCR have become very interesting research fields helping to improve the calibre of documents and thereby recognising and classifying the text from images. Various conventional algorithms are used for OCR like template matching, hidden markov model etc. With advancing technology and processing power, machine learning algorithms are taking over the traditional methods with improved accuracy and high speed. But, OCR of handwritten text in a document is still a complex problem for researchers because to its poor quality, indifferentiable foreground and background and variety of handwriting styles. It is particularly true for Indian languages due to a vast character set and complex writing style. OCR with high accuracy is reported in English and other western languages which have a less number of characters and minimum structural complexity. But character recognition of Indian scripts is comparatively acute coz of its compound structure and similar nature of characters.Remaining part of the paper has been arranged in the below format. Part II lists some of the notable works accomplished in the domain of document image binarization and character recognition. Part III depicts the methodology developed in detail. Experimentation with result evaluation is shown in part IV. Part V will be the conclusion

II. REVIEW OF LITERATURE

In this part, we briefly depict some of the text extraction and character recognition methods used by earlier researchers. Generally, the techniques used for BZ can be either local or global. The global binarization techniques allot a single threshold for the entire image whereas threshold for individual or group of pixels in the document image will be identified in local binarization. Histogram shape based global binarization methods [1][2] tries to estimate a global threshold to minimize intra-class variance. It requires a bimodal histogram pattern and therefore, cannot handle the document images with high variation in background. Though local binarization methods comparatively yield a better result, it is still an unsolved problem in case of ancient manuscripts. This is mainly due to different variety of noise, degradation and unclear foreground. Adaptive thresholding methods like Sauvola[3] which is an improvement over Niblack's[4] and Bernsen[5] will either generate a certain quantity of noise or fail to identify the text with a low contrast[6]. All these algorithms use mean, variance or standard deviation and contrast information of local region to calculate different thresholds. They have also failed to handle the images with light texture background.

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Sachin Bhat received his M.Tech degree in Digital Electronics and Communication from NMAMIT, Nitte. He is a research scholar in the School of Electronics and Communication Engineering, Reva University, Bengaluru and working as a senior Assistant Professor in SMVITM, Udupi. His areas of interest are Document Image Processing, Deep Learning, Remote Sensing and Object Oriented Programming. He has published over 30 research papers in national and international journals.

Dr. G. Seshikala has 25 years of teaching and research experience. She holds PhD degree in Biomedical Signal Processing from JNTU-A, BE in ECE and and ME in Digital Electronics. She has published over 20 research papers in international journals and conferences. Her areas of specialization are Communication Engineering, Image Processing, Pattern Recognition and Signal Processing.

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Agri Robo

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Abstract: **The Discovery of Agriculture is the first big step towards civilized life, advancement of agricultural tools is the basic trend of agricultural improvement. The project we put forth has been designed to automate work of a farmer so that he can tirelessly perform his farming tasks. We intend to automate the most common and frequent tasks of the farmer. This paper focuses on remote controlling and slightly automating the tasks in agriculture so as to get daily farming tasks done with ease. The qualitative approach of this paper is to develop a system which minimizes the working cost and also reduces the time for ploughing, cutting, digging, seed sowing operation, spraying, weed control by utilizing solar energy and power supply to run the robot.**

Key words: DC Motor, Arduino, Zigbee, Raspberry pi.

I. INTRODUCTION

The main motive for developing Agricultural Automation Technology is decreasing labour force, a phenomenon common in the developed world. Robotics offer solutions in precision agriculture to processes. The multipurpose agricultural robots are designed to perform the basic functions required to be carried out in farms. This Agri Robo can perform basic elementary functions related to ploughing, cutting seeding, water, pesticide spraying etc. to improve productivity and efficiency. Manual method includes broadcasting the seeds by hand. Sometimes method of dibbling i.e. making holes and dropping seeds by hand is used. Also a pair of bullocks is used to carry heavy equipment of leveling and seed dropping. These processes are time consuming and not precised one. So it's time to automate the sector to overcome this problem. Moreover, farmers have great benefits by having this robot which leads less work, requires less amount of labor that also eliminates both maintenance and labor costs while having high profit. The benefits of the developed Agribot are better efficiency when compared to manual system. A agricultural robot controller is developed using microcontroller which transmits the data using Zigbee link to a remote server. Using the most efficient and compatible technology, a few proposed solutions have been mentioned which can be integrated with Raspberry Pi to provide better robot for agriculture.

In today's world robotics technology plays an important role in all sections like industries, medical field and various other organizations. In other countries robots are used in almost all fields including agriculture to perform different operations. Driverless robots are designed to replace human labor. Robotics and artificial intelligence achievements offered solutions in precision agriculture to processes related to seeding, harvesting, weed control, grove supervision etc. to improve productivity and efficiency. The agricultural robot designed in this will perform multiple farming tasks like seed sowing, cutting, ploughing, water spraying, and pesticide spraying. Agricultural robot is a robot deployed for doing agricultural purposes. Thus the agricultural robot developed here will contain all in feature and can be controlled wirelessly using remote.

II. LITERATURE SURVEY

Author discussed on two major issues in modern agriculture. They are water scarcity and high labour costs. The Agribot is developed using an Arduino microcontroller. Agribot acts as an IoT device and transmits the data collected from multiple sensors to a remote server using Wi-Fi link. At the remote server, raw data is processed using signal processing operations such as filtering, compression and prediction. Accordingly, the analysed data statistics are displayed using an interactive interface, as per user request. [1]

The proposed system aims at designing multipurpose autonomous agricultural robotic vehicle which can be controlled through Bluetooth for ploughing, seeding and irrigation systems. The objectives of the proposed system are to dig the soil depending on moisture level in the soil, to plough the seeds with teeth's like structure at the end to turn the top layer of soil down, to close the seeds and level the ground automatically and to provide irrigation system by spraying water with a pump in the field. [2]

Here author discusses to design, fabricate, program a low-cost mobile robotic system to perform pesticide spraying and insect repelling tasks in the field efficiently without seeking any human interaction during operation. Spraying Mechanism consists of water pump, water tank, water hose and nozzle. 12V DC Water Pressure Diaphragm Pump is

Engineering Science and Technology, an International Journal 23 (2020) 225–239

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Full Length Article

A novel medical image fusion by combining TV-L1 decomposed textures based on adaptive weighting scheme

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ABSTRACT

Medical image fusion involves combining multiple images of diverse modalities to acquire superior image quality while retaining the information of an individual image. The fusion process aids physicians to diagnose and assess the disease by increasing the visual information and clarity. Direct fusion methods often generate undesirable effects leading to distortion and poor contrast. To some extent, multi-scale decomposition (MSD) methods have achieved success in various image fusion problems. However, they suffer from ringing artifacts, due to the blur caused by strong edges in decomposition steps. Hence, to overcome these drawbacks, we propose an efficient and novel image fusion algorithm for constructing a fused image through total variation (TV-L1) model using an optimized adaptive weighting scheme. Our method focuses on transferring the prominent textural details of Magnetic Resonance Imaging (MRI) and visual details of Positron Emission Tomography (PET) by cartoon and texture decomposition. It consists of data fidelity term to force the cartoon component to remain close to original image and a regularization term to transfer gradients from original image to the fused image. The present work preserves structural and functional details with high contrast. Experiments were conducted using MRI and PET images collected from standard Brain Atlas Datasets. The qualitative and quantitative analysis of the work suggest that the proposed method achieves better quality and accuracy as compared with the available state-of-the-art techniques.

1. Introduction

In medical image analysis, there is a frequent need to combine images from distinct modalities by preserving the patterns of an individual image. This process of integrating images expedites the amount of information or enhances the spatial/spectral resolution of an image. Medical image fusion covers an extensive area of study that includes image processing, pattern recognition, computer vision, machine learning and artificial intelligence with wide applications in medicine to understand the presence of lesions by fusing multimodal medical images. This paper specifically focuses on fusion of MRI and PET images in a single image to view the details of both. Multimodal medical images in general provide complementary details of different human organs of the body. The ultimate goal of image fusion is to derive the relevant information from individual images and merge them to highlight and enhance more complex details about the organs under investigation and to assist accurate diagnosis and treatment [1–3].

