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3.3.1 NUMBER OF RESEARCH PAPERS PUBLISHED PER TEACHER IN THE JOURNALS NOTIFIED ON UGC CARE LIST DURING THE CALENDAR YEAR 2021

Title of paper	Name of the author/s	Department of the teacher	Name of journal	ISSN number	Link to website of the Journal	Link to article / paper / abstract of the article
Medical Quora Tagging using MATAR and LDA Algorithm	Elangovan, G.	CSE	Journal of Physics: Conference Series	1742-6596	https://iopscience.iop.org/	https://doi.org/10.1088/1742-6596/1964/4/042029
SVM-based compliance discrepancies detection using remote sensing for organic farms	Selvakanmani	CSE	Arabian Journal of Geosciences	1866-7511	https://www.springer.com/journal/12517	https://doi.org/10.1007/s12517-021-08470-9
Traffic sign detection and recognition using RGSM and a novel feature extraction method	Sudha, M. Galdispushparathi, D.V.P.	CSE	Peer-to-Peer Networking and Applications	19366442	https://link.springer.com/journal/12083	https://doi.org/10.1007/s12083-021-01138-x
ANN and fuzzy based household energy consumption prediction with high accuracy	Balachander, K., Paulraj, D.	CSE	Journal of Ambient Intelligence and Humanized Computing	18685137	https://link.springer.com/journal/12652	https://doi.org/10.1007/s12652-020-02455-4
Building energy time series data mining for behavior analytics and forecasting energy consumption	Balachander, K. Paulraj,D.	CSE	KSII Transactions on Internet and Information Systems	1976-7277	https://itiis.org	https://doi.org/10.3837/tiis.2021.06.001
Optimal relay and channel selection schemes for multi constrained QoS multicast routing in cognitive radio adhoc networks	Indumathi, G.	CSE	International Journal of Communication Systems	1074-5351	https://onlinelibrary.wiley.com/doi/10.1002/dac.4674	https://doi.org/10.1002/dac.4674
Fuzzy assisted fog and cloud computing with MIoT system for performance analysis of health surveillance system	Selvakanmani, S. Sumathi, M.	CSE	Journal of Ambient Intelligence and Humanized Computing	18685137	https://link.springer.com/journal/12652	https://doi.org/10.1007/s12652-020-02156-y
Predictive analysis of student academic performance and employability chances using HLVQ algorithm	Subramanian, D.V.	CSE	Journal of Ambient Intelligence and Humanized Computing	18685137	https://link.springer.com/article/10.1007/s12652-022-04150-y	https://doi.org/10.1007/s12652-019-01674-8

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Hybrid Cloud Data Protection Using Machine Learning Approach	GladisPushparathi, V.P	CSE	Studies in Big Data	21976503	https://link.springer.com/chapter/10.1007/978-3-030-75657-4_7	https://doi.org/10.1007/978-3-030-75657-4_7
Pattern Mining—FTISPAM Using Hybrid Genetic Algorithm	Pushparathi, G.	CSE	Studies in Big Data	21976503	https://link.springer.com/book/10.1007/978-3-030-75657-4	https://doi.org/10.1007/978-3-030-75657-4_16
Multimodal biometric algorithm using IRIS, finger vein, finger print with hybrid GA, PSO for authentication	Sujatha, E. SathiyaJebaSundar, J. Deivendran, P. Indumathi, G.	CSE	Lecture Notes on Data Engineering and Communications Technologies	23674512	https://link.springer.com/chapter/10.1007/978-981-15-8335-3_22	https://doi.org/10.1007/978-981-15-8335-3_22
An optimal metaheuristic optimization based ElGamal public key cryptosystem for privacy in IoT environment	Devi, P. Sathyalakshmi,S. Subramanian, D.V.	CSE	International Journal of Systems Assurance Engineering and Management	9756809	https://link.springer.com/journal/13198	https://doi.org/10.1007/s13198-021-01173-0
Machine Learning Based Competent Routine And Effective Management Onwaste Prediction Analysis For Smart City Garbage Disposal	Galdispushparathi, D.V.P.	CSE	Utkal Historical Research Journal	2021	0976-2132	https://utkaluniversity.ac.in/utkal-historical-research-journal/

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Federated Data Management In Distributed Cloud Using Surrogate Technique	Galdispushparathi, D.V.P.	CSE	NIU International Journal of Human Rights	2021	2394 – 0298	https://niu.edu.in/niuijhr/
Fetal Brain Abnormalities Detection And Classification Using Region Growing Approach	Galdispushparathi, D.V.P.	CSE	Utkal Historical Research Journal	2021	0976-2132	https://utkaluniversity.ac.in/utkal-historical-research-journal/
Neural Network Based Refine Observation For Kidney Stones	Galdispushparathi, D.V.P.	CSE	NIU International Journal of Human Rights	2021	2394 – 0298	https://niu.edu.in/niuijhr/
A nature-inspired meta-heuristic paradigm for person identification using multimodal biometrics	M.Vijay	ECE	Concurrency and Computation: Practice and Experience	1532-0626	https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.6420	https://doi.org/10.1002/cpe.6420
GlioMeNet: Brain tumor analysis using faster R-CNN	SethuramRao, G. Vydeki,D.	ECE	2nd Global Conference for Advancement in Technology, GCAT	978-1-6654-1836-2	https://ieeexplore.ieee.org/document/9587605	https://doi.org/10.1109/GCAT52182.2021.9587605
An efficient adaptive threshold-based dragonfly optimization model for cooperative spectrum sensing in cognitive radio networks	Dr.B.Sridevi	ECE	International Journal of Communication Systems	1074-5351	https://onlinelibrary.wiley.com/journal/10991131	https://doi.org/10.1002/dac.4829

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A hybrid-supervised learning model for compressive spectrum sensing in fifth generation(5G) cognitive Radio enabled internet of things (IoT) networks	Dr.B.Sridevi	ECE	International Journal of Communication Systems	10745351	https://onlinelibrary.wiley.com/journal/10991131	https://doi.org/10.1002/dac.4797
Diagnosing Cancer Cells Using Histopathological Images with Deep Learning	Vijay, M.	ECE	International Conference on Wireless Communications, Signal Processing and Networking, WiSPNET2021	978-1-6654-4086-8	https://ieeexplore.ieee.org/Xplore/home.jsp	https://doi.org/10.1109/WiSPNET51692.2021.9419468
A structured support vector machine for hyperspectral satellite image segmentation and classification based on modified swarm optimization approach	Manju, S. Helenprabha,K.	ECE	Journal of Ambient Intelligence and Humanized Computing	1868-5145	https://link.springer.com/article/10.1007/s12652-019-01643-1	https://doi.org/10.1007/s12652-022-03966-y
Securing Privacy Using Optimization and Statistical Models in Cognitive Radio Networks	Sridevi, B.	ECE	Computer Systems Science and Engineering	0267-6192	https://www.techscience.com/csse/v42n2/46108	https://doi.org/10.32604/csse.2022.021433
Efficient tumour detection from brain MR image with morphological processing and classification using unified algorithm	G. SethuramRao	ECE	International Journal of Medical Engineering and Informatics	17550653	https://www.inderscienceonline.com/doi/abs/10.1504/IJMEI.2021.118762	https://doi.org/10.1504/IJMEI.2021.118762
Design of Multistar Fractal Microstrip Patch Antenna for Multiband Application	JothiChitra, R.	ECE	Lecture Notes in Networks and Systems	978-981-33-4686-4	https://link.springer.com/book/10.1007/978-981-33-4687-1	https://doi.org/10.1007/978-981-33-4687-1_31

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Unhindered Safety Monitoring System for Underground Workers	Shanmugaraj, G.	ECE	Lecture Notes in Networks and Systems	978-981-33-4686-4	https://link.springer.com/book/10.1007/978-981-33-4687-1	https://doi.org/10.1007/978-981-33-4687-1_18
Design of a 48 V BLDC Motor for Military Application	Moorthy, G. Shanmugaraj, G. SankarRaj, R. Gunavathi, P. Jeyaprakashini, R.	ECE	Lecture Notes in Networks and Systems	978-981-33-4686-4	https://link.springer.com/book/10.1007/978-981-33-4687-1	https://doi.org/10.1007/978-981-33-4687-1_32
Enhanced SURF- and Wavelet-Based Underwater Image Stitching	Sridevi, B.	ECE	Lecture Notes in Networks and Systems	2367-3389	https://link.springer.com/chapter/10.1007/978-981-33-4687-1_33	http://dx.doi.org/10.1007/978-981-33-4687-1_33
Wearable Jacket for Posture Correction Using Flexible Fabric Stretch Sensor for Working Age Groups	Jijin Godwin, J.	ECE	Lecture Notes in Networks and Systems	978-981-33-4686-4	https://link.springer.com/book/10.1007/978-981-33-4687-1	https://doi.org/10.1007/978-981-33-4687-1_30
JOJO—A Social Media Application with a Live Map Interface to Advance Social Security	Pughazhendhi, A. Muruganandam, S.B. Sridevi, B.	ECE	Lecture Notes in Networks and Systems	23673370	https://link.springer.com/book/10.1007/978-981-16-0666-3	https://doi.org/10.1007/978-981-16-0666-3_37
Detection of Leukemia and Its Types Using Combination of Support Vector Machine and K-Nearest Neighbors Algorithm	Jijin Godwin, J.	ECE	Lecture Notes in Networks and Systems	978-981-16-0666-3	https://link.springer.com/book/10.1007/978-981-16-0666-3	https://doi.org/10.1007/978-981-16-0666-3_35

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IoT Based Intelligent Ambulance Monitoring and Traffic Control System	Mr.J.Jijin Godwin	ECE	Intelligent Systems Reference Library	978-3-030-57834-3	https://link.springer.com/book/10.1007/978-3-030-57835-0	https://doi.org/10.1007/978-3-030-57835-0_20
Intelligent Wearable Sensor Band for Underground Working People	Mr.SethuramanRaoMr.S.Karthikeyan	ECE	Intelligent Systems Reference Library	978-3-030-57834-3	https://link.springer.com/book/10.1007/978-3-030-57835-0	https://doi.org/10.1007/978-3-030-57835-0_2
IoT Based Emergency Alert System	Chinnusamy, K.	ECE	Intelligent Systems Reference Library	978-3-030-57835-0	https://link.springer.com/book/10.1007/978-3-030-57835-0	https://doi.org/10.1007/978-3-030-57835-0_21
Investigation on photovoltaic system based asymmetrical multilevel inverter for harmonic mitigation	Vivek, P.	EEE	Proceedings of the 7th International Conference on Electrical Energy Systems, ICEES 2021	978-172817612-3	https://ieeexplore.ieee.org/document/9383641	https://doi.org/10.1109/ICEES51510.2021.9383641
Educational tool for analysis of proportional integral and fractional order proportional integral controlled quadratic boost converter system using MATLAB/simulink	J.NanadhaGopal	EEE	International Journal of Electrical Engineering and Education	207209	https://journals.sagepub.com/	https://doi.org/10.1177/00207209211013435
Current mode fractional order PID control of wind-based quadratic boost converter inverter system with enhanced time response	NandhaGopal J	EEE	Circuit World	0305-6120	https://www.emerald.com/insight/content/doi/10.1108/CW-03-2020-0038/full/html	https://doi.org/10.1108/CW-03-2020-0038