Each of the imaging modalities have their own constraints and manifests particular information. Magnetic Resonance Image (MRI) highlights internal body structures such as abdomen, liver, pancreas and other smooth tissues, while computed tomography (CT) exhibits bony structures and other anatomical parts with high resolution. Positron Emission Tomography (PET) and Single-Photon Emission Computed Tomography (SPECT) images provide functional information related to metabolism [4]. They are often portrayed in pseudo color and typically have low-resolution [5]. Some of the important categories of imaging modalities such as MRI, CT, PET and SPECT with tumor lesions highlighted in fusion results are depicted in Fig. 1

Several fusion techniques have been proposed for various applications in the past. Pixel level fusion approaches such as pyramid, averaging, Principal Component Analysis (PCA) [5], Brovey [6] generate annoying artifacts with spectral deformity. In [7,8], source images are decomposed into various Laplacian pyramid levels, in [9], ratio of low-pass pyramids are utilized and finally merged to

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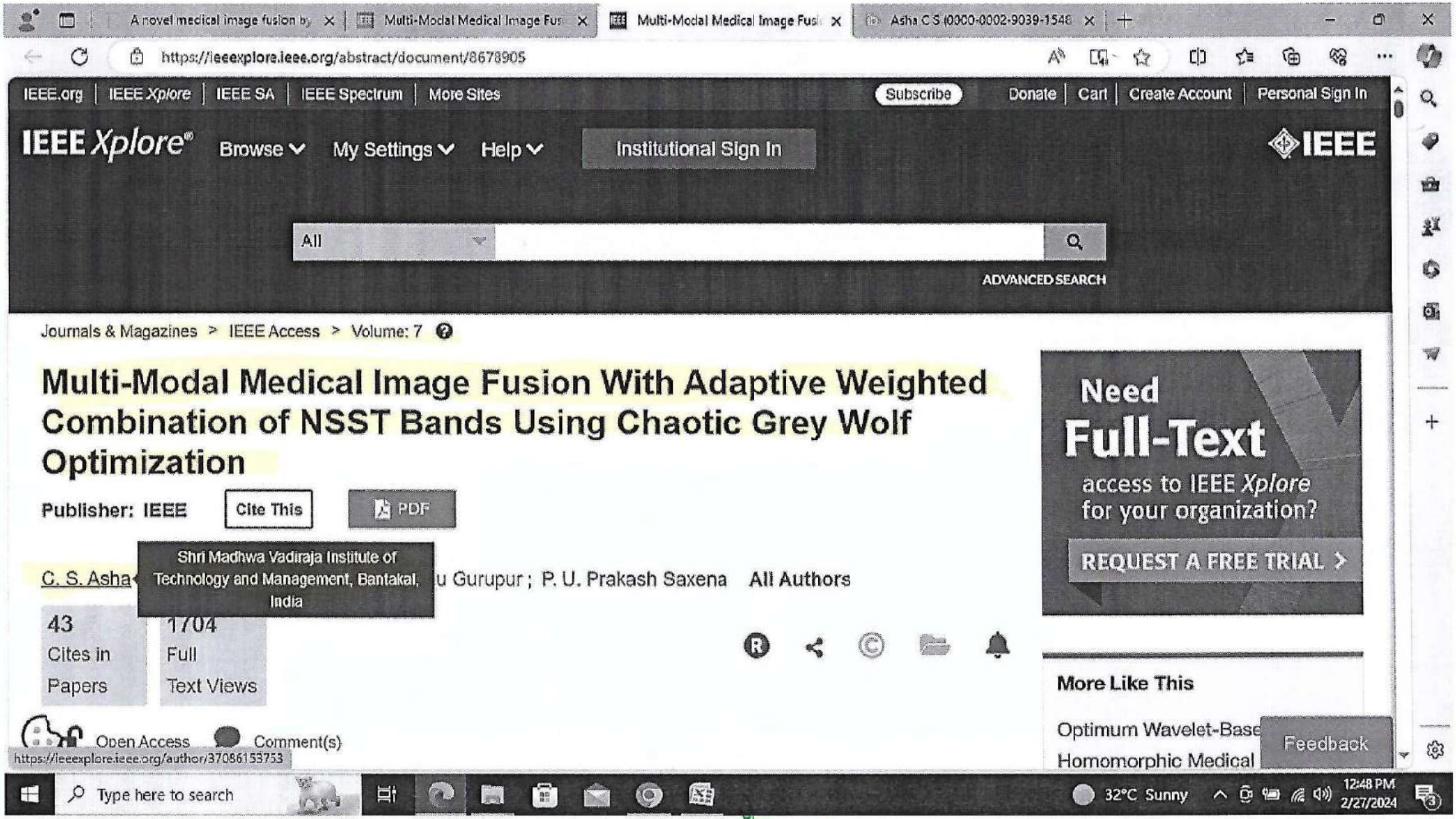

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Auto Removal of Bright Spot from Images Captured Against Flashing Light Source

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Abstract:

An image captured using a single lens camera with the sun or flashing source of light in the background frequently exhibits a bright spot in it. Usually, we observe bright spots in images caught during sunrise or sunset. The color of the bright spot varies depending on the overall background of the scene and mainly relies upon the light reflected from the lens. In several instances, bright spot, haze, or flare can arise anywhere in the image. The phenomenon occurs due to the light reflected or scattered by the imperfection of the lens and improper angle of incidence of light. One can avoid by taking the picture at a proper angle such that the t is positioned directly on the source of light which necessitates expertise. Manual

DC-DC Buck Converter using Sliding Mode Control

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Abstract— **DC-DC converters are power electronic converters that convert one level of DC voltage to other level using switching action. They are widely used in industrial applications such as DC motor drives, computer systems, adapters, communication equipments. One of the main problems of DC-DC converters is the adequate selection of control scheme because these systems are non-linear and show complex behavior patterns. Crucial to the performance of power converter, is the choice of control methods. A linear PID controller designed for regular operation cannot give satisfactory performance when the operating point changes due to line variation and load variation. Sliding Mode Control has gained importance as a design tool for the robust control of linear and non-linear systems. SMC provides inherent order reduction, robustness against system uncertainties, disturbances, and implicit stability proof. The design allows a high-performance control system at low cost. The application of the Sliding Mode Control techniques to DC-DC converter is analyzed with respect to buck converter using MATLAB/SIMULINK™ based simulation.**

Index Terms—Buck Converter, DC-DC Converter, Sliding Mode Control (SMC),

I. INTRODUCTION

The DC-DC converters are power converters that convert one level of DC voltage to another level of DC voltage using switching action. The DC-DC conversion technology has been developing very quickly, besides they are extensively employed in industrial applications such as dc motor drives, computer systems, adapters and communication equipment. DC-DC converter circuits are utilized in a controllable and lossless DC voltage transformation, offering voltage isolation through the incorporation of a high-frequency electrical device.

One of the main problems in Power Electronics is the adequate selection of the control scheme for switch mode DC-DC converters, as these systems are nonlinear and show complex behavior patterns. The significant part of the performance of power converters is the choice of control methods. Traditional frequency-domain analog methods are mainly used in compensator design. There are a few drawbacks that obstruct the execution of analog controllers such as temperature float of the segments, the necessity for modifying numerous physical parts, and susceptibility to electromagnetic impedance (EMI). To overcome these limitations, four class of non-linear controllers are employed which are Robust, adaptive, Fuzzy and Neural controller. An essential alternative to linear controllers in the field of power electronics are Intelligent (Fuzzy Logic and Neural Network) control techniques[1].

After pioneer study of DC-DC converters, a great deal of effort has been directed in developing the modeling and control methods of various DC-DC converters[7]. The classic linear approach depends on the state averaging methods to get the state-space averaged equations. Specific Perturbations are introduced into the state variables around the operating point from the state-space averaged model, and small-signal state-space equations are therefore derived. Linear transfer functions of the open-loop plant can be obtained based on the equations. A linear controller is easy to design with these necessary transfer functions based on the small-signal state-space equations. The procedure is well known. However, the stability under significant variations of state condition changes cannot be ensured with these methods.

Sliding mode control is a powerful methodology that produces a very robust closed-loop system under plant uncertainties and external disturbances because the sliding mode control can be designed entirely independent of these effects. This technique offers several benefits compared to old control methods, they are Stability, even for broad line and load variations, excellent dynamic response and simple implementation. The SMC has been designed to improve the toughness, and dynamic response in switch mode power supplies as SMC is a control approach that complies with non-linear nature of switch mode power supplies[1]-[4].

II. MODELLING OF BUCK CONVERTER

The power processor usually consists of more than one power conversion stage. Each power conversion refers as a converter. It is a basic module of power electronic systems. It utilizes power semiconductor devices and possible energy storage elements such as inductors and capacitors.

The DC-DC converters converts fixed dc input voltage to a controllable dc output voltage. They are widely used in regulated switch-mode power supplies, in DC motor drive applications, subway cars, trolley trucks, and battery-driven vehicles.

A. Buck Converter

The DC-DC buck converters are widely used in regulated switch-mode power supplies and dc motor drive application. They provide smooth acceleration control, high efficiency, and fast dynamic response. The converter switch can be executed by using power Bipolar Junction Transistor (BJT), power Metal Oxide Semiconductor Field Effect Transistor (MOSFET), Gate Turn Off thyristor (GTO), or Insulated Gate Bipolar Transistor (IGBT). Although a dc converter can be operated either at a fixed or variable frequency, it is usually operated at a fixed frequency with a variable duty cycle.

The buck converter, also known as a step-down converter, is a switching converter that produces an output voltage lower than the dc source voltage. The buck converter has four primary components, namely a power semiconductor switch,

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Design and Analysis of 8-T and 5-T based XOR and XNOR gates using Soft Computing Tools

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Abstract— **XOR and XNOR gates are the basic building block of arithmetic and logic circuits. In the modern era, VLSI technology demands the circuit design with least area consumption, least power consumption and high speed in operation. There are various CMOS logic structures available to design digital VLSI circuits, like, pass transistor logic, transmission gate logic, pseudo NMOS logic, CMOS logic, dynamic and domino CMOS logic, clocked CMOS logic, CVSL logic and so on. This paper presents the design of XOR and XNOR gates using pass transistor logic. Simulation results obtained in the mentor graphics tool are used to compare the number of transistor usage, area consumption, delay between 8-T and 5-T based XOR and XNOR gates and it proves that 5-T based design is the best in all the above-mentioned parameters.**

Keywords—Pass transistor logic; XOR and XNOR gates; area; delay

I. INTRODUCTION

Nowadays, the primary concern for any Very Large-Scale Integration (VLSI) system designers focuses mainly on System on Chip (SoC) design of VLSI circuits pertaining to minimum transistor count, thereby reducing the area consumption, power consumption, which is a crucial factor to be taken into consideration in case of any processor. XOR and XNOR gates are the fundamental components in designing of VLSI based circuits like adders, multipliers, comparators, multiplexers, demultiplexers, phase locked loop and so on.

Henceforth, a careful design and analysis is very much essential in designing these building blocks of VLSI circuits that is, designing XOR and XNOR gates. There are several Complementary Metal Oxide Semiconductor (CMOS) logic structures like pass transistor logic, transmission gate logic, dynamic CMOS logic, domino CMOS logic, clocked CMOS logic, cascade voltage switch logic (CVSL) available for designing digital VLSI circuits. Each type is having its own advantages and drawback. Since our main intention is to reduce the transistor count, in this paper we present a detailed design of XOR and XNOR gates using pass transistor logic by making use of 5 transistors and 8 transistors [1] thereby simulating and analyzing various performance parameters which needs to be taken into consideration for ease of design (simplicity) as well as better performance.

II. RELATED WORK

There are several techniques applicable to design XOR and XNOR gates which have its own advantages and drawbacks. Depending upon the designer and end user requirement, suitable CMOS logic structures. Pass transistor logic is a series combination of a set of transistors. Pass transistors can be categorized as PMOS pass transistor logic and NMOS pass transistor logic. PMOS pass transistor can pass good logic 1 whereas NMOS pass transistor can pass exact logic 0. Due to threshold voltage effect, PMOS and NMOS pass transistors are not capable of passing good logic 0 and logic 1 respectively. However, by connecting the substrate terminal of PMOS transistor to VDD and substrate terminal of NMOS to ground, this effect can be minimized to some extent. Due to minimal transistor usage in case of pass transistor, in this paper we have implemented the design of XOR and XNOR gates using this logic.

Pass transistor logic based XOR and XNOR gates and Complementary Metal Oxide Semiconductor inverter proved to dissipate less power, speed in operation and lower power delay product [2] when compared to design with a lower supply voltage [3].Usage of VDD and ground connection in the design of 6 transistor based XOR and XNOR gates using pass transistor has proved to have better driving capability and

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Smart Traffic System

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***Abstract*— Monitoring the traffic is one of the most important elements especially in a developing country like India with a mixed traffic flow of vehicles including motorcycles, cars and heavy vehicles. The traffic flow varies with different daytime and location; therefore, the adoption of proper traffic monitoring system is very essential. Thus, our project focuses on monitoring the traffic system and detecting the riders without helmet and solutions for traffic jam. Our project also focuses on creating an automated traffic controller using image processing. The methodology we use here for monitoring the traffic is image processing. This method enables us to implement a simple but efficient traffic control especially in crossroad context compared to other convenient methods.**

***Keywords*— Image Processing,Open CV, YOLOv3.**

1. INTRODUCTION

Fast transportation systems and rapid transit systems are nerves of economic developments for any nation. Mismanagement, traffic rule violation, safety rule violation and traffic congestion results in long waiting time, loss of fuel and money. With the increasing number of vehicles on the road, new methods are being invented to overcome such a problem. One way to improve traffic flow and safety of current transportation system is to apply traffic surveillance using image processing techniques.

Traffic congestion increases especially in cities because of population increasing. In consequence it takes more time to travel and traveller feels stressed. So here our main objectives are to check the traffic condition and to develop a traffic congestion investigating system by image processing from CCTV camera. Which will let the rider know about the condition of traffic know in prior and rider can decide on which route to travel and can save the fuel and time.

Controlling of traffic at the junction where three/four roads meet is very challenging task to be performed manually by human beings. Handling of the traffic can be difficult when there are a greater number of vehicles present in different sides of the road. Handling of the traffic can be done more efficiently at the junction with the help of image processing. Mainly because there are very less room for error with image processing when compared to the manual handling of the traffic.

Motorcycle accidents have been rapidly growing throughout the years in many countries. The helmet is the main safety equipment of the motorcyclists. In case of accident if motorcyclists do not use the helmet, the consequences can be fatal. This paper aims to propose a system for detection of motorcyclists without helmet and notify them about the safety procedure by using image processing techniques.

2. GENERAL METHODOLOGY

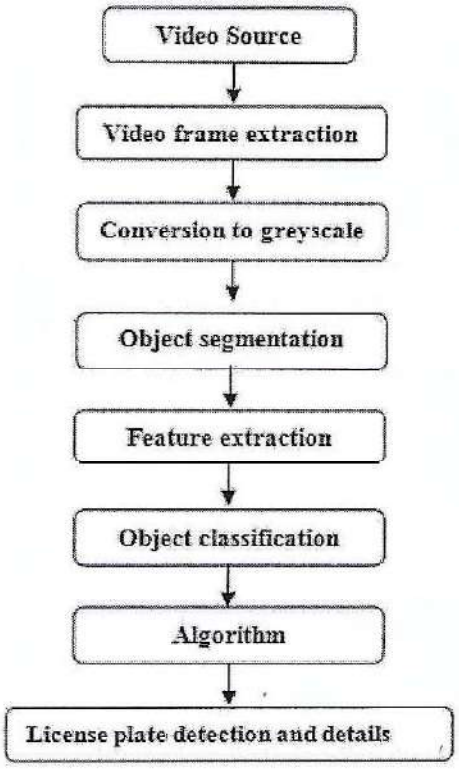

Fig. 1. Method Overview: General methodology flow chart.

The first step of the current methodology which is to record videos or Capture images through the camera. In most of the cases it will be a CCTV camera which will be located near the road. Recorded video will be converted into number of frames so that information of particular

Application of Steganography in Image Processing Framework

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Abstract— **Steganography is the art of hiding the fact that communication is taking place, by hiding information in other information. Different applications have different requirements of the steganography techniques applied. For example, some applications may require absolute invisibility of the secret information, while others require a larger secret message to be hidden. This paper intends to give an overview of image steganography, its uses and techniques. It also attempts to identify the requirements of a good stenographic algorithm and briefly reflects on which stenographic techniques are more suitable for which applications.**

Keywords— **Steganography, PSNR, DWT, Transform domain, Palette based images**

I. INTRODUCTION

Steganography is an emerging area which is used for secured data transmission over any public media. Since the increased application of Internet, in the field of information technology and communication has been the security of information. It is sometimes not enough to keep the contents of a message secret, it may also be necessary to keep the existence of the message secret. The technique used to implement this, is called steganography. Steganography is a process that involves hiding a message in an appropriate carrier like image or audio. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the Internet. For hiding secret information in images, there exists a large variety of stenographic techniques, which are more complex than others and all of them have respective strong and weak points.

II. DIFFERENT KINDS OF STEGANOGRAPHY

Almost all digital file formats can be used for steganography, but the formats that are more suitable are those with a high degree of redundancy. Image and audio files especially comply with this requirement, while research has also uncovered other file formats that can be used for information hiding. Different file formats for steganography are based on the text, images, audio, video and protocol applications.

A. Image steganography is further classified into image domain and transform domain techniques.

1) *Image Domain:* In which the Least Significant Bit (LSB) will be in the Bit Map (BMP) file format. In which, LSB insertion is a common, simple approach for embedding the information in a cover image. The LSB of some or all of the bytes inside an image is changed to a bit of the secret message. Using a 24-bit image, a bit of each of the red, green and

The Computation of Stiffness Derivative for an Ogive in the Hypersonic Flow

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ORIGINAL ARTICLE

THE COMPUTATION OF STIFFNESS DERIVATIVE FOR AN OGIVE IN THE HYPERSONIC FLOW

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Evaluation of Stiffness Derivative for a Delta Wing with Straight Leading Edges in Unsteady Flow

Renita Sharon Monis, Asha Crasta, S.A. Khan.