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Model predictive controller–based quadratic boost converter for WECS applications	NandhaGopal, J. Muthukaruppasamy, S.	EEE	International Transactions on Electrical Energy Systems	2050-7038	https://onlinelibrary.wiley.com/doi/abs/10.1002/2050-7038.13133	https://doi.org/10.1002/2050-7038.13133
Network Virtualization Incorporation and Projection System Technologies Using Block Chaining	Sailaja,P.	IT	Journal of Physics: Conference Series	1742-6596	https://iopscience.iop.org/journal/1742-6596	https://doi.org/10.1088/1742-6596/1964/4/042054
Learning Based Download of Health Care Confidentiality Apps Iot with Power Storage	Sailaja,P.	IT	Journal of Physics: Conference Series	1742-6596	https://iopscience.iop.org/journal/1742-6596	https://doi.org/10.1088/1742-6596/1964/4/042094
Deep Analysis of Covid-19 Receptors Recognition and Locating in Pulmonary Ultrasound	Sailaja, P. Jagadish Kumar, N.	IT	Journal of Physics: Conference Series	1742-6596	https://iopscience.iop.org/journal/1742-6596	https://doi.org/10.1088/1742-6596/1964/4/042019
An Intelligent Wheelchair for Disabled Person	P.Sailaja	IT	Lecture Notes in Networks and Systems	978-981-33-4686-4	https://link.springer.com/book/10.1007/978-981-33-4687-1	https://doi.org/10.1007/978-981-33-4687-1_37
Predator–Prey based firefly optimization for PV Module parameters extraction	Madhu, B.	Mechanical	Energy Reports	2352-4847	https://www.sciencedirect.com/journal/energy-reports	https://doi.org/10.1016/j.egyr.2022.10.203

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Effect of fins and silicon dioxide nanoparticle black paint on the absorber plate for augmenting yield from tubular solar still	Dr.D.MageshBabu Dr.B.Madhu	Mechanical	Environmental Science and Pollution Research	9441344	https://link.springer.com/journal/11356	https://doi.org/10.1007/s11356-021-13126-y
Role of Surface Functionalized Crystalline Nano-silica on Mechanical, Fatigue and Drop Load Impact Damage Behaviour of Effective Stacking Sequenced E-glass Fibre-reinforced Epoxy Resin Composite	Heaven Dani, M.S	Mechanical	Silicon	1876-9918	https://link.springer.com/journal/12633	https://doi.org/10.1007/s12633-020-00486-2
Applications of Two Separate Methods to Deal with a Small Dataset and a High Risk of Generalization	Athikesavan, D.	Mechanical	Proceedings - 2nd International Conference on Smart Electronics and Communication, ICOSEC 2021	978-1-6654-3368-6	https://ieeexplore.ieee.org/Xplore/home.jsp	https://doi.org/10.1109/ICOSEC51865.2021.9591870
Micro structure and finite element analysis of fitness and unfitness square butt joint of aluminium based nano composite plates	Deepakaravind V	Mechanical	Materials Today: Proceedings	2214-7853	https://www.sciencedirect.com/science/article/abs/pii/S2214785321000481?via%3Dihub	https://doi.org/10.1016/j.matpr.2021.01.034
Evaluating the Mechanical and Tribological Properties of DLCNanocoatedAluminium 5051 Using RF Sputtering	Kaliappan, S.	Mechanical	Journal of Nano materials	16874110	https://www.hindawi.com/journals/jnm/	https://doi.org/10.1155/2021/8428822

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Experimental Investigation on Mechanical Properties of Carbon Nanotube-Reinforced Epoxy Composites for Automobile Application	Kaliappan, S.	Mechanical	Journal of Nano materials	1687-4129	https://www.hindawi.com/journals/jnm/	https://doi.org/10.1155/2021/4937059
Processing and characterization of carbon nanofibre composites for automotive applications	Dr.S.Kaliappan	Mechanical	Journal of Nano materials	16874110	https://www.hindawi.com/journals/jnm/	https://doi.org/10.1155/2021/7323885
Improvement on Mechanical Properties of Submerged Friction Stir Joining of Dissimilar Tailor Welded Aluminum Blanks	Kaliappan, S	Mechanical	Advances in Materials Science and Engineering	16878442	https://www.hindawi.com/journals/amse/2021/3355692/	https://doi.org/10.1155/2021/3355692
Analysis the mechanical properties and material characterization on Magnesium Metal Matrix Nano composites through stir casting process	Deepakaravind, V.	Mechanical	Materials Today: Proceedings	2214-7854	https://www.sciencedirect.com/science/article/abs/pii/S2214785321000559	https://doi.org/10.1016/j.matpr.2021.01.041
Characterization and effect of the use of safflower methyl ester and diesel blends in the compression ignition engine	Kaliappan, S	Mechanical	Oil and Gas Science and Technology	12944475	https://ogst.ifpenergiesnouvelles.fr/articles/ogst/full_html/2021/01/ogst200363/ogst200363.html	https://doi.org/10.2516/ogst/2021011

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Effect of Design Parameters on Fresh Water Produced from Triangular Basin and Conventional Basin Solar Still	B. Madhu, D. Mageshbabu,	Mechanical	International Journal of Photo energy	1110-662X	https://www.hindawi.com/journals/ijp/2021/6619138/	https://doi.org/10.1155/2021/6619138
Experimental analysis on single and double basin single slope solar still with energy storage material and external heater	Raj Kamal, M.D. Parandhaman, B. Madhu,B. MageshBabu, D.	Mechanical	Materials Today: Proceedings	2214-7853	https://www.sciencedirect.com/science/article/abs/pii/S2214785320401610?via%3Dihub	https://doi.org/10.1016/j.matpr.2020.12.444
Evaluating the Hardness and Microstructural Analysis of Reinforcing the Nano Silicon Carbide and Nano Zirconium Oxide in Hybrid Al6061 Metal Matrix Composite	Deepakaravind, V.	Mechanical	Lecture Notes in Mechanical Engineering	21954356	https://link.springer.com/chapter/10.1007/978-981-15-5947-1_19	https://link.springer.com/chapter/10.1007/978-981-15-5947-1_19
Optimization of Shell and Tube Condenser for Low Temperature Thermal Desalination Plant	Kaliappan, S.	Mechanical	E3S Web of Conferences	2267-1242	www.e3s-conferences.org	https://doi.org/10.1051/e3sconf/202130901011
Mn-doped nickeltitanate ($Ni_{1-x}Mn_xTiO_3$) as a promising support material for PdSnelectrocatalysts for methanol oxidation in alkaline media	Saraswathy, R.	S&H	RSC Advances	2046-2069	https://pubs.rsc.org/en/content/articlelanding/2021/ra/d1ra02883a	https://doi.org/10.1039/d1ra02883a

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Enhanced photocatalytic degradation efficiency of graphitic carbon nitride-loaded CeO_2 nanoparticles	Subashini, A.	S&H	Chemical Physics Letters	0009-2614	https://www.sciencedirect.com/science/article/abs/pii/S000926142100124X?via%3Dihub	https://doi.org/10.1016/j.cplett.2021.138441
Brain–computer interface for assessment of mental efforts in e-learning using the non markovian queueing model	Balamurugan, B. Mullai,M. Soundararajan, S. Selvakanmani, S.	S&H	Computer Applications in Engineering Education	1099-0542	https://onlinelibrary.wiley.com/doi/abs/10.1002/cae.22209	https://doi.org/10.1002/cae.22209
Ultrasonic velocity studies of benzoic acid and substituted benzoic acids in aqueous mixed solvent systems	Jagan Raj, S.	S&H	Rasayan Journal of Chemistry	0974-1496	http://www.rasayanjournal.co.in	http://dx.doi.org/10.31788/RJC.2021.1445767

Medical Quora Tagging using MATAR and LDA Algorithm

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Abstract. The success of clustering or classification methods the detection of relevant textual formats is incredibly meaningful. The high dimensionality and irrelevance of textual materials was subjected to text records. Existing methods lack integration and are particularly vulnerable to original value. Metaheuristic algorithms are also applied to solve the challenges of standard classification algorithms. In this paper, an enhanced Latent Dirichlet Assignment clustering method & Inter Modeling for Tag Suggestion rating system is documented to boost correlation - based & identification efficiency to suggest labels with material modern web labels that promotes the exchange of medical information using unmonitored data through question-answering. For accurate tagging, Methods like POS marking, Hopping, Whistles& Stopping words are being used for speech recognition. The efficiency of the evolved architectures is compared to the standard methods, by using specificity of the recommendation, defining features, sensitivity, plain word and speed. The findings reveal that the classification and grouping scheme of the proposed structure succeeds traditional textual record approaches.
Keywords: Allocation of Residual Dirichlet, Unsupervised classification, Data grouping, POS labelling, Lemmatisation.

1. Introduction

Scanning is an effective means of categorising information, and also to better support automated labeling, label advice has been used. [1] The main idea of this article is the automatic marking of text from unmonitored large datasets. After entering into the portal, the user can check for any questions relating to diseases or disorders. That information is visible throughout the format of a text. While using keywords to check for a certain illness or its effects, the words throughout the questions were compared it against terminology and in index. It [2] connection system method includes preparation of both the database for both the words sought. Because as study focus mostly on automated labelling of unmonitored results, for such a reason, it requires [3] both aggregation and grouping. While automatic word labeling represents a problem, far beyond obvious complexities of energy and cost, for two principal reasons: A) labeling isn't really ideal [4] because of user mistakes; & b) classification taxonomies that change with the appearance of the data, especially given the vast amount of medicine-related information created online on a daily basis. [5] Subsequently, with the exclusion or inaccurate assignment of identifiers, unsupervised data always remains essentially unorganised. Auto identification is the approach attributable to the preparation of the database utilizing data science with power of peer design.

ORIGINAL PAPER

SVM-based compliance discrepancies detection using remote sensing for organic farms

Markkandan S[1] · Aditi Sharma[2] · Surendra Pal Singh[3] · Vikas Solanki[4] · Selvakanmani Sethuramalingam[5] · Simar Preet Singh[6]

Abstract

Organic farming is well-known as a traditional farming method which is responsible in producing the hygienic food product. The organic farm is the integration of agricultural production and system management. Organic farming includes the usage of low pesticides, maintains low nitrate leaching in groundwater as well as surface water, uses animal wastes, and minimizes soil erosion. Crop rotation, natural pest control, and barrier nets are the conventional methods of fertilization techniques. Organic farming makes use of recycling resources comparatively to using chemical fertilizers. A natural compost, animal manure with crop rotation implementation will improve the soil quality. Thus, organic foods are highly hygienic without causing any side effects. A few challenges arise during the implementation of organic farms. These challenges are overcome only via the smart approach and planning and coordination of public and government officials. Organic seeds take a long time to grow, and it is an economically high cost to implement this type of farming. Smart transport and supply of organic products to any location is a bit difficult. The proper selection of seed and selection of land with the suitable climate and soil texture that has to be verified for cultivation is the restrains of organic agriculture. Soil moisture content and sufficient water for the crop are attained through the usage of remote sensing in agricultural farms. The food crisis can be managed via the adaptation of remote sensing. The sensor collects information about the soil, water supply, temperature, and other environmental factors to the control unit. Initially, the infected plant with leaves will be isolated as single image as leaf, and each leaf would be diagnosed with various kernel functions including Cauchy, Invmult, and Laplacian kernel. The proposed system uses image processing to capture the images, and the remote sensing sensor generates the information to the Support Vector Machine which classifies the infected plant or part of the plant from the healthy plant based on the features extracted. The proposed Support Vector Machine (SVM) used a remote sensing technique in detecting the compliance discrepancies in an organic farm.