Abstract: ***The emphasis of this paper is to examine the Stiffness derivative variation with the pivot position by varying Mach number in unsteady flow and its comparison with quasi-steady flow of Crasta& Khan for varying angle of attack with different Mach number. From the results, it is evident that Stiffness derivative decreases as the Mach number increases. Comparison with Liu as well as Crasta& Khan theory it is evident that there is an improvement in the present theory being unsteady over quasi-steady theory, in addition to the fact that in the present work the pressure on the leeward surface is taken into account which results in increased value of the stability derivative and the same is clearly visible in results.***

Index Terms -Delta wing, Hypersonic, Straight leading edge, Unsteady.

I. INTRODUCTION

Ghosh [1] has developed a 2D large deflection hypersonic similitude. The resulting piston theory is not restricted to slender shapes as in the cases of Lighthill's [2] and Miles [3] piston theories. Ghosh's piston theory has been applied (Ghoshet al. [4]) to oscillating plane ogives to predict C_{m_q} .The similitude was extended to non-slender cones/quasi cones,and a new kind of piston motion, called conico-annular piston motion was given by Ghosh[5]. Oscillating delta wings at large incidence was treated by Ghosh[6].

According to Liu &Hui [7] depending on the combination of flight Machnumber,the angle of attack, the ratio of specific heats of the gas and the swept back angle of the wing for an oscillating triangular wing in supersonic/hypersonic flow the shock wave may be attached or detached from the leading edges.

Etkin [8] and Levin [9] have shown the separate effects of the pitch rate and incidence rate on the pitching moment. Hui et al. [10] have studied the problem of stability of an oscillating flat plate wing of arbitrary plan form placed at a specified mean angle of attack in supersonic/hypersonic flow by applying strip theory. The plane piston theory of Ghosh was applied with the inclusion of wave reflection effect to obtain in closed form $C_{m_{\dot{\alpha}}}$ for non-slender wedges/plane ogives in Hypersonic flow (Ghoshet al. [11]).

Ghosh [12] has given a unified hypersonic similitude,and a consequent piston theory which is valid for wedges/quasi-wedges for any Mach number greater than 1 and $E \leq 0.3$ provided bow shock is attached. It is assumed that at each spanwise station, the flow is 2-D with the shock attached.

To assess the overall stability the moment derivatives due to the pitch rate as well as incident rate should be evaluated. In the present work, the unified similitude of Ghosh [14] along with the extended theory of Crasta& Khan is combined with strip theory to obtain the unsteady moment derivative for the delta wing with the straight leading edge. In this paper, an attempt has been made to study the Stiffness derivative with different pivot position which gives the better comparison with the theory developed by Liu as well as Crasta& Khan.

Implemented two-dimensional slender body theory in supersonic/hypersonic flow at the high angle of attack for various Mach number by utilizing the concept of piston theory, relations for stability derivatives were obtained for a wedge, which depends on the flight Mach number and semi vertex angle of the wedge [16]–[23].

The theory developed by Crasta and Khan [24]-[25] which is a quasi-steady can now be extended to unsteady theory to predict the formulae for Stiffness derivative.

Khan et al., [26] analytical and numerical methods are used to evaluate flow over a wedge at supersonic Mach numbers. Closed form solutions are obtained for the various semi-vertex angle of the wedge and the Mach numbers

Renita et al., [27] an analytical study to account the effect of the sweep angle of a delta wing whose leading edges are curved on roll damping derivative at various angles of attack and the amplitude of the full sine waves?

Musavir et al., [28] simulated the trajectory of the unguided rolling projectiles at varying Mach numbers using aerodynamic coefficients. The aerodynamic coefficients are estimated using an aerodynamic prediction code, Missile DATCOM. The predicted stability derivatives will determine the design criteria, and also their effect on the design aspects (stability and accuracy) of the projectile. To satisfy the condition of stability for the trajectory of the projectile, a model of 6 DOF equations has been used.

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AN EFFECT OF SWEEP ANGLE ON ROLL DAMPING DERIVATIVE FOR A DELTA WING WITH CURVED LEADING EDGES IN UNSTEADY FLOW

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ABSTRACT

This paper presents the results of an analytical study to account the effect of the sweep angle of a delta wing whose leading edges are curved on roll damping derivative at various angles of attack and the amplitude of the full sine waves. In the present theory, the effect of Leeward surface has been taken into consideration with the attached shock case at the leading edge. For a detached shock case, this theory will not be valid. Results have been obtained for the hypersonic flow of perfect gases over a wide range of angle of attack and the Mach number. The results indicate that the roll damping derivative decreases with a sweep angle, but increase with the increase in the flow deflection angle θ as well as with Mach M.

KEYWORDS: Curved Leading Edge, Delta Wing, Hypersonic & Sweep Angle

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Original Article

1. INTRODUCTION

The intangible desire to explore the space has become universal and designing the spacecraft is on the top priority. With the requirement of high-performance aircraft, the importance of research has been shifted to the field of hypersonic flow. At the preliminary design stage, the knowledge of aerodynamic load and stability derivatives facilitating the design process of delta wings is of the most important aspect. In this regard, the present study has been taken up to relate the influence of the angle of sweep on damping stability derivative due to the rate of roll of a delta wing whose edges are curved.

Ghosh [1] has developed a 2D large deflection hypersonic similitude. The resulting piston theory is not restricted to slender shapes as in the cases of Lighthill's [2] and Miles [3] piston theories. Ghosh's piston theory [4] has been applied to oscillating plane ogives to predict C_{m_q}. The similitude was extended to non-slender cones/quasi cones, and a new kind of piston motion, called conico-annular piston motion was given by Ghosh [5]. Oscillating delta wings at large incidence was treated by Ghosh [6]. Ericsson [7] and Levin [8] have shown the separate effects of the pitch rate and incidence rate on the pitching moment. The plane piston theory of Ghosh [9] was applied with the inclusion of the wave reflection effect to obtain in closed form C_{m_α} for non-slender

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Full Length Article

Investigation of dry sliding wear properties of multi-directional forged Mg–Zn alloys

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Abstract

Effect of multi-directional forging (MDF) on wear properties of Mg–Zn alloys (with 2, 4, and 6 wt% Zn) is investigated. Dry sliding wear test was performed using pin on disk machine on MDF processed and homogenized samples. Wear behavior of samples was analyzed at loads of 10 N and 20 N, with sliding distances of 2000 m and 4000 m, at a sliding velocity of 3 m/s. Microstructures of worn samples were observed under scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), and x-ray diffraction (XRD) and the results were analyzed. Mechanical properties were evaluated using microhardness test. After 5 passes of MDF, the average grain size was found to be 30 ± 4 μm, 22 ± 3 μm, and 18 ± 3 μm, in Mg–2%Zn, Mg–4%Zn, and Mg–6%Zn alloys, respectively, with significant improvement in hardness in all cases. Wear resistance was improved after MDF processing, as well as, with increment in Zn content in Mg alloy. However, it decreased when the load and the sliding distance increased. Worn surface exhibited ploughing, delamination, plastic deformation, and wear debris along sliding direction, and abrasive wear was found to be the main mechanism.

Keywords: Multi-directional forging; Mg–Zn alloy; Microhardness; Wear; Coefficient of friction.

1. Introduction

The necessity for lightweight materials in various engineering applications like automotive, electronics, and construction industries has led to a massive demand for lighter structural materials [1]. In that aspect, there is a huge demand for Mg and its alloys owing to their unique properties such as high strength to weight ratio, low density, high thermal and electrical conductivity, good vibration and shock absorption ability, etc. [2,3]. These properties make Mg alloys more suitable and a possible alternative to steel and aluminum, particularly for moving components [4]. The major drawback encountered for widespread application of Mg alloys is related with their poor resistance towards corrosion and wear [5–7]. In general, wear is a kind of surface damage phenomena which can shorten the service life of the components and results in catastrophic failure and also, increases the operating cost of the equipments. Hence, for effective use of Mg alloys, in moving part applications, it is essential to improve its anti-wear property for better performance and reliability. One of the novel methods for improving wear properties of Mg alloys is through strengthening techniques [8]. Wear resistance and strength of material are improved by grain refinement technique, and it is considered as an effective strengthening method [9,10]. In that aspect, severe plastic deformation (SPD) is considered as one of the useful methods of grain refinement, and it is also simple in operation. Ultra-fine grained materials processed by SPD techniques exhibit higher strength, hardness, and adequate wear resistance as compared to coarse-grained materials [11–14]. Among various SPD techniques, multi-directional forging (MDF) is considered as an unique technique to

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Influence of heat treatment on Cr and Fe-rich precipitates in thermally aged duplex steels

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Abstract

In this investigation, three different heat treatment conditions were evaluated to correlate the microstructural changes of duplex steels with their mechanical properties. In the first heat treatment condition, the samples were aged at 475°C up to 1000 h. This resulted in the formation of alpha and alpha-prime precipitates in ferrite matrix due to spinodal decomposition, which in turn embrittled the samples. In the second heat treatment condition, the embrittled samples were reversion heat-treated at 550°C up to 120 min, which resulted in dissolution of the alpha and alpha-prime precipitates. This resulted in an increased ductility of samples. In the third heat treatment condition, the reversion heat-treated samples were re-aged at 475°C for 100 h in order to check applicability of reversion heat treatment. The results showed that spinodal decomposition again remained as the primary mechanism of embrittlement, and it was also found that there was not much difference in the re-embrittlement rate.