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Traffic sign detection and recognition using RGSM and a novel feature extraction method

M. Sudha[1] · **Dr.V.P. Galdis pushparathi**[1]

Abstract

Independent mobility involves various challenges to Visual Impairment or Blindness (VIB) people. Most of the mobile devices are accessible to people with VIB that makes the use of available specific applications in online stores. Some applications support the independent mobility for VIB users in safely crossing road. The traffic sign detection and recognition (TSDR) is an essential challenge to VIB people. Existing research offers various techniques to detect the traffic sign in an open road environment. However, this system did not correctly recognizes the traffic sign. This research addressed the problem of traffic sign recognition to support the VIB people for safely crossing the road. Traffic sign detection and recognition are achieved by using novel Random Gradient Succession with Momentum (RGSM) with novel shape specific feature extraction method. Finally, the CNN classifier will be utilized to categorize the trained output labels, which then converts the traffic sign into the audio signal in both the training phase and the testing phase. The results are estimated for the performance measures like accuracy, specificity, precision, F-score, Jaccard coefficient, kappa, and Dice coefficient. Estimation of the results shows a better improvement for this parameter on comparing the proposed system with that of the existing methods. The proposed traffic sign detection system involves the robust audio signal processing that increased the feature extraction and classification performances. The suggested solution solves the obstacles faced by visually impaired peoples for independent mobility.

Keywords Edge preserved bilateral filtering · RGSM · CNN

1 Introduction

Traffic sign detection and the development of an automated guidance system for the visually impaired people is an essential one on considering the condition of Indian roads. It is very difficult for the visually impaired people, which the traffic sign may be missed prominently. The traffic signs play a second part that is to normalize the traffic and the next is to indicate the road state stated from Maldonado et al. [1]. This sign can be categorized as the shape and color. There is a lot of chance for an accident to occur if the visually impaired people didn't notice a stop sign. Also, for the visually impaired peoples, it will be beneficial in crossing the roads safely- Belongie et al. [2]. The computer vision community is turned mainly on

the recognition of object patterns instead of the traffic signs-Liatara et al. [3]. The shape feature is implemented in various fields to detect the shapes of the computer sketch. The intention of this is to identify the different objects. Next, the edges are then detected by using some appropriate algorithm. Also, the information regarding the boundary shape may play a crucial role in the aerial imaginary, and the local features were also useful, which provides a clue for recognition of the object. On choosing the pixels having a high-intensity region, it is necessary to examine the exact boundary shape of that pixel in which the pixels are lying- Moon et al. [4]. An intelligent traffic sign recognition system may reduce traffic accidents and are helpful in the visually impaired persons for crossing the road safely- De La et al. [5].

1.1 Contribution of the research

1.1.1 Problem identification

In existing, there are various traffic sign recognition and detection methods for the use of visually impaired peoples. The following problems are identified in the existing methods:

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ANN and fuzzy based household energy consumption prediction with high accuracy

K. Balachander[1] · D. Paulraj[2]

Abstract

Timeline Data is gathered according to different time intervals, which are day after day after week or month after month, for updating properties and rationing institutional resilience it is important to consider the usage of systems and lead to reduced lifespan Such details illustrate the use of the system as well as its interaction with time, like day, week, month and time of year, and the relation between the equipment and a relative, essential factors for the effects of the usage of their potency and the expected movement by customers. This is because it is not significant to determine the various relations between specific devices utilizing concurrent data. In addition, precise relations between interval-based instances in which specific system usage continue for certain duration cannot be calculated. To address these difficulties, we propose supervised energy time series data clustering and frequent pattern mining analysis as well as a Bayesian network forecast for energy use. However, the AI model is a univariate construct based on past use-values. Neural Networks have the favored position that can estimate nonlinear limits. Everything together they have an approximate usage of vitality, the ANN adds in a planning knowledge table between the use of vitality (EC) and its determinants. SVM is capable of reliably calculating knowledge on time structure while the basic system mechanism is frequently nonlinear and not set. Also, certain nonlinear mechanisms such as multilayer perceptron have been shown to flank SVM. The single data has been converted into a multivariate and the ANFIS has been selected as it transmits both the AI (ANN) and Fuzzy Inference Method (FIS) points of concern. ANFIS yields the accuracy, RMSE, and MAPE among genuine and anticipated power utilization of 91.19%, 0.4076 and 0.9049 which is moderately low.

Keywords ARIMA · Fuzzy time series · ANN · SVR · Energy consumption

1 Introduction

Power is basic in society, regardless of whether it is for home use or in the different sections of the economy. Routine exercises, for example, sitting in front of the TV or utilizing the climate control system are just conceivable through the electric burden. The power load section gets a lot of energy from the transmission framework and disperses it to the last customers, homes, independent ventures, and businesses. The power load supply is one of the most testing

administrations of current society. A political or monetary transition is taking place in the energy segment around the globe (Amara et al. 2019). Box and Jenkins present in the 70 s, made significant work in contemplating applications made out of scientific straight models (Box et al. 2013) and the generalized prediction model stream appears in Fig. 1. These models speak to Autoregressive (AR) and Moving Averages (MA) forms. When the AR forms are required to specifically combine their previous characteristics in the current time structure evaluation. The MA procedures presume that this interest is an aspect of the structure determined by random block passes or bothers. An autoregressive moving normal model (ARMA, exponential smoothing and regression models are frequently hard to display the power load with high correctness's because of the nonlinearity of the heap naturally (Ding et al. 2011). The ARIMA model, to create progressively exact pinnacle load estimating of structures. The option of an ARIMA layout was designed using the auto ARIMA function. Numerous useful investigations

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Building Energy Time Series Data Mining for Behavior Analytics and Forecasting Energy consumption

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Abstract

The significant aim of this research has always been to evaluate the mechanism for efficient and inherently aware usage of vitality in-home devices, thus improving the information of smart metering systems with regard to the usage of selected homes and the time of use. Advances in information processing are commonly used to quantify gigantic building activity data steps to boost the activity efficiency of the building energy systems. Here, some smart data mining models are offered to measure, and predict the time series for energy in order to expose different ephemeral principles for using energy. Such considerations illustrate the use of machines in relation to time, such as day hour, time of day, week, month and year relationships within a family unit, which are key components in gathering and separating the effect of consumers behaviors in the use of energy and their pattern of energy prediction. It is necessary to determine the multiple relations through the usage of different appliances from simultaneous information flows. In comparison, specific relations among interval-based instances where multiple appliances use continue for certain duration are difficult to determine. In order to resolve these difficulties, an unsupervised energy time-series data clustering and a frequent pattern mining study as well as a deep learning technique for estimating energy use were presented. A broad test using true data sets that are rich in smart meter data were conducted. The exact results of the appliance designs that were recognized by the proposed model were filled out by Deep Convolutional Neural Networks (CNN) and Recurrent Neural Networks (LSTM and GRU) at each stage, with consolidated accuracy of 94.79%, 97.99%, 99.61%, for 25%, 50%, and 75%, respectively.

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Optimal relay and channel selection schemes for multiconstrained QoS multicast routing in cognitive radio ad hoc networks

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Summary

During multicasting in cognitive radio ad hoc network (CRAHN), apart from energy consumption, interchannel interference, path delay, and channel switching delay should be minimized. The channel selection should be done, based on spectrum opportunities and channel quality. Hence, the multicast routing problem becomes a multiconstrained QoS routing problem. This paper proposes optimal relay and channel selection schemes (ORCS) for multiconstrained QoS multicast routing in CRAHNs. For multicast tree construction, distributed minimum spanning tree (DMST) is used. For meeting the delay, energy, and interference constraints, relay nodes are chosen with minimum path delay, less energy consumption, and minimum interference. For effective channel assignment, channels with good channel quality, maximum spectrum accessibility, and sufficient common slots are selected. By simulation results, it has been shown that the proposed ORCS minimize the energy consumption and end-to-end delay.

1 | INTRODUCTION

The progression of technology in recent decades has resulted in the development of wireless ad hoc networks composed of devices that are self-organizing and can be arrayed without the support of infrastructure. With the propagation of wireless devices, spectra are progressively becoming congested.[1] Cognitive radio (CR) networks can improve the spectral efficiency by manipulating the existing wireless spectrum. So they have gained excessive considerations in recent years. The secondary users (SUs) are provided with CRs that can sense and access the "spectrum hole" which is unused by the primary users (PUs) in this kind of network. This is because nodes have diverse ambience in CR networks and the SUs have different accessible spectrum bands or networks. This typical feature brings out added difficulties for harmonization and communication amid nodules in CR systems, specifically, in CR ad hoc networks (CRAHNs). Since the infrastructure is not fixed in CRAHN, the harmonization and communication are more convoluted, and each node can perform as a router for all its neighbors.[2]

Due to the influence of the relative position between the sending and receiving nodes, environment and other factors, communication quality may vary across channels that can be accessed. This tends to various transmission rates for different channels.[3]

Poor attention has been gained for multicast in CR networks. When the dynamic ingestion for the multicast trees in CR systems is estimated, we ought to take into consideration the energy consumed for detecting the accessibility of the network as well as the energy utilized for broadcasting. There is a significance in the proportion of the sensing energy particularly when spectrum opportunities turn out unusual. Much more energy is spent in this case for sensing the

Fuzzy assisted fog and cloud computing with MIoT system for performance analysis of health surveillance system

S. Selvakanmani[1] · M. Sumathi[2]

Abstract

The clouds are the most common medium for aggregating, storing and analyzing data from the Internet of Things (MIoT) based medical therapy applications used by patients or pharmaceutical knowledge in the conventional health care monitoring network. Mobile Web infrastructure, remote communication, and networking can cause data and other delays. In addition, a slight delay in response to the analyzed data could lead to incorrect decisions about care in case of an emergency that could jeopardize the life of the patient. Recently, an indirect coat of fog or edge projection has been utilized for the dispersed accessing and depositing data of MIoT to resolve networking and contact delays. Fuzzy Assisted Fog and Cloud Computing (FAFCC) with MIoT devices become the most favored traditional healthcare surveillance system approach. In this paper, it provides an application model for such a framework to illustrate how machine assets cost reduction is assured while efficiency limitations are guaranteed. Health access requests held in a fuzzy assisted fog-cloud delivery system. This model is established on a fuzzy system and can determine the minimum amount of computing assets needed to meet fog along with cloud projections agreement on Employment Level (SLA). The proposed model is approved and checked via distinct action simulator Java Modeling Tools (JMT). The results show that the proposed model can predict the response time of the system and accurately define the number of computing resources for health data services to achieve better performance.

Keywords Fog and cloud computing · Internet of things · Healthcare surveillance system

1 Introduction

Medical IoT (MIoT) tools are usually fitted with various sensors, detecting and gathering physical evidence for a variety of health care applications such as medical imaging, the administration of clinics, patient self-executive, their safety, and analytical intelligence device in the sense of health care services (El Kafhali et al. 2018). The cloud model is, however, become an interesting integral way of compensating for aforesaid restraints, given computer and depot restraints for IoT system (Mahmud et al. 2018). The IoT structure will convert the circumstances of a measured substantial extent in digital data, which is captured, stored and examine in the cloud (pressure, temperature, vibration, moisture, etc.). The

cloud offers other advantages such as mass storage, self-service connectivity requirement, network aggregation, managed monitoring, scalability, virtuality, flexibility, low-cost infrastructure, software alignment and enhanced protection (Kiran et al. 2014).