Keywords: metals scanning electron microscopy transmission electron microscopy

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Improving Surface Roughness of Burnished Components using Abrasive Particles

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ABSTRACT

Roller burnishing process was carried out on free cutting brass materials in the presence of fine silicon carbide abrasives in the form of paste on a pre-machined surface. The results of 'without-paste' burnishing (plain burnishing, PB) and 'with-paste' burnishing (abrasive assisted burnishing, AAB) processes are compared to examine the effect of abrasive particles in the burnishing process. A 2^4 full factorial design is adopted to develop the mathematical model for surface roughness regarding four process parameters like burnishing force, burnishing speed, burnishing feed and number of passes for both the cases, i.e. PB and AAB. Analysis of variance (ANOVA) was carried out to find the effect of process parameters and to check the adequacy of the models. The results show that the parameters have a significant effect on the response in PB to improve the surface roughness by 75 % than the turned components. Whereas in AAB, fine abrasive particles as a single entity controlling the response and making other parameter effects as non-significant. Surface roughness further improved by 15 % in AAB process.

Keywords: Roller burnishing; turning; abrasive paste; factorial design; surface roughness.

INTRODUCTION

Burnishing is essentially cold working, chip-less finishing process carried out using a hard and soft ball or roller on machined components. The irregularities present in pre-machined surfaces will be deformed due to the action of the ball or roller into valleys and causes plastic deformation. When peaks fill in the valleys, during this action of the burnishing tool, the properties at the surface like surface finish, microhardness, wear resistance, fatigue strength, corrosion resistance increases. Burnishing is chip-less when compared with the conventionally used chip removal, finishing processes Viz., grinding, lapping, honing [1]. This process can be carried out on the same machine tool as lathe where turning tool and burnishing tool can be fixed at same tool post. So, the time required to set the tool, change the tool, etc. decreases. The schematics of the burnishing process is shown in Figure1. The graphical representation of the burnishing process shows the formation of three different zones during the process and also represents the formation of compressive stresses at the surface at the end of the burnishing action.

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Machinability and related properties of austempered ductile iron: A review

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ABSTRACT

When the ductile iron which is also known as Spheroidal Graphite (SG) iron, is subjected to austempering heat treatment, the material is known as austempered ductile iron (ADI). This material has good mechanical properties and has various applications in different fields. This revolutionary material with its excellent combination of strength, ductility, toughness and wear resistance has the potential to replace some of the commonly used conventional materials such as steel, aluminium and other light weight alloys as it offers production advantage as well. One of the problems encountered during manufacturing is machining of ADI parts owing to its high hardness and wear resistance. Many researchers over a period of time have reported the machinability aspects of the ADI. This paper presents a review on the developments made on the machinability aspects of ADI along with other mechanical properties.

Keywords: Machinability; Austempered ductile iron; Austenitization; Austempering.

INTRODUCTION

Ductile cast iron which is also known as Spheroidal Graphite (SG) iron is a type of cast iron with better ductility compared to the other types of cast iron. When the austempering heat treatment is carried out on the ductile iron, the material is known as austempered ductile iron (ADI). Austempered ductile iron has good mechanical properties because of its unique microstructure "ausferrite" which is shown in the Figure 1. This microstructure consists of ferrite, austenite and graphite nodules. Ferrite is in acicular shape whereas austenite is rich in carbon. ADI has great strength, high hardness with good ductility and toughness [1-6]. ADI has good strength to weight ratio. It is nearly 10 % less dense than steel [7-9]. The cost associated with this material is also less because of the simple casting method. This engineering material offers the design engineers the economical benefit as it is available at lesser cost. Other mechanical properties of this material, such as wear resistance and fatigue strength are also higher [9]. Because of this superior combination of mechanical properties and lesser cost, ADI has wide range applications such as structural application, automotive industry and farm machinery [10-13].

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Mechanical characteristics evaluation of dual phase and related hardening techniques on AISI 4340 steel

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ABSTRACT

Steel has wide range of applications and is used in various machinery and general metallic components. Depending on the particular application, steels with tailorable and appropriate properties are used. This requires various methods which can be used to alter the properties based on the requirements. Generally, mechanical properties of the steel are improved by conducting the heat treatment processes. The aim of the present work is to experimentally investigate the effects of conventional heat treatments and special hardening techniques for dual phase structure on mechanical properties of AISI 4340 steel. The test specimens are machined as per ASTM standards and hardness, tensile, impact and microstructure analysis were carried out after the heat treatment processes. Dual phase heat treatment to obtain ferrite-bainite structure is performed by heating the as-bought specimen to the intercritical temperature for two hours followed by isothermal holding in fusible salt bath containing sodium nitrate and sodium nitrite at subcritical temperature for 30 minutes and cooling in air to room temperature. Similarly, ferrite-martensite structure is obtained by air cooling after holding isothermally in the salt bath for 10 seconds. Ferrite-bainite steel was observed to be soft, whereas ferrite-martensite steel was relatively harder. Austempered steel has high toughness with optimum hardness and conventionally hardened steel is the hardest among all. Microstructure shows colony of bainite and martensite in ferrite matrix of ferrite-bainite and ferrite-martensite dual phase structures respectively. An increase in brittleness was observed with the increase in hardness due to the conventional hardening to display lesser impact strength compared to austempered steel.

Keywords: Bainite; austempering; microstructure; martensite.

INTRODUCTION

Heat treatment is a method of heating and cooling for different time intervals to improve the properties of the material [1-2]. During heat treatment of steel, type of phases, weight % of phases and grain size of the material may vary depending on the duration of treatment and cooling methods. Some of the properties may vary so that desired mechanical properties such as hardness, toughness, yield strength, ultimate tensile strength, Young's modulus, percentage elongation may be incorporated [3-5]. The most

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PAPER

Effects of combined multiaxial forging and rolling process on microstructure, mechanical properties and corrosion behavior of a Cu–Ti alloys

Ramesh S[5,1], Gajanan Anne[2], H Shivananda Nayaka[1], Sandeep Sahu[3] and Shashibhushan Arya[4]

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Abstract

Combined multiaxial forging (MAF) and rolling was performed on Cu-3% Ti (wt%) alloy at room temperature with emphasis on microstructural evolution, improvement in mechanical properties, and corrosion resistance. Microstructural changes were confirmed from various characterization techniques, and co-related with mechanical properties. TEM analysis revealed high shear band density in the 3 pass MAF + 90% rolled sample appearing due to high strain. EBSD analysis revealed transformation to low angle grain boundaries from high angle grain boundaries. Maximum microhardness and UTS reached to 340 HV and 960 MPa, respectively in the processed samples. Significant grain refinement was observed in MAF processed Cu-3%Ti alloy, and after combined MAF + rolling, higher dislocation density and refinement of shear bands were observed. In addition, potentio-dynamic polarization test was used to study the corrosion behavior of the alloy. Scanning electron microscope (SEM) was used to analyze the corroded surface morphology.

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Influence of Multidirectional Forging on Microstructural, Mechanical, and Corrosion Beha

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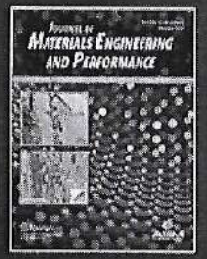

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Investigations on Effect of Different Ball Burnishing Conditions on Surface Roughness Using Response Surface Methodology

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Keywords:
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ABSTRACT

Burnishing is becoming popular post-machining surface finishing technique due to its excellent features. The use of high finish and hard, ball or roller on pre-machined surface with pressure smooths out protrusions to fill the valleys and thus, resulting in lower surface roughness. In present work, ball burnishing has been carried out on free cutting brass in different burnishing conditions such as dry (Plain Burnishing, PB), lubricated (LB) and with abrasives (Abrasive Assisted Burnishing, AAB) to establish the relationship between surface roughness and the four process parameters like burnishing force, burnishing feed, burnishing speed and number of passes. The effect of using lubricants and abrasive particles is compared over PB. Design of Experiments based on Response Surface Methodology (RSM) is adopted to develop the mathematical models of second order for each above said conditions. Analysis of Variance (ANOVA) is carried out to study the effect of burnishing parameters on response and to check the adequacy of the models developed. The results showed significant reduction in the surface roughness with all cases. Surface roughness of level 0.1043 µm can be achieved from the burnishing of the turned surface having roughness level of 2.7838 µm.