The integration of cloud and IoT has become the preferred framework for combining IoT and cloud computing assets. Medical services based on Cloud-IoT can have a significant role to play in enhancing patient quality of life (Baskar et al. 2019). In addition, the latest architectural design model can be used to support physicians and medical staff tracks patient treatment, create customized healthcare services such as alert and prescription alerts, and provide comprehensive access to on-line health data. It can also be used to track the everyday health habits of seniors and older people in real-time. Cisco Inc. by 2020 predicts the connection to the internet exceeding 50 billion IoT systems (Yang et al. 2016) leading to significant scalability matter also cloud's capacity to access data of IoT in problem-solving time. Localized storage and processing near to the IoT devices are necessary to overcome these problems. The novel progression, however,

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ORIGINAL RESEARCH

Predictive analysis of student academic performance and employability chances using HLVQ algorithm

K. Subhash Bhagavan[1] · J. Thangakumar[1] · D. Venkata Subramanian[2]

Abstract

Educational Data Mining (EDM) uses various data mining tools and methods for different applications in the field of education. EDM applications and techniques follow both pure and practical research objectives to enhance the learning process and to improve and develop learning quality. Educational data mining helps in forecasting the future patterns to make the organizations or institutions provide quality based education to the learners. Educational institutions still struggle with graduation and employment toll. It is an appropriate demonstration of a "surplus of information but a starvation of knowledge". It is essential to identify the prospective ability of student by predicting the present performance by means of earlier period performance and awareness to ensure the student start the career and move ahead in the right path for better quality. This paper presents a novel hybrid algorithm, HLVQ to predict student academic performance and employability chances.

Keywords Student placement · Academic performance · Data mining · EDM · LVQ · Classification

1 Introduction

Educational Data Mining (EDM) aims at identifying and resolving research issues in educational field. EDM uses a range of data mining techniques in analyzing the education data (Baker and Yacef 2009). EDM utilizes the data used by the students in order to discover new knowledge that enables in validating education systems as well as in enhancing the quality of education and learning process (Romero et al. 2004).

In recent times, educational institutions are maintaining the student data such as enrollment details, attendance and internal and external marks in large volumes. A range of data mining tools and techniques are used in analyzing this data to predict the students' performance (Dutt et al. 2017). It includes different academic attributes identified that the student performance can be assessed using the two major variables, student's grade and attendance record. Students' grade and attendance are considered as direct and longstanding requirements in assessing the students' performance at end of the year.

The information thus generated enables the teachers, managers and coordinators in assessing the student's performance there by taking the necessary precautions in order to improve the students' performance. The variables discovered enables in predicting whether a student succeeds or not in the end examination of the course, in identifying the student learning issues and in solving them, in taking necessary precautions thereby enhancing the students' success rate and employability chances (Fernandes et al. 2019).

Researchers reported that there are many prediction models existing with diverse approaches in predicting student performance, but there is no conviction that these predictors could accurately determine whether the student will be placed (Parmar et al. 2015). Prediction of outcome will help to channelize labors of students and educators to take counteractive measures towards the improvement of the student through the course (Al-Radaideh et al. 2011).

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Advanced Soft Computing Techniques in Data Science, IoT and Cloud Computing pp 151–166

Hybrid Cloud Data Protection Using Machine Learning Approach

D. Praveena ✉, S. Thanga Ramya, V. P. Gladis Pushparathi, Pratap Bethi & S. Poopandian

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Abstract

In today's digital world, information created by Internet of Things (IoT) devices has expanded drastically. This expansion is due to an increase in the number of IoT devices associated with the internet. Hybrid cloud computing provides enormous support to these emerging IoT devices in processing vast data. However, security is a challenging issue because

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Advanced Soft Computing Techniques in Data Science, IoT and Cloud Computing, pp 353–369

Pattern Mining—FTISPAM Using Hybrid Genetic Algorithm

L. Mary Gladence, S. Shanmuga Priya, A. Shane Sam, Gladis Pushparathi & E. Brumancia

Abstract

An innovative approach is elegantly launched to effectively identify the medical behavioural changes of the patients. With this end in view, the sequential change patterns are extracted at two diverse time intervals, with the help of the fuzzy time interval sequential change pattern mining employing the HGA technique. However, the pattern mining at two

Multimodal Biometric Algorithm Using IRIS, Finger Vein, Finger Print with Hybrid GA, PSO for Authentication

E. Sujatha, J. Sathiya Jeba Sundar, P. Deivendran, and G. Indumathi

Abstract Biometric is emerging and promising technology to identify and authenticate human being. It is more robust, accurate, and accurate. It is hard to imitate, forge, share, distribute and cannot be stolen, forgotten. After September 11, 2001, incident, the biometric technologies are focused more. Integrating more than one biometric trait yields a promising solution to provide more security. It manages the variety of demerits in unimodal biometric systems such as non-universality, noise in sensed data, intra-class variations, distinctiveness, and spoof attacks. The traditional way of authentication a human and their identity is resolved. The proposed method proves with experimental results on multimodal biometric algorithm for authentication using normalized score-level fusion techniques and hybrid Genetic Algorithm and Particle Swarm Optimization for optimization in order to reduce the parameters considered for evaluation as false acceptance rate and false rejection rate and to enhance accuracy. In this proposed research work, it integrates iris, finger vein, and finger print biometric traits chosen for their best biometric characteristics. The experiment is conducted by SDUMLA-HMT database, and the state-of-art algorithm is evaluated by metrics as false acceptance rate, false rejection rate, equal error rate, and accuracy for proving that the claimed identity as genuine or imposter.

Keywords Multimodal biometrics · Genetic Algorithm · Particle Swarm Optimization

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ORIGINAL ARTICLE

An optimal metaheuristic optimization based ElGamal public key cryptosystem for privacy in IoT environment

P. Devi[1] · S. Sathyalakshmi[1] · D. Venkata Subramanian[2]

Abstract Recent advancements in the field of internet of things (IoT) and networking technologies, maximum attention has been received in the field of privacy and security in IoT environment. The IoT devices are commonly employed to acquire real world person dataset, security and privacy pose a major challenging issue. To resolve these issues, this paper develops novel partially homomorphic encryption named ElGamal public key cryptosystem with optimal key generation using cross entropy with a red deer optimization algorithm (EGPKC-CERDA) for privacy preserving in IoT environment. The presented EGPKC-CERDA algorithm aims to focus on the IEEE 802.15.4 MAC standard where security field is kept at the MAC header. Besides, EGPKC technique with optimal authentication key creation is involved for secure authentication at the MAC header. Furthermore, the optimum key selection procedure for EGPKC is carried out by CERDA technique where cross entropy scheme is integrated into the RDA for improving the local and global optima. To assure the proficient results analysis of the EGPKC-CERDA algorithm, a series of experimentations were taken place and the results are investigated with respect to different dimensions. The resultant experimentation values ensured the superior outcome of the EGPKC-CERDA algorithm.

Keywords Internet of things · Privacy · Security · Public key cryptosystem · Optimal key generation

1 Introduction

With the rapid development of information technologies (IT), Internet of Things (IoT) links the real world and data community. It generally consists of an enormous number sensor nodes and servers. The prior one is accountable to collect data, and the next one is answerable to process the data, store the data and maintain situation knowledge of the entire method, so it creates an optimal solution (Cecchinel 2014; Abu-Elkheir et al. 2013; Perera et al. 2015). In current times, by the growth of hardware and network, a huge number of IoT application are developing incessantly, that leads to extraordinary accurateness, effectiveness, and economical advantages. Several IoT applications like smart city, smart health care, smart homes, social networking, smart grids, and smart phones, etc. have distinct operations and have modified the lifestyle. For instance, in smart health care applications, several medicinal sensor nodes are placed on the epidermis of a person which collects the real-world patient details. Physicians can examine the health status of the patient by observing the gathered data. In smartphones, a traveler might seek locations such as hotels, restaurants, etc. through location dependent services. In smart homes, sensor collects the information about the house-hold appliances and inform them to centralized

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MACHINE LEARNING BASED COMPETENT ROUTINE AND EFFECTIVE MANAGEMENT ONWASTE PREDICTION ANALYSIS FOR SMART CITY GARBAGE DISPOSAL

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Dr.B. Murugeshwari Professor and Head Department of Computer Science and Engineering Velammal Engineering College Chennai

Abstract—The crux of an effective waste management system is an efficient routing algorithm that aids to collect the garbage from the bins efficiently and thereby eliminate the overflow of the garbage bins. To automate the garbage collection process, the bins use a smart integrated sensing system. Three sensors (ultrasonic, load and gas sensors) are equipped in the proposed garbage bin to sense the level, weight and Carbon-di-oxide (CO_2) concentration of the garbage in the bin. A dedicated webpage is assigned to monitor the collected garbage bin sensor data continuously.

To schedule the route(s) and to allocate pickup vehicle(s) to collect the bins whose sensor data reaches a threshold a heuristic algorithm is proposed in this project. The primary aim of the proposed heuristic routing algorithm is to reduce the total usage cost of vehicles by minimizing total traversed distance. Predictive analysis algorithms will aid the pickup trucks to be used to the fullest capacity even though there are only few bins to collect so that better efficiency is achieved. In this project, simple linear regression and multiple linear regression predictive algorithms are applied to predict the bins (that will be filled in near future) to be added to the route that will help achieve maximum usage of truck capacity. The waste management web application allows the admin to add these bins to the route and authorize the same for the drivers. The project proposes to help the management to sustain a hygienic and better sanitized city.

Key words- Smart City; Smart Wastebin; Smart Management; Simple Linear Regression; Routing problem;

I. INTRODUCTION

Internet of Things (IoT) has taken priority in research among the technical communities due to the advances and popularity in sensing, propulsion, exchange of information and control. IoT is a broad domain providing many services, such as smart waste collection system for making a city smart, healthcare observation, transportation facility, logistics department to find vehicles or packages, etc.

IoT comprises very large number of devices interconnected to the internet. IoT is an integrated system comprising different physical entities such as various components, transportation system, constructions and other things—fixed with electronics, software, detectors, and network connectivity that make them capable to gather the information and exchange data. It allows to operate remotely through network framework, generating new opening for more direct incorporation of the physical world into computer-based systems, and enhances perfection, accurateness and financial benefits. With IoT, the technology (sensors and actuators) has become sophisticated to create smart and intelligent systems. Every object is separately identified is capable to work within the existing internet architecture. It is estimated that by 2020 nearly 50 billion components will be integrated into IoT.

Constant rise in population has lead to difficulty in maintaining the cleanliness of public areas and has also made garbage management to degrade staggeringly. This leads towards an unhygienic environment and is responsible for various types of disease in the locality. To eliminate the healthcare issues and improve the cleanliness, an 'IoT-based garbage management system' is proposed in this paper. Internet of Things (IoT) has brought a chance to build a smarter and a healthy city. Margins, column widths, line spacing, and type styles are built-in; examples of the type styles

FEDERATED DATA MANAGEMENT IN DISTRIBUTED CLOUD USING SURROGATE TECHNIQUE

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Abstract— The rapid growth in the distributed cloud environment offer infinite services over cloud environment. However, a cloud faces different challenges such as scarce bandwidth, limited energy due to dependency on single service provider, frequent disconnection of the database server. Federating with multiple service providers and caching frequently accessed data is an effective way to provide seamless data access in distributed cloud system. We propose a new federation scheme which federates two or more service providers using surrogate object for the purpose of reduced network congestion and data access delay. The federated data management in distributed cloud enables further reduction of costs due to partial replication of data to more surrogate objects.

Keywords—*Cloud Computing, Surrogate Object, Federated Data, Data Management.*

I. INTRODUCTION (*HEADING 1*)

Realistic platforms for Cloud computing are facing security threats from network attacks and system vulnerability. Computational Cloud is often used to execute a large number of user Datas at dispersed resource sites. Some of the Datas may be dispatched to multiple machine sites for distributed parallel execution. Thus, Data outsourcing becomes a major incentive in collaborative Cloud computing. Specifically, in a large-scale computational Cloud, distributed resource clusters work at different autonomous domains (ADs). Data executions are carried out across the domain boundaries, meaning that the Datas from one AD could be outsourced to another AD for faster execution. However, a major hurdle of such Data outsourcing is caused by network security threats. If a Cloud site is under attack, its resources may not be accessible from outside of the domain. Thus, a Data dispatched to that site may be delayed or failed after system infections leading to machine crashes. To enable more effective Data scheduling, it is desirable to know a priori the security demand (SD) from Cloud Datas, as shown in following Fig. and the trust level (TL) assured by a resource provider at the Cloud site. In a real life situation, asking the Cloud users to fully specify their SD is an unreasonable burden. This situation is illustrated with a simple Cloud Data submission request. In addition to the request for computing power under deadline and budget limits, the user wishes to simply express an SD level from high to low. Obviously, the scheduling of Datas has to take the risk factor into account. A practical Cloud Data scheduler must be security-driven and resilient in response to all risky conditions. The scheduler must consider the risks involved in dispatching Datas to remote sites. Furthermore, risk- resistant strategies are needed to properly manage the risks it may take. However, despite the fact that many heuristics have been suggested for large-scale Data scheduling, previously proposed heuristics were not applicable in a risky environment. We have tackled the Cloud heterogeneity problem by developing security assurance and risk-resilient strategies and offer four Data-scheduling algorithms for use under various risky conditions. We design three risk-resilient scheduling strategies, namely, preemptive, replica-tion- based, and delay-tolerant. We then incorporate them into existing heuristics and genetic algorithms. Furthermore, we observe that, while these heuristics or genetic algorithms are easy to implement with low complexity, security assurance and, thus, better performance could be achieved, if we build the risk-resistant features into Cloud Data scheduling algorithms.

II. Related Work

Current efforts to incorporate mobile devices into the cloud for data management and transaction management are very few. Most of the current efforts are focused on considering conventional

FETAL BRAIN ABNORMALITIES DETECTION AND CLASSIFICATION USING REGION GROWING APPROACH

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Abstract— Automatic defects detection in MR images is very important in many diagnostic and therapeutic applications. Because of high quantity data in MR images and blurred boundaries, tumor segmentation and classification is very hard. This work has introduced one automatic brain tumor detection method to increase the accuracy to yield and decrease the diagnosis time. The goal is classifying the fetal brain and detecting the abnormalities. The diagnosis method consists of three stages, pre-processing of MR images, feature extraction and classification. After histogram equalization of image, the features are extracted based on Dual-Tree Complex Wavelet Transformation (DTCWT) and further with Gray Level Co-occurrence Matrix (GLCM). In the last stage, Neural Network is employed to classify the Normal and Abnormal brain (Begin/Malignant). This classification is further validated to provide accurate results so that brain abnormalities will be detected in an early stage. They are also been used for medical applications and research purposes.
Keywords--Dual-Tree Complex Wavelet Transformation (DTCWT), Gray Level Co-occurrence Matrix (GLCM), Convolution Neural Network, Pre-processing of MR images, feature extraction and classification.

I. INTRODUCTION
A. DIGITAL IMAGE PROCESSING

The identification of objects in an image would probably start with image processing techniques such as noise removal, followed by (low-level) feature extraction to locate lines, regions and possibly areas with certain textures. The clever bit is to interpret collections of these shapes as single objects, e.g. cars on a road, boxes on a conveyor belt or cancerous cells on a microscope slide. One reason this is an AI problem is that an object can appear very different when viewed from different angles or under different lighting. Another problem is deciding what features belong to what object and which are background or shadows etc. The human visual system performs these tasks mostly unconsciously but a computer requires skillful programming and lots of processing power to approach human performance. Manipulating data in the form of an image through several possible techniques. An image is usually interpreted as a two-dimensional array of brightness values, and is most familiarly represented by such patterns as those of a photographic print, slide, television screen, or movie screen. An image can be processed optically or digitally with a computer.

To digitally process an image, it is first necessary to reduce the image to a series of numbers that can be manipulated by the computer. Each number representing the brightness value of the image at a particular location is called a picture element, or pixel. A typical digitized image may have 512×512 or roughly 250,000 pixels, although much larger images are becoming common. Once the image has been digitized, there are three basic operations that can be performed on it in the computer. For a point operation, a pixel value in the output image depends on a single pixel value in the input image. For local operations, several neighbouring pixels in the input image determine the value of an output image pixel. In a global operation, all of the input image pixels contribute to an output image pixel value.

B. CLASSIFICATION OF IMAGES

There are 3 types of images used in Digital Image Processing.
They are :

> 1. Binary Image

NEURAL NETWORK BASED REFINE OBSERVATION FOR KIDNEY STONES

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*Abstract***:** Back Propagation Network with image and data processing techniques was employed to implement an automated kidney stone classification. The conventional method for medical resonance kidney images classification and stone detection is by human inspection. Operator-assisted classification methods are impractical for large amounts of data and are also non-reproducible. Medical Resonance images contain a noise caused by operator performance which can lead to serious inaccuracies classification. Artificial intelligent techniques through neural networks and feature extraction are shown great potential in this field. Decision making was performed in two stages: feature extraction using the principal component analysis and the classification using Back Propagation Network (BPN). This project presents a segmentation method, Fuzzy C-Mean (FCM) clustering algorithm, for segmenting computed tomography images to detect the lung cancer in its early stages. The performance of the BPN classifier was evaluated in terms of training performance and classification accuracies. Back Propagation Network gives fast and accurate classification than other neural networks and it is a promising tool for classification of the Cancers.

I. INTRODUCTION

Accurate quantification and correct classification of tumors could largely influence the effect of the following computer-aided treatment of renal
cell carcinoma [6]. In this meaning, for the quantification
and classification, the accurate kidney tumor segmentation
is a significant prerequisite. Traditional human-based manual delineation for kidney tumor segmentation is not desirable in clinical practice, due to both the subjective (e.g., incorrect delineation) and objective (e.g., a large number of images) factors. Thus, computer-aided automatic segmentation meth-ods for kidney tumors (in CT images) are in high demand. However, segmenting the kidney tumors automatically in CT images is a very challenging task. According to the clinical and experimental observation. In order to visually illustrate these challenges, we have segmented several typical kidney tumors in CT images by introducing two representative models: the energy minimization-based model [1] and the traditional learning-based model [2]. Please note that the extensive comparison with other state-of-the-art models is reported in our experimental part. The tumors with high contrast and clear boundaries could be well segmented by traditional segmentation methods. The key issue of accurate segmentation is how to well distinguish the tumor and non-tumor boundary by extract- ing (or learning) the informative and discriminative features.Recent trends of deep convolutional neural network (CNN) have demonstrated the superior performance on learning-based segmentation tasks in different imaging modalities for different organs, e.g., prostate heart , brain . Hence, in this paper, we present a CNN- based model for CT kidney tumor segmentation. Previous CNN-based segmentation methods could be roughly classified into two categories: the image-based CNN models and the patch-based CNN models Both of these previous methods treated either whole images or squared patches as the training samples to first learn the segmentation model and then employ the obtained models to segment the new coming testing images. Unlike the traditional image- or patch-based CNN models, we originally propose the new findings for kidney tumor
segmentation in CT images. Specifically, in CT images, the
kidney tumors normally appear as the subrounded shape with a certain degree of symmetry. This observation inspires us that we could leverage the shape information for kidney tumor segmentation

WILEY

A nature-inspired meta-heuristic paradigm for person identification using multimodal biometrics

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Abstract

Because of the expanding improvement of the internet, security toward individual data has gotten more significant in recent decades. Due to the increasing development of the internet, security toward personal information has become more important in recent decades. Various person recognition methods are introduced for ensuring the security of a person's information. However identifying the information of the user using unique physiological characteristics poses a major issue in the biometric recognition system. Hence, an effective multimodal recognition system is developed using the proposed Elephant Deer Hunting Optimization-based hybrid fusion (EDHO-based hybrid fusion) model for person recognition. The proposed EDHO is designed by the integration of Elephant Herding Optimization and Deer Hunting Optimization Algorithm. Here, three different modalities, such as finger vein, dorsal hand vein, and electromyography (EMG) data are employed for the person recognition process. To increase the level of security, the hybrid feature fusion process is employed in such a way that features are fused based on the weight coefficients. The optimization algorithm is considered for the computation of the weight factor. However, the optimal weight value shows the optimal solution of person recognition in such a way that the computation of optimal value is based on the fitness measure. The proposed method achieved higher performance of accuracy as 0.963, True Negative Rate (TNR) as 0.9658, and True Positive rate (TPR) as 0.9548, respectively.

KEYWORDS

deep Maxout network, EMG signals, hybrid feature fusion, multimodal biometrics, person recognition

1 | INTRODUCTION

Biometrics is the branch of engineering and biology that reflects the study of biological observation and phenomena through statistical analysis.[1,2] The biometric system is uniqueness, stability, and universality when compared with the existing verification methodologies.[3] The biometric system is the pattern recognition system, which needs the biometric data from each individual with respect to their behavioral or physical traits, like iris, voice, face, electrocardiogram (ECG), or fingerprint pattern.[4–6] When compared to the existing methods, like tokens and passwords, the biometrics cannot be shared, forgotten, forged, manipulated, lost, or copied. However, biometrics is not confined to the criminal enforcement of laws in recent years. Most of the business uses biometrics for regulating the access of information system and buildings. The main challenges that exists are various issues in the unimodal biometric system of real world applications, as it operated with a single biometric modality, like noise in the

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ADVANCED SEARCH

GlioMeNet: Brain tumor analysis using faster R-CNN

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G Sethuram Rao ; D Vydeki   **All Authors** •••

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Abstract

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Abstract:

Beyond the advancement in the medical field, the development in the neuroradiology to diagnose the pathology of the brain tumor is still a concern for the neuron experts. To get over the formal problem, the Deep learning technique which is the sub domain of AI [Artificial Intelligence] is availed. Deep structured learning has the ability to analyze the data with acute precision. Deep learning algorithm provides the health care industry a highly exceptional computational speed and accuracy. Magnetic Resonance Imaging [MRI] is widely used diagnostic tool in the health care, the professionals use MRI to differentiate among ligaments to tumors. The intracranial tumors are best evaluated on MRI. In this proposed method, the faster R-CNN [Faster Region based Convolutional Neural Network] technique has been employed to predict and classify the intracranial tumor. In this method, the tumors are classified as meningioma and glioma. This also accelerates the immediate updation and monitoring of health reports of the patient through the database.