INTRODUCTION

Machined surfaces inherently consist of peaks and valleys produced by the tools and other factors such as vibrations in the machine structure, wear and process parameters. Therefore, to finish the machined surfaces the common practice is to use abrasive-based finishing methods like grinding, superfinishing, honing etc. Nowadays, post-machining finishing methods like burnishing works based on cold working principle are employed to achieve the better surface roughness along with other added advantages such as increase in microhardness, wear resistance, fatigue strength, corrosion resistance etc.[1][2] [3]. The ball burnishing process uses a ball as a deformer, which can be pressed against the machined surface during burnishing. When applied load is more than the yield strength of the material, plastic deformation takes place resulting in filling up of peaks in valleys. This plastic deformation mechanism during burnishing depends upon the mobility of dislocations and their interaction. In general, dislocations are initiated when shear strength on material reaches its critical value and further resistance

Experimental and Numerical Investigations on Heat Transfer Characteristics of Open Cell Al6061 Alloy Foam

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Abstract

This paper reports on fabrication of open cell Al foam by sand salt mould method, using NaCl crystal as space holder and Al6061 alloy as base metal. The developed Aluminum foam specimens have been tested in wind tunnel to determine relative heat transfer coefficient for different velocities of air, mass flow rate and temperatures. Thus, obtained experimental results were compared with the CFD results obtained by simulating the wind tunnel test using CFD packages. Heat transfer coefficient increases with increase in temperature for both experimentation and finite element approach. Experimentation results were found to be well supported by simulation results and both conduction and convection as main mode of heat transfer. Increase in mass flow rate had significant effect on heat transfer coefficient.

Keywords: Al6061, Open Cell, Metal Foam, Heat Transfer Coefficient, FEM.

1.0 Introduction

Engineering technologies are emerging to new ideas and concepts at very fast rate and there is huge demand for new, versatile, compact and lightweight material. Metal foams are one such kind of materials that open up to the requirement of new demanding arenas in numerous applications of industry. These class of materials are heterogeneous in nature and appear to be cellular structured normally made up of gas and metal which proves them to have very low density, that adds up to the improvised properties such as higher stiffness to weight ratio, less weight, enhanced property of energy, sound and vibration absorption, with great ability to act as thermal insulator. The important character of such materials is; they can be produced on the basis of need and requirement for particular applications. Metal foams are basically made up of outer dense material and inner core is the form of matrix or pores. The design understanding and concept was evolved through naturally available substances such as stones, sponges etc. Aluminum, titanium and tantalum are few major elements in engineering applications that has varied applications, the foams developed by these elements are extensively studied. Higher compressible strength, porous in nature, low specific weight in comparison to its solid structure, great thermal conductivity due to voids in the internal structure and excellent acoustic benefits has made this material to be sought after than the solid form. NihadDukhanet. al. [1] have

Properties of Glass fiber hybridized woven Flax and Sisal fabric hybrid composites

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Abstract

In recent years, the natural Fiber reinforced composites have attracted significantly among automobiles, wind turbine blades and electrical applications. The only use of natural fiber cannot satisfy the needs of composites. The purpose of this study is to investigate the effect of incorporation of glass fiber at different loading (0, 5 and 10 weight fraction) on physical, moisture absorption and mechanical properties of two different hybrid composition of woven Flax and Sisal fabric (15/15 and 20/20 weight fraction) separately. Experimental results indicated that increases in incorporation of glass fiber into woven Flax and Sisal fabric hybrid composites can be significantly increases tensile strength, flexural strength and water resistance of composites significantly but less effect on impact strength and density. Fractography analysis was carried out to examine the nature of fractured specimen using Scanning Electron Microscope.

Keyword: Flax fabric, Sisal fabric, Hand layup, Mechanical Properties, Moisture absorption, SEM

I. INTRODUCTION

The properties of fiber reinforced polymer composites are depends on many factors such as properties of the fibers, fiber orientations, fiber content, properties of the matrix, fiber-matrix bonding etc [1]. Natural fibers contains various chemical compositions such as cellulose, hemicelluloses, lignin, waxes, fats and pectin [2]. The Possibility of some of natural fibers such as jute, banana, Sisal, and coir as reinforcement and filler in composites has already been studied in the past [3-5]. Saheb and Jog [5] were reported major review on properties of natural fiber reinforced composites by varying types of fibers, matrix materials, fibers treatment and fiber-matrix bonding. Gowda et al. [6] are reported mechanical properties of jute fiber reinforced polyester composites have significant strengths than wood based composites. Also, pulp based fiber reinforced thermoplastic composites showed that stiffness improved by a factor of 5.2, the strength of the composite has improved by a factor of 2.3 compared to the virgin polymer [7].

Flax fiber is raw material often used in high quality paper industry to manufacture printed bank notes and rolling paper for cigarettes and tea bags[8]. Flax fibers come from the Flax plant, and these plants are generally harvesting in West Europe where the average temperature is generally below 30 °C [9]. Pavithran et al. [11-12] investigated the impact strength of composites. Also the authors related the impact strength of polyester composites with more natural fiber composites. It was reported that Sisal fiber reinforced composites had higher significant fracture resistance than pineapple fiber composites.

Li et al. [12] studied on various forms of chemical treatment for natural fiber reinforced composites. The authors studied various types of chemical treatments such as the alkaline, acetylation, silane, benzoylation, isocyanates, permanganate and other types of treatments. The researchers stated that alteration of the fiber surface can improve the rapport of hydrophobic thermoset matrix and hydrophilic cellulose fibers.

Athijayamani et al. [13] are revealed mechanical and machinability characteristics of Sisal and roselle natural fibers reinforced composite materials. It was found that 10% NaOH chemically treated composites were resulted in major improvement in properties of composites.

Boopalan [14] fabricated jute and banana fiber reinforced composites to investigated various properties such as tensile strength, flexural strength, impact strength and thermal properties. To increase the mechanical properties of the composite material, jute fiber and banana fibers are hybridized by changing weight ratios of 100/0, 75/25, 50/50, 25/75 and 0/100. All results were compared with the raw jute fibers. It was observed that the addition of banana fiber with raw jute fiber improved the tensile strength, impact strength, flexural strength, thermal properties and reduced the moisture absorption.

Glass fiber were incorporated into the Sisal–polypropylene composites which increases tensile, flexural, and impact strength and also it improved thermal properties and moisture absorption resistance of composites without having significant effect on tensile and flexural moduli. Maries Idicula et al. [15] studied the mechanical performance of short banana/short Sisal hybrid fiber reinforced polyester composites. The authors fabricated hybrid composites with the different fiber volume fractions ranging from 0.20 to 0.50Vf. It was found that when the amount of fiber loading increased, the properties are also getting improved. Arifuzzaman et al. [16] studied the woven jute fabric reinforced poly composites, they revealed that fiber yarns have interlocking structure of warp and weft. In tensile loading, these curvy fibers tend to become straighten out, which create high stresses in the matrix. Resulted in higher strength of the woven fabric composite than the strength of Non-woven jute fabric /PLLA composite. The better mechanical properties were obtained at 0.40Vf. Jayabal et al. [17] have studied the behavior of hybrid composite material fabricated using woven coir (C) and glass (G) fiber polyester reinforced composites. The researchers made dissimilar stacking layers of composites. The layering order was G/G/C, C/G/G. It was observed that C/G/G layering composite materials given high flexural strength, impact strength and tensile strength. Researchers concluded that that the stacking sequences also effect the behavior of

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Investigation of Antiallergic and Antipruritic Activity Studies of *Shorea robusta* Oleoresin and *Wrightia tinctoria* Bark Extracts by Animal Models

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Abstract: Plants have formed the basis of sophisticated traditional medicinal systems that have been in existence for thousands of years and continue to provide mankind with new remedies. The study of total ethanol extract of *Shorea robusta* oleoresin and *Wrightia tinctoria* bark investigated the antiallergic activity study by sheep (*Capra hircus*) serum and compound 48/80 induced mast cell degranulation method using ketotifen fumarate and antipruritic activity study by compound 48/80 method using chlorpheniramine maleate as standard. The results showed both plants are excellent candidates.

Keywords: Traditional, investigated, antiallergic, antipruritic, compound 48/80.

INTRODUCTION

Shorea robusta and *Wrightia tinctoria* are widely distributed in Asia, Africa and Australia [1]. Both the plants are traditionally used for skin ailments [2, 3]. Shorea robusta oleoresin contains Nor-triterpenes 3- β-acetoxy-28-nor-urs-12-ene [4]. The stem bark of *W. tinctoria* is reported to contain β-amyrin, lupeol, β-sitosterol, stigmasterol, campesterol, a triterpenoid, flavonoids, steroids, alkaloids and phenolics [1].