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Contents

RESEARCH ARTICLE

WILEY

An efficient adaptive threshold-based dragonfly optimization model for cooperative spectrum sensing in cognitive radio networks

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Summary

Effective utilization of spectrum resources is an important factor in wireless communication which reduces spectrum scarcity. Over the years, communication systems use different frequency bands, and the users are categorized into licensed and unlicensed users. Most of the wireless bands are typically licensed; as a result, accommodation of new technologies such as Internet of Things and machine to machine communication becomes difficult. So it is essential to obtain a wireless spectrum to adopt new technologies. Cognitive radio technology is introduced to improve such spectrum utilization. Reports state that most of the licensed spectrums are underutilized, and few spectrums are overutilized. Cognitive radio networks help to exploit the licensed spectrum and access the spectrum without any interference to the licensed user. Through its spectrum sensing and spectrum sharing process, cognitive radio network gains more attention in wireless communication. This research work proposed an efficient optimized spectrum sensing technique for cognitive radio networks through dragonfly optimization algorithm along with the adaptive threshold process. Proposed work performs better in terms of detection accuracy and efficiency when compared to conventional spectrum sensing schemes such as linear support vector machine and particle swarm optimization models.

KEYWORDS

classification, cognitive radio network, spectrum sensing, spectrum sharing

1 | INTRODUCTION

Spectrum access in the current wireless communication systems is stuck with fixed frequency allocation policies. Due to this policy management, most of the licensed bands are underutilized, and other unlicensed bands are overutilized. Recent studies report that most of the licensed spectrum is not utilized properly in the time and space domain. The average utilization of licensed bands will be in the range of 5–50%, and it proves that the utilization of spectrum is handled inefficiently. Static policies followed in spectrum allocation, fixed radio functions, and rigid policies are the major reasons for this underutilization. To improve the spectrum utilization and reduce the unlicensed band issues, these unused spectrums can be allocated to unlicensed users in an opportunistic manner. Cognitive radio technology provides such possibilities to unlicensed users to utilize the licensed user spectral bands without

RESEARCH ARTICLE

WILEY

A hybrid-supervised learning model for compressive spectrum sensing in fifth generation(5G) cognitive Radio enabled internet of things (IoT) networks

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Summary

5G Internet of Things (IoT) networks are characterized by wideband radio frequency spectrum utility and are therefore of primary importance for efficient means of sensing the wideband spectrum characterized by high bandwidth. A cognitive radio network (CRN) intelligently does the sensing of authorized users ideal spectrum and allocates the same to the demanded unauthorized user. Conventional energy detection and k-means schemes associated with CRN perform well for narrowband applications, whereas they are not quite suitable for wideband applications. Hence, a compressive collaborative sensing scheme together with deep neural network learning model (CCS-DLNN) has been proposed to sense the information from the compressed and reconstructed information signal. Based on the extracted features, decision on presence or absence of primary user (PU) in the received signal has been observed. This paper proposes a deep learning neural network model for learning the dynamic change in the input spectra. Accordingly, this paper also updates the weights associated with the neurons to converge upon the target objective. The performance of the proposed sensing scheme has been evaluated pertaining to probability of detection, sensing error, and accuracy of detection of idle channels. The proposed work will be very useful for the upcoming generation departing to be implemented with 5G IoT networks.

KEYWORDS
5G IoT networks, cognitive radio, compressive sensing, deep learning neural network

1 | INTRODUCTION

Rapid advancements in communication technologies have given rise to numerous state-of-the-art communication platforms and protocols. Most of the research and innovations are aimed at improving the speed of communication, the degree of mobility of users and thus improving the secure means of communication. With the increasing use of wireless technologies and gadgets that rely on radio frequency spectrum, an intelligent means of utilizing the scarcely available radio spectrum has been on the rise. Through effective research and a fair number of tests and trials, cognitive networks have emerged to be an effective solution. As they offer a cost and time-effective solution towards intelligent utilization of available bandwidth. This is done effectively by categorizing the available number of users into primary or licensed and secondary or unlicensed band of users. Thereby allocating the available bandwidth either cooperatively or

Diagnosing Cancer Cells Using Histopathological Images with Deep Learning

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Abstract—Early diagnosis of breast cancer for women can increase the survival opportunity with correct treatment in the clinic. Breast cancer can be diagnosed by detecting the malignancy of the cells of breast tissue. The microscopic images of breast cancer cells can be collected which can be used for detecting the presence of malignant (cancer) cells. The diagnosis process is tedious and the result may vary between pathologists. So, the Computer-Assisted Diagnosis (CAD) system is significant for improving diagnostic accuracy. The machine learning methods require export professional knowledge and experience to extract suitable features from histopathological images. A proposed deep learning-based approach can be used to classify breast cancer histopathological images in an automated way which utilizes different CNN models such as simple Convolutional Neural Network (CNN), dilated CNN, channel-wise separable CNN to extract image features and also uses Support Vector Machine (SVM) classifier and Softmax classifier to classify the histopathology images. This approach identifies the type of tumor and predicts the type of cancer cell as either benign (non-cancer) or malignant (cancer). This approach also identifies the best convolutional models which consume less time for training and also provide good training accuracy.

Index Terms—Computer Assisted Diagnosis, deep learning, Convolution Neural Network, Dilated Convolution Neural Network, Channelwise separable Convolution Neural Network.

I. Introduction

Breast cancer has the second highest mortality rate after Lung and Bronchial cancer, and about 30 percent of newly diagnosed cases are of breast cancer only. Breast cancer is the most common cancer worldwide with high death rate especially for women; early diagnosis can increase the survival opportunity with correct treatment in the hospital. It is diagnosed by detecting the malignancy of the cells of breast tissue. The microscopic images are collected and can be used to detect the presence of cancer cells. The microscopic images consist of different types of tumors which help to detect whether the image has cancerous or non-cancerous cell. The tumors such as ductal_carcinoma, lobular_carcinoma,mucinous_carcinoma,papillary_carcinoma comes under malignant cells or cancerous cells. The tumors such as adenosis, fibroadenoma, phyllodes_tumor, tubular_adenoma comes under benign cells or non-cancerous cells. The Computer Assisted Diagnosis system is of vital significant for improving the diagnostic accuracy as the diagnosis process is tedious and the result may be different between pathologists. The methods of machine learning

to extract appropriate features in histopathological images require professional knowledge and experience on export.

A deep learning-based approach can be used to automatically identify histopathological images of breast cancer, and also delivers better accuracy. This method uses deep Convolutionary Neural Network to extract image attributes, SVM classifier or SoftMax classifier to classify histopathology images that define the tumor type and predict the cancer cell type as either benign or malignant. The traditional convolutional layers in this model are completely replaced by the dilated CNN to improve the performance of CNN. The dilated convolution is a layer which describe the inputs with gaps. This model does not need pooling as it automatically skips the image pixel-based measurements and produces performance with classification layer SoftMax and classification layer SVM. The channel-wise separable convolution splits a kernel into two separate kernels that do two convolutions such as channel-wise convolution and depth-wise convolution. For channel-wise separable convolution (also known as depth-wise separable convolution), replace the convolution block with channel-wise convolution and point-wise convolution blocks for reducing computation cost compared to normal CNN. For the channel-wise convolution, the filter size and the stride is defined and for the point-wise convolution, the number of filters and filters of size 1 in the convolutional layer is defined. Thus, the network is able to process more in a shorter amount of time with fewer computations.

II. Related Work

The random forest's technique [1] is proposed to diagnose breast cancer using histopathological images that aid early diagnosis of cancer. This work aimed to provide guidance to histopathologists and the scientific community that could further assist them in developing new and successful breast cancer diagnostic methods in an efficient and early manner. In this work, pre-processing is the first step in digital image analysis after the acquisition of the image. This plays a major role in the diagnosis of the biological tissues captured in an image by improving the image quality without losing the important characteristics. Segmentation is one of the essential stages in the recognition of the cells and nuclei in histopathological images that form the basis for classification. The identification of features is the most important step in classifying breast

ORIGINAL RESEARCH

A structured support vector machine for hyperspectral satellite image segmentation and classification based on modified swarm optimization approach

S. Manju[1] · K. Helenprabha[2]

Abstract

The hyperspectral image analysis improved by the most powerful and fastest growing technologies in the field of remote sensing in recent years. The hyperspectral image classification involves the identification and recognition by capturing spectral information over the region and consequently analysis by the pixel value. The conventional method uses the wiener filter for pre-processing and GLCM approach to extract the second order statistical features with dragonfly optimization technique for image extraction. The machine learning techniques used in the conventional technique is extreme learning machine and relevance vector machine. Here the high-resolution hyperspectral remote sensing datasets are taken from hyperspectral remote sensing scenes. This scene acquired by the AVIRIS sensor during a flight campaign over the Indian pines test site in Northwestern Indian. The hyperspectral images are filtered by a modified swarm optimization approach and these images are extracted by threshold-based segmentation process with the use of OTSU's binary threshold method. The structured support vector machine is proposed for the classification of the satellite image. By the use of the optimization process, the structured support vector machine is improved its performance. Since overall sensitivity, specificity, and accuracy is improved. The simulation part carried out the data set for Indian pines and Salinas's scene and the overall design is done with MATLAB.

Keywords Hyperspectral image · Structured support vector machine · Otsu's binary threshold method · Modified particle swarm optimization · Image segmentation · Classification

1 Introduction

Nowadays, the advances in remote sensing and geographical information play a vital role in this field and it has developed by hyperspectral image sensors. The hyperspectral remote sensing is also named as imaging spectroscopy Zhang et al. (2013). The imaging spectroscopy is a new technological development in the research field. This is developed by researchers and scientist with the investigation of minerals, vegetation, man-made materials and backgrounds. Remote

sensing technology is used over 100 years, it absorbs the detected image for its classification. The absorption feature is to specify the chemical bonds in solid liquid or gas and we can also measure the wavelength of that detected image. The hyperspectral image data is generally composed of 100–200 bands of spectrum. These hyperspectral cameras are designed for detecting the infinite object distance and it is robust, compact with high performance for versatile instruments. The pre-processing method uses a weighted least square technique; it is a new type of exposure fusion technique used to filter the input image with high resolution.

In recent days, satellite image processing is a major tool to survey any region of logical fields. Here the satellite image classification includes the interpretation of remote sensing images, data mining, and different vegetation classification Li and Wang (2015). The main difference between the multispectral and hyperspectral image is the number of bands used and how the narrow bands are. In multispectral image has 3–10 bands, which is obtained from the remote sensing radiometer Manju and Venkateswaran (2018). But

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Securing Privacy Using Optimization and Statistical Models in Cognitive Radio Networks

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Abstract: Cognitive Radio Networks (CRN) are the possible and ideal solution for meeting the spectrum needs of next-generation communication systems. CRN is a promising alternative approach that allows spectrum sharing in many applications. The licensed users considered Primary Users (PU) and unlicensed users as Secondary Users (SU). Time and power consumption on security issues are considered degrading factors in performance for improving the Quality of Service (QoS). Irrespective of using different optimization techniques, the same methodology is to be updated for the task. So that, learning and optimization go hand in hand. It ensures the security in CRN, risk factors in spectrum sharing to SU for secure communication. The objective of the proposed work is to preserve the location of the SU from attackers and attain the clustering of SU to utilize the resource. Ant Colony Optimization (ACO) is implemented to increase the overall efficiency and utilization of the CRN. ACO is used to form clusters of SUs in the co-operative spectrum sensing technique. This paper deals with threat detection and classifying threats using parameters such as unlikability, context privacy, anonymity, conditional traceability, and trade-off. In this privacy-preserving model, overall accuracy is 97.4%, and it is 9% higher than the conventional models without Privacy-Preserving Architecture (PPA).

Keywords: Attacks; secondary users; cognitive radio networks; security

1 Introduction

Ever-increasing bandwidth demand in wireless communication initiates CRN to improve spectrum utilization. CRN allows the unlicensed SU to utilize PU spectrum without interference if the user was not using it as per Federal Communications Commission (FCC) regulatory policies. Many research models are available to measure the security threats [1] in CRN based on classes of vulnerabilities. Since CRN learned about the environment by being aware of the users, the Privacy-Preserving Algorithms (PPA) protect the network against interferences. Even though the algorithm secures the network, they do not present methodologies to determine the type and extent of privacy protection. Since PPA implementation increases the efficiency against security threats, it is insufficient to provide access and manage the attacks in the spectrum sharing process. It deals with specific security and privacy framework in CRN [2]. For providing accountable security within CRN entities, the theoretical model first addresses the risk factors in the spectrum sharing to SU. Efficient PPA is proposed experimentally for secured communication in the network. The improved ACO enhances security parameters. It improves efficiency, spectrum utilization,

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Efficient tumour detection from brain MR image with morphological processing and classification using unified algorithm

G. Sethuram Rao and D. Vydeki

🔧 ⏵ **ABOUT**

Abstract

Brain diseases caused due to malignant are the biggest concern among all the age groups. Studies show that almost 80% of death cases are reported due to presence of malignant tumour. Hence diagnosing brain tumour at an early stage would increase the survival rate. Magnetic resonance imaging (MRI) plays a major role in diagnosing tumours in human brain. However, it is considered to be a time consuming and tedious process which could lead to deviation in the opinion of radiologists. This has led to the development of computer-based automatic extraction of tumour cells from the images obtained by MRI. This paper proposes an efficient tumour detection mechanism from MR images using morphological processing and unified algorithm. A neural network that uses bounding boxes and associated class probabilities detects the packets of tumour that exist in a full MR image. Simulated results of the proposed technique on the BRATS 2016 dataset show that a detection accuracy of 95.97% is achieved, while reducing the likelihood of false positives. This approach is compared with other detection methods such as DPM and R-CNN and the analysis proves that our method proposed outclasses the other detection methods.

Keywords

terms-magnetic resonance image, brain tumour, thresholding, histogram, segmentation, CLAHE, unified detection, malignant, benign

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Design of Multistar Fractal Microstrip Patch Antenna for Multiband Application

R. Jothi Chitra, M. Mukesh Khanna, M. Rakesh, A. Praveen Kumar, J. Jerin Godbell, R. Nivetha, and C. H. Amulya Nissy

Abstract A new multistar fractal microstrip patch antenna is introduced in this paper for multiband applications. The proposed antenna is designed to resonate within the frequency range of the WiMAX, WLAN, S and C bands. The action of a multiband is studied by constructing five star-shaped structures in the same Substrate. The proposed antenna uses FR-4 substrate which has a dielectric constant $\varepsilon_r = 4.4$ and loss tangent of 0.02. Increasing the number of iterations will greatly improve the operating bandwidth. By changing the size of the transmitter, the antenna can work for multiband mode by adding additional four star-shaped structures. The parameters of the antenna such as return loss, VSWR, radiation pattern and gain are simulated and then described using CST Microwave Studio.

Keywords Multistar · Multiband · CST · WiMAX · Iteration

1 Introduction

In past years, it is important to design an antenna which resonates for multiband application to meet the required demands in the modern communication system. Microstrip patch antenna is preferred to meet the current trends in wireless communication due to its extraordinary features like small weight, low cost, easily fabricated, less fabrication cost and multiband application support. Fractal antennas are most suitable for multiband operation. Applying fractal to antenna results in size reduction and supports multiband operation. Fractals have space-filled properties of self-uniqueness which is the attractive feature of fractal antenna. Self-similar fractal

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Unhindered Safety Monitoring System for Underground Workers

G. Shanmugaraj, B. V. Santhosh Krishna, S. SriSahithya, M. Sandhya, and T. H. Monikca

Abstract Though the earth is heading toward automation, there are still many works which could be performed only by mankind. Such jobs always tend to be dangerous and life demanding. Even today, jobs like sewage cleaning and mining fall under this category. In such cases, real-time health monitoring systems for these workers will be helpful. In this paper, the device presented will monitor the heart beat rate, the body temperature, the methane concentration and also the atmospheric oxygen concentration and provides alert to the worker and the exterior unit. When parameters deviate from the safe limit range, it will alert the workers to stay safe and detect toxic gases before any harm.

Keywords Health sensing · Pulse oximetry sensor · Arduino nano · Arduino uno · Inter-integrated circuit communication · Gas sensor · Beats per minute · Temperature sensor · Occupational health hazards · Wearable in underground

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Design of a 48 V BLDC Motor
for Military Application

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Abstract Electromechanical actuators are increasingly used in aerospace applications, particularly for all electrical and space aircraft. In the recent years, unmanned aerial vehicles (UAV) have gained widespread applications. Here an electromechanical actuator is used to control the speed and position of the nose landing gear for military purpose. The hydraulic actuators had been replaced into electromechanical actuators (EMA) which has the ability to control and monitor torque. The EMA consists of a BLDC motor which has an advantage of high efficiency and excellent controllability. The main challenge of using BLDC motor in this application is that it should have good size and torque ratio with reasonable efficiency. For this reason, design has to be made analytically and motor FEA analysis has to be done with transient electromagnetic analysis for motor effectively before prototype. In this project, a 48 V BLDC motor is designed by using JMAG-Designer software. This software provides to verify the FEA analysis under transient condition. The JMAG software has the ability to evaluate all the motor characteristics like torque–speed characteristics, loss characteristics, inductance characteristics, etc. Finally, the results are

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Wearable Jacket for Posture Correction Using Flexible Fabric Stretch Sensor for Working Age Groups

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Abstract Generally, IT professionals and people who are engaged with working in a long duration sitting postures are affected by musculoskeletal disorder. Our device is designed to help the people who are affected by this kind of health issue. Usually the people suffering from this disorder cannot give attention to their postures due to their full concentration in their respective work. This jacket will help in alerting the patient by the warning or stimulus which is given to them whenever the angle of the bend of the spinal cord has reached the pre-determined value or the threshold value of spinal cord angle in comparison with posture indication position. The sensor used in this device is flexible and thereby can be fixed to the fabrics so that the patients can wear them regularly. The trigger or stimulus given by our system which is done by using IOT will make the people to change their postures to prevent themselves from this disorder. Overall, the analysis performed implements the proposed idea as a monitoring system that can be used to identify body posture variations related to different levels of engaged users while performing cognitive tasks. Our model is also embedded with a pulse monitoring facility for easy diagnosis. Since it is a wearable one it can be used by young age people, middle age people as well as older age people.

Keywords IOT · Postures · Musculoskeletal disorder · Wearable one deflection sensor

1 Introduction

Due to the advancement of IT industry and the rapid increase in the busy hurry world, people loss themselves to give attention to their health especially the youngsters and

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Enhanced SURF- and Wavelet-Based Underwater Image Stitching

G. Babu, B. Sridevi, T. Divyani, M. Monisha, and D. Pavithra

Abstract Underwater images are used in numerous scientific applications in the fields of marine geology, archaeology, military reconnaissance, finding underwater resources, detection of temporal changes under the sea, environment damage assessment, etc. Stitching these underwater images to obtain a clear view is a challenging and interesting problem for researchers. Several advances have been made to stitch normal images, but the problem of stitching underwater images has been poorly exploded because underwater images suffer from poor visibility conditions. Since underwater images are captured by unmanned underwater vehicles (UAVs), the orientation of the images obtained also introduces an difficult problem. An effective underwater image stitching technique is proposed in this paper. The images obtained from a particular location are oriented in correct angle using self-organizing map (SOM). The features of the oriented images are obtained with the help of speeded-up robust feature (SURF) registration technique. Hessian matrix plays the role of obtaining the feature points because it augments the number of feature points. From the obtained feature points, the overlapping regions in the images are identified. These regions are then eliminated using random sample consensus (RANSAC) algorithm. Finally, the pre-processed images are fused to obtain the overview of that particular area, thus provides a helping hand for researchers in various fields.

Keywords Image stitching · SURF algorithm · Mosaicked image · Fusion

1 Introduction

The image stitching is broadly used in various fields like document mosaicking, medical imaging, video stitching, multiple-image super-resolution imaging, high-resolution mosaicked photos in digital maps and satellite imagery. Many techniques have been employed by researchers for stitching underwater images; still they find

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JOJO—A Social Media Application with a Live Map Interface to Advance Social Security

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Abstract There are a lot of women's security applications similar to this which are available on the Internet, having the facility which is limited only to send alert messages to a set of people or to the nearest police station which will not be effective if the person receiving the alert message is not available to respond. JOJO gives the power to its every registered user to help the person who is under abuse, attack, ill-treatment (women, transgender and even men) or whosoever in danger. The application can be used in two ways. It can be used by the person who is in danger to send alert messages, and it can be used by the people who have always wanted to help but did not get the opportunity or have enough details. This application can be triggered by using the hardware device which could either be connected with the user's mobile through Bluetooth or a wired network, and it works in coordination with the application. The application is triggered immediately either through the hardware or by shaking the phone vigorously. The application has a map in which the location of every user who has installed this app will be displayed in real time using a Marker, and when the victim triggers the app, the colour of the marker changes, and continuous vibrations are triggered in every available user's mobile until they open the notification. The app redirects to Google Maps which provides the route to reach the victim. The main objective of JOJO is to provide the power of helping a victim to the general public as it increases the chance of the victim being saved exponentially. As the number of users increases, the chances of a victim being saved increase tremendously. Apart from this, JOJO is a full-scale social media application with a lot of engaging features such as the "Best Guardian" and Chat Box.

Keywords Social media application · Live map interface · Victim protection · Large-scale audience · Social security

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Detection of Leukemia and Its Types Using Combination of Support Vector Machine and K-Nearest Neighbors Algorithm

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Abstract White blood cell cancer is additionally mentioned as leukemia could also be a really perilous disease. To this day, the tactic of recognizing white blood cell cancer or leukemia remains done conventionally, which if done by different doctors, can cause a difference within the diagnosis. To retort these problems, a computer-assisted method is proposed during which leukemia is detected from microscopic images employing a mixture of SVM and KNN. Initially, preprocessing is performed to arrange the image for processing. Later support vector machine (SVM) and K-nearest neighbor are used for classification. The proposed algorithm classifies healthy and cancerous cells into one of the four types such as acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL), and chronic myeloid leukemia (CML). Additionally, the counting of the infected cells is also performed.