Allergy is the fifth leading group of chronic diseases, affecting as much as 40% of the first-world population. Its pathophysiology has a genetic component and is driven by the immune system's sensitized response to antigens and environmental factors [5]. The incidence of allergic diseases is rising considerably worldwide in both developed and developing countries. These diseases include asthma, rhinitis, anaphylaxis drug, food, and insect allergy, eczema, urticaria and angioedema [6].

Pruritus is an important feature of atopic dermatitis (AD) with a high impact on the quality of life. Although the pathophysiology of atopic dermatitis itch is not fully understood the current studies have demonstrated a variety of mechanisms contribute to the induction and maintenance of the symptom [7]. Chronic pruritus is characteristic of several dermatologic diseases but also occurs in a variety of noncutaneous disorders [8].

Mast cells are best known for their role in IgE-associated allergic disorders and enhance the sensitization of certain cutaneous contact hypersensitivity responses, and increase inflammation and mortality during some severe bacterial infections [9]. Mast cells are found in the skin and in all mucosal tissues at homeostasis and their numbers are elevated in asthmatics lungs and gastrointestinal tract of inflammatory bowel disease [10]. Mast cells have cytoplasmic membrane-bound granules that contain a variety of biologically active mediators. The granules also contain acidic proteoglycans that bind basic dyes such as toluidine blue. The cytoplasmic granules take purple to red colour, while nucleus is stained blue. Mast cells are activated by the cross-linking of high-affinity IgE Fc receptors [11].

EXPERIMENTAL SECTION

Plant materials

Wrightia tinctoria (*W.tinctoria*) bark and *Shorea robusta* (*S.robusta*) oleoresin were collected from Kulamavu Idukki district Kerala, India (Voucher No: 1180 and 1178). The Sample drug has been identified and authenticated by the Botanist Mr. Rogimon P. Thomas, Assistant Professor, Department of Botany, C.M.S. College Kottayam, Kerala, India.

Preparation of the plant extract

Shade dried and powdered drug of all the plant materials exudates of *S.robusta* (SR) and *W.tinctoria* (WT)) bark were soaked in 95% ethanol in a round bottom flask. After soaking it for one day, it was

Experimental and Theoretical Evaluation of Rutin as Eco-Friendly Corrosion Inhibitor for Aluminum 6063 Alloy in Acidic Medium

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P. D. Reena Kumari & Divya Kumari

Abstract

The corrosion inhibition characteristics of rutin a natural flavonoid glycoside has been studied as an eco-friendly green inhibitor for corrosion control of aluminum alloy AA6063 in 0.5 M HCl medium at a temperature range of 30–60 °C by weight loss method, electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization (PDP) techniques. The inhibition efficiency increased with the increase in concentration of the inhibitor and also with increase in temperature. The surface morphologies of the polished, corroded and inhibited surfaces were scanned using the scanning electron microscope

Synthesis of novel Schiff base benzamides via ring opening of thienylidene azlactones for potential antimicrobial activities

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Abstract

3-Hydrazinyl-3-oxo-1-(thiophen-2-yl)prop-1-en-2-yl]benzamide (**4**) is identified as a key intermediate for the synthesis of some new 3-[aryl substituted hydrazinyl]-3-oxo-1-(thiophen-2-yl)prop-1-en-2-yl]benzamide (Schiff base compounds) (**5a–5o**). The nucleophilic attack of hydrazine hydrate on 2-phenyl-4-(thiophen-2-ylmethylidene)-1,3-oxazol-5(4*H*)-one (**3**) results in the breaking of heterocyclic 1,3-oxazol-5(4*H*)-one with the formation of compound (**4**). It contains a new bonding site for further nucleophilic attack of

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Sentimental Analysis of Student Feedback using Machine Learning Techniques

Daneena Deeksha Dsouza, Deepika, Divya P Nayak, Elveera Jenisha Machado, Adesh N. D.

ABSTRACT—Educational institutions attempt to collect feedback from students to study their sentiment towards courses and facilitates provided by the institution to improve the college environment. In present scenario, grading technique is used for feedback. This grading technique does not reveal the true sentiment of students, but the textual feedback provides a chance to the students to highlight certain aspects. In this paper, a method has been proposed for sentimental analysis of student feedback using machine learning algorithms such as Support Vector Machine, Multinomial Naïve Bayes Classifier, and Random Forest. A comparative analysis is also conducted between these machine learning techniques. The experimental results suggest that Multinomial Naïve Bayes Classifier is more accurate than other methods.

Index Terms: Sentimental analysis, Multinomial naïve Bayes, Machine Learning

I. INTRODUCTION

Feedback is the statement sent to an entity about its past behavior from which the entity can analyze the future and current behavior to achieve the expected result. Feedback plays animportant role in education and learning by helping to adopt new knowledge and prevent repetitive mistakes. In matters concerning quality in higher education, a lot of peoplewonderabout whose opinion should really be taken seriously or has greatest importance in the decision-making processes.Feedback is aprocess which helps the organization to monitor, evaluate, and regulate the overall working environment. Good feedback practice provides usefulinformation to the organization in improving the teaching and learning experience.

Depending on the feedback given by students it can be classified as textual or grading (Likert-scale based score) form.In Likert-scale based score questions are provided to the students and are asked to answerthose questions using a rating based scale. This technique mainly focuses on a question that is related to same topic and it does not express the exact sentiment of the students.

In order to know the exact sentiment of the students textual feedback technique is used. In this textual form student are given with set of questions and they need to answer it in sentences.It is helpful to both theacademic administration and the instructor to overcome the issues related to their organization.In this paper, the student feedback with varied opinion is collected using google forms. The aim is to extract expressions of opinion and classify it asnegative, positive or neutral using machine learning techniques.

Sentimental analysis is a method for identifying the sentiment expressed in texts. The need ofSentiment Analysis oftext has gained more importance in today's situations faced by the people of the world. Generally, there are three approaches in sentimental analysis. They arelexicon based,machine learning and hybrid approach. In machine learning technique, it uses unsupervised learning or supervised learning. Classification problem can be carried out using several algorithms like support vector machine, naïve bayes, randomforest. Inlexicon based method sentiment polarity of the textual content is detected using sentiment lexicon. A lexicon is a list of words with associated sentiment polarity. Hybrid approach is a combination of lexicon-based and machine learning methods. The training data set is labelled using sentiment lexicon and this is used to for the machine learning model. Then testing data is evaluated using this model.

The remaining of this paper is organised as follows: In section 'Literature Review' we provide a brief description about some work related to sentiment analysis and machine learning techniques. The process of classifying the text into different classes using feedback obtained from students is presented in section 'Methodology'. Comparative analysis of different machine learning algorithms based on accuracy and F-score are presented in section 'Performance Analysis'. Section 'Conclusion' concludes the research work.

II. LITERATURE REVIEW

Lot of research has been done in the area of sentiment analysis. However, there was not much research done in area of text classification which classifies the sentence into three classes i.e. negative, positive and neutral.

Sentiment analysis aims at identifying, analyzing and extracting opinions from texts. This paper describes hybrid approach for performing sentiment analysis and it is done using TF-IDF(term frequency-inverse document frequency)

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Ambient Assisted Living: A Research on Human Activity Recognition and Vital Health Sign Monitoring using Deep Learning Approaches

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Abstract— The rise in life expectancy rate and dwindled birth rate in new age society has led to the phenomenon of population ageing which is being witnessed across the world from past few decades. India is also a part of this demographic transition which will have the direct impact on the societal and economic conditions of the country. In order to effectively deal with the prevailing phenomenon, stakeholders involved are coming up with the Information and Communication Technology (ICT) based ecosystem to address the needs of elderly people such as independent living, activity recognition, vital health sign monitoring, prevention from social isolation etc. Ambient Assisted Living (AAL) is one such ecosystem which is capable of providing safe and secured living environment for the elderly and disabled people. In this paper we will focus on reviewing the sensor based Human Activity Recognition (HAR) and Vital Health Sign Monitoring (VHSM) which is applicable for AAL environments. At first we generally describe the AAL environment. Next we present brief insights into sensor modalities and different deep learning architectures. Later, we survey the existing literature for HAR and VHSM based on sensor modality and deep learning approach used.

Keywords— Ambient Assisted Living; Deep Learning; Human Activity Recognition; Vital Health Sign Monitoring

I. INTRODUCTION

The global phenomenon of population ageing among human population is seen more often in most of the countries across the world due to gradual decline in the birth and mortality rate. In years to come this demographic change will have serious implications on our society. The pace of population ageing has increased dramatically in most of the developed countries and some of them even attained the older population age structure than ever seen and heard in the past[1]. According to Department of Economic and Social Affairs, United Nations there about around 13% of the global population comprising an estimated 962 million in the world are aged 60 or over in the world. The population aged 60 or above is increasing at a rate of about 3% per year [2].

In India, there are around 104 million people aged 60 or above which comprises the 8.6% of total population as per demographic reports. The ageing rate has increased over time from 5.6% in 1961 and it is projected to grow around 20% of population by 2050 (i.e., around 34 million)[3]. This stark reality of spike in elderly population will be accompanied by surge in age-related chronic disorders such as dementia and other mental health issues, diabetes, cancer, cardio-vascular diseases, respiratory related issues etc., as well as with physical or cognitive impairments such as sensory loss, motor handicap, hyperactivity disorder etc. In order to alleviate the predicament of such aged or disabled population to be dependent on their family members or caregivers; a technological ecosystem which provides independent and healthy lifestyle is the need of the hour. Ambient Assisted Living (AAL) tries to fill this gap by making targeted interventions at various stages of assisting the elderly population. In recent years, various research communities, focus groups, businesses and policy makers have shown keen interest to develop a low-cost, reliable, secure, robust, eco-friendly assistive healthcare solutions to effectively counter the repercussions of aging population. However, gathering the ambient intelligence from the operational surroundings demands the confluence of multiple assistive techniques. It involves the scenarios such as human activity recognition, vital health sign monitoring, mobility assistance, gait analysis, sensor data analysis etc. The state of art deep learning approaches will leverage the experience of assisted living which facilitates in acquiring the ambient intelligence from the devices deployed in the AAL ecosystem.

This paper is organized into sections as follows: Section II provides the introduction to Ambient Assisted Living environment. Section III briefly summarizes sensor modality most commonly seen in sensor based monitoring Section IV describes the classification of deep learning architectures which is extensively used in the research work and many applications. Section V and VI respectively focuses on the critical review of HAR and VHS based on sensor modality and deep learning approach used. Section VII concludes the paper by discussing some of recent happenings related to research of HAR and VHSM using deep learning in AAL environment.

II. AMBIENT ASSISTED LIVING

The term of AAL has opened up new avenue to innovate cutting edge technologies to provide assistance as well as healthcare and rehabilitation to elderly people with physical or mental impairment [4].

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A COMPREHENSIVE REVIEW OF NEURAL NETWORK ASSISTED MACHINE VISION SYSTEM FOR AUTOMATIC FRUIT SORTING AND GRADING

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ABSTRACT

Rapid increase in population growth has led to a great influence on the preference based on colour, shape, size, and quality of the food. This is found to increase in mishandling and processing of quality food products. Manual sorting and inspection process provides less quality assurance, increased time consumption, requires larger work force and afflicts inaccurate results. However, the recent advances in computer machine vision systems has proved to be a better alternative for quality analysis of fruit sorting and has led to the developments of effective accurate automatic fruit classification technique for extracting quality fruits. In this paper, a detailed survey is conducted on various approaches existing for fruit sorting and grading based on neural network techniques assisted machine vision system has been presented. The machine learning techniques based on Deep learning architectures such as Artificial Neural Networks (ANN), Feedforward Neural Networks, Probabilistic Neural Networks (PNN) are discussed for the classification of fruits by extracting feature set based on the outermost layer of the fruits. This paper, further discusses the advantage, limitations, challenges among various neural network techniques and classifiers and future scope has been highlighted in this paper.

Keywords: *Fruit sorting, grading; machine learning techniques; Neural Network; Machine Vision System.*

I. INTRODUCTION

In recent years, agriculture plays a very significant role in the development of Indian economy [1]. According to recent survey, it has been observed that more than 40% of the Indian population depends on agriculture as a key source of income. In comparison with other countries, the normal yield in India is approximately 40% of the highest normal yield in the world

One of the colossal difficulties in agriculture is giving assurance in quality of products. India still follows the conventional method for inspection of fruits to check hygiene and quality, which leads to more time consumption and less quality check of fruits. In order to overcome this issue, vision-based computing techniques and algorithms is used for recognition and removal of tedious product [7].

Machine vision systems has proved to be an effective tool for automatic inspection and sorting based on the quality of fruits

Due to digitization, the applications of machine vision systems have increased rapidly in the field of agriculture. Machine vision system is defined as a technique used for automatic verification and analysis of the fruit and vegetables by processing input image. In this system, quality of the fruit is generally predicted using the acquired image, which in turn depends on the camera quality and illumination [5]. The outermost parameters such as colour, texture, shape is considered during input image processing [6]. The basic steps involved in determining the image quality are: recognition of image, size recognition, classification and grading using quality measures. The grading parameters and weight of fruit varies depends the fruit category and type of the fruit [3].

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Article

Dew Point Temperature Estimation: Application of Artificial Intelligence Model Integrated with Nature-Inspired Optimization Algorithms

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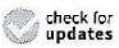

Abstract: Dew point temperature (DPT) is known to fluctuate in space and time regardless of the climatic zone considered. The accurate estimation of the DPT is highly significant for various applications of hydro and agro–climatological researches. The current research investigated the hybridization of a multilayer perceptron (MLP) neural network with nature-inspired optimization algorithms (i.e., gravitational search (GSA) and firefly (FFA)) to model the DPT of two climatically contrasted (humid and semi-arid) regions in India. Daily time scale measured weather information, such as wet bulb temperature (WBT), vapor pressure (VP), relative humidity (RH), and dew point temperature, was used to build the proposed predictive models. The efficiencies of the proposed hybrid MLP networks (MLP–FFA and MLP–GSA) were authenticated against standard MLP tuned by a Levenberg–Marquardt back-propagation algorithm, extreme learning machine (ELM), and support vector machine (SVM) models. Statistical evaluation metrics such as Nash Sutcliffe efficiency (NSE), root mean square error (RMSE), and mean absolute error (MAE) were used to validate the model efficiency. The proposed hybrid MLP models exhibited excellent estimation accuracy. The hybridization of MLP with nature-inspired optimization algorithms boosted the estimation accuracy that is clearly owing to the tuning robustness. In general, the applied methodology showed very convincing results for both inspected climate zones.

Keywords: dew point temperature; firefly algorithm; gravitational search algorithm; humid climate; hybrid models; nature-inspired optimization; semi-arid region

1. Introduction

Dew point temperature (DPT) is a weather condition that happens when the air is fully saturated with water vapor and the number of water molecules evaporating from any surface is in equilibrium

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Multiple AI model integration strategy–saturated hydraulic conductivity predic available soil properties

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Highlights

- A multiple integrated model was developed to predict soil hydraulic conductivity.
- The MARS, M5Tree, SVM and ELM models were also implemented for K estimation.
- The proposed model (MM-ANN) was recognized as a reliable model for estimating Ks.

Abstract

A multiple model integration scheme driven by artificial neural network (ANN) to improve the prediction accuracy of soil hydraulic conductivity (Ks) in Tabriz parameters such as silt, clay, organic matter (OM), bulk density (BD), pH and el model inputs to predict soil Ks. Standalone models including multivariate adap model tree (M5Tree), support vector machine (SVM) and extreme learning mac comparative evaluation with MM-ANN model predictions. Based on several pe Sutcliffe Efficiency (NSE), results showed that the calibrated MM-ANN model ir M5Tree, SVM and ELM models by considering all the soil parameters used in th Ks estimates. The proposed hybrid model (MM-ANN) emerged as a reliable inte soil hydraulic conductivity with an NSE = 0.939 & 0.917 during training and test

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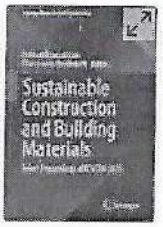

Sustainable Construction and Building Materials pp 561–569

Experimental Investigation on Utilization of Waste Shredded Rubber Tire as a Replacement to Fine Aggreg in Concrete

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Abstract

Depletion of natural resources in the past few decades due to rapid construction activities all around the world has forced a threat to the availability of natural resources for future generation. The utilization of waste industrial by products, in the

form of supplementary cementitious materials and waste tire rubber products replacing natural aggregates in production of concrete. In the present study performance of concrete mixes incorporating 2.5, 5, 7.5 and 10% Waste Shredded Rubber Tire (WSRT) as partial replacement of fine aggregate is investigated. Numerous research works have been conducted on replacement of aggregate by waste crumb rubber but data scarce on utilization of waste rubber in concrete directly. Hence to examine characteristics of shredded rubber tire based concretes, two sets of concrete specimen were produced. In the first set, shredded rubber tire is added directly without any pretreatment and in the second set the shredded rubber tire was immersed in NaOH solution for 24 h and then washed with water thoroughly and rubbed with sand paper to obtain the rough surface finish to facilitate improved bonding properties with cement matrix. To evaluate the performance of WSRT based concretes, fresh and hardened properties were determined by conducting slump tests on fresh mixes, and compression, flexural and impact tests on hardened concrete cubes and prisms. Proving results were obtained for potential use of WSRT in concretes for generalized applications.

Keywords