Keywords Leukemia · Preprocessing · Segmentation · Support vector machine · Watershed algorithm · Blood cell classification

1 Introduction

RBC, WBC, and platelets are the three primary blood components. Most cancer cells start in the body, but leukemia is the cancer type which in the cells of the blood begins and grows [1]. Leukemia, lymphoma, and myeloma are the three cardinal types of blood cancer. Leukemia may be a quite common sort of cancer and ranks 10th among the foremost common sorts of cancers round the globe. Children below 15 years aged and adults above 55 years aged are at a bigger risk of falling prey to the present deadly sort of cancer. Former information of its causes, risk factors, and symptoms can save

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Chapter 20
IoT Based Intelligent Ambulance Monitoring and Traffic Control System

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Abstract The evolving problem of traffic problems is an inevitable situation in wide and rising cities worldwide. Population growth has led to a growth in the number of cars leading to absolute congestion development. Life is sacred and can not be repatriated until lost. The reaction time required by the emergency responders plays a vital role in the face of disasters. This might be a department for medical, disaster, or defense. The greatest challenge they face is congestion from flow. To address this, an intelligent traffic system is needed using a preemptive equation that adapts rapidly to environmental conditions. The aim of this article is to identify the emergency call headed back to the location and to monitor the congestion system in order to provide efficient facilities. This journal also sets out a method that uses a Zigbee component and Internet of Things (IoT) to transmit the treatment request from the ambulance to the nearby hospitals, while ambulance attaining the road junction, the smart traffic system which in turn changes the traffic signal cycle. This system can be implemented throughout the city thereby reducing the delay.

Keywords Preemption algorithm · Traffic congestion · IoT Zigbee module · Smart traffic control system

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Chapter 2
Intelligent Wearable Sensor Band for Underground Working People

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Abstract This paper presents an Intelligent wearable sensor band for underground working people. The security and soundness of laborers are significant for underground individuals. The proposed framework consolidates wearable sensors to quantify physiological and natural parameters. A passage is acquainted with giving information preparing, a neighborhood web server, and a cloud association. A wearable sensor on a laborer and natural sensor on a wanderer that can transmit the information to the client by means of a door for example server, gives offer notice and cautioning component for the clients. Live health examination taken for laborers who work in an underground like Tunnels, Shafts, etc., it has an Individual database of laborers and contrasts it and current essential tangible qualities separate to workplace information. Live update, will screen from the control room and it can direct the specialist if any medical problem occurs and furthermore can maintain a strategic distance from the undesirable passing.

Keywords Sensor · Cloud · Natural parameters · Tunnels · Security

2.1 Introduction

The Wearable Sensor Network (WSN) is being prospected in numerous applications like home security, savvy spaces, ecological checking, combat zone reconnaissance, target following and also consists of various little, low-fueled, vitality gained sensor hubs with detecting, preparing the information, and remote correspondence [1]. The Performance of the remote sensor arranges (WSN) in ecological observing and human services applications has been improved as of late. Therefore, the client can comprehend the continuous physiological and ecological information from neighborhood internet browser or portable applications anyplace and

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Chapter 21
IoT Based Emergency Alert System

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Abstract There is rapid increase in population, due to which associated challenges in safety and health care are also in raise. No proper assurance is given to safety, especially for women. Moreover, elder people in isolation are facing many health issues due to which continuous monitoring is essential. In order to pave path for these issues, a method is proposed which will ensure road safety, women safety as well elder people safety. On the whole, the major threats and difficulties faced by people will be prevented or solved using this application.

Keywords IoT · Geo fencing algorithm · Sensor · Fall detection · Safety

21.1 Introduction

The personal security of women and elderly people are highly vulnerable in the modern society at different times and venues. Sexual harassments and also other forms of sexual violence are very often in public places such as nearby schools, colleges, parks. This way, the freedom to girls and women is not ensured thereby, preventing them from exploring this competitive world with hidden talents. A wearable smart band is designed which will ensure safety for women during emergencies [1]. Many systems were designed for women's safety of which, a safety system is described in [2]. In addition to this, road safety is not ensured now a days, a certain proportion of which results from untimely treatments and secondary accidents. These accidents need to be prevented before occurring or immediately further action must be taken to rescue the victim. The accidents are detected using different algorithms such as weighted extreme learning algorithm which is explained in [3]. To detect the

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Investigation on Photovoltaic System based Asymmetrical Multilevel Inverter for Harmonic Mitigation

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Abstract – The power quality improvement by multilevel inverters are gaining more response among the researchers in the recent trends for the low and medium power applications. The purpose of this research work is to integrate the solar PV system with the inverter and to investigate the performance of Asymmetric multilevel Inverter with various multi-carrier PWM schemes on harmonic mitigation. And the simulation study helps in analysis of various carrier-based modulation schemes along with the injection of third harmonics on the reference signal which efforts on harmonics mitigation. The simulation results and the hardware modelling along with basic design for implementation of three phase symmetrical Multilevel Inverter topology is carried out in this research work. MATLAB-Simulink software is used for the purpose of simulation in integration with digital controller for generation of high frequency pulses in order to reduce the harmonics level. This research paper concludes with simulation results on three phase symmetrical multilevel inverter.

Index Terms- Photovoltaic (PV), Pulse width modulation(PWM), Multilevel Inverter (MLI) & MATLAB/Simulink.

I. INTRODUCTION

The use of renewable energy is now more politically and economically favourable. Ambiently renewable energy resources, such as solar and wind, are among many types of Power, owing to its modern technology, has become very popular and difficult. Actually, PV solar sources are used for different benefits, such as pollution-free sources[1]. For every five years ,the utilization of solar energy has been increasing tremendously. Using the PV based inverter, the DC power obtained from the PV modules is converted into AC Power and then fed into the load. [2]. Power Quality improvement mainly focusses on the votlage and current waveform, independent of the load which has been used. The conventional inverter has been switched in order to obtain the pulsating AC component with reduction in harmonic content [2]. In the recent years, Multilevel Inverters are gaining more popularity among the researchers for the power quality improvement. The unique feature for the multilevel inverter which attracts the researchers, as the number level of the AC output waveform increases with decrease in harmonic content. Due to this advantages the multilevel Inverter are used in integration with various pulse width modulation (PWM) schemes to decrease the harmonic distortion further [2]. These type of inverters can improve the voltage and current quality, lower lower switching loss, lesser electromagnetic interference (EMI), lower component size & lower total harmonic distortior(THD)[1]. Generally multilevel inverters are classified based on their configurations, three basic topologies are identified they Cascaded H-bridge(CHB),Diode clamped /Neutral Point Clamped (NPC) and flying capacitor based inverter (FC). [1]. All three converter topologies have the capacity for multilevel inverters for medium and high voltage applications, including a choice of electronic power inverters. Semiconductor equipment and voltage sources of the capacitor, the output voltage of which Generate by stepping through waveforms for voltage. The output voltages have several stages as the number of stages in the inverter increases[1]. Producing a waveform of the staircase that has a decreased harmonic level. But a higher number of phases increase the size of the controller and present issues with voltage difference[2]. The topology of the FC [1] is similar to the topology of the FC. NPC, with the exception that flying capacitors exchange the clamping diodes and CHBs inverters are Classified by two or more 1- bridge inverters as a series relation. Strong frequency of switching and The cascaded multilevel inverters are operated using simple switching frequency PWM scheme[6]-[10]. Since it has higher efficacy and lower loss of switching. Each level includes a distinct DC in the CHB MLI.A PV cell or battery must be combined for each DC source and for each DC source. CHB MLI, as contrasted with the other two, The

Original Article

Educational tool for analysis of proportional integral and fractional order proportional integral controlled quadratic boost converter system using MATLAB/simulink

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Abstract

This paper displays an simple method for identification of controller for wind based Quadratic Boost Converter Inverter system. India, being the fourth largest wind power generator has attracted numerous researchers towards the improvement of wind energy conversion system. This paper also presents improved controller techniques for a Permanent Magnet Synchronous Generator (PMSG) coupled with Cascaded Quadratic Boost Converter (QBC) and Space Vector Modulation Inverter (SVMI). The digital simulation and execution of PMSG based wind turbine along with QBC and SVM Inverter is presented in a closed loop system. The performance of closed loop system is realized using Proportional Integral (PI) and Fractional Order Proportional Integral (FOPI) controllers. Initially, the AC power from PMSG wind turbine is rectified to DC using rectifier circuit. The DC power from the bridge rectifier is then boosted to the required level using quadratic boost converter. The output from QBC is then given to the SVM inverter. The closed loop investigations are carried with PI and FOPI

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Current mode fractional order PID control of wind-based quadratic boost converter inverter system with enhanced time response

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Abstract

Purpose – The purpose of this paper is to enhance the response of quadratic boost converter inverter system (QBCIS) and also investigate proportional integral (PI) and fractional order proportional integral derivative (FOPID)-based space vector modulation inverter (SVMI) systems.

Design/methodology/approach – This paper presents modern expansion in control methods and power electronics have created wind-based AC to AC converters that relays to AC drives. The process includes the flow of quadratic boost converter (QBC) and SVMI locate their technique in associating permanent magnet synchronous generator and three phase load. This effort conveys with digital simulation using MATLAB/Simulink and hardware implementation of current mode wind-based QBCIS.

Findings – The direct current (DC) output from the rectifier is boosted using Quadratic Boost Converter (QBC). The DC yield of QBC is provided to the SVMI. The alternating current (AC) yield voltage is attained by using three-phase filter. The investigations are done with PI and FOPID-based SVMI systems. Current mode FOPID control is proposed to improve the time response of QBCIS system.

Originality/value – The simulation results are compared with the hardware results of QBCIS. The results of the comparison of PI with FOPID controlled by converters are made to show the improvement in terms of settling time and steady-state error.

Keywords Circuit simulation, Power dissipation, Quadratic boost converter, SVM inverter, Three-phase LC filter, Proportional integral

Paper type Research paper

1. Introduction

As of date, for an extraordinary number of machines, direct current (DC) to DC converter topology is used. Generally, in renewable energy system, the framework having low yield attributes to regain this interest, where DC to DC converter topology is actualized. During the exchanging activity, the voltage stress will be raised. The highlights to be concentrated on while picking the inverter are: when switch is turn on, it should accomplish the zero voltage crossing when photo voltaic cluster is associated with the framework the converter ought to give the high terminal voltage to low information range (SelvaKumar *et al.*, 2016).

"A solitary switch QBBC (Quadratic Buck Boost Converter) with continuous input port current and continuous yield port current" was exhibited by Zhang *et al.* (2014). Contrasted and the customary QBBC, the recommended converter can acquire a more extensive scope of the voltage change proportion with a similar duty cycle. In addition, the proposed converter can work with consistent input port current and constant yield port current contrasted with the current partners with intrinsically spasmodic information port current and intermittent yield port current (NengZhang and KhayWaiSee, 2017). "QBC with Diminished Buffer Capacitor Stress" was presented by MaoYe and Eric Cheng (2014). In the existing Quadratic Boost Converter (QBC) is compared with another QBC was introduced in this investigation. This benefit is entirely significant for high voltage and its gain applications (YuanmaoYe and EricCheng, 2014; Neng *et al.*, 2015). High voltage gain QBC with voltage multiplier was recommended by Zhang. Plan and Examination was scheduled which attractively coupled quadratic boost topology with a damping system for DC microgrid was given by Ahmad *et al.* (2015, 2017)111.

"Outline of High Step up Coupled Inductor Boost Converters" was introduced by Liu *et al.* (2016). In the previous years, the improvement of topologies with venture up limits has been imperative to fulfill the new prerequisite of inexhaustible source energy. This investigation shows a Quadratic Boost Converter (QBC) is depends on the reduced excess power handling guideline, well as the controller structure approach using current customized control to fulfill the details of yield voltage regulation (Jorge *et al.*, 2014; Huawu *et al.*, 2016; Gorji *et al.*, 2017; Forouzesh *et al.*, 2017; Peyman *et al.*, 2017). Schedule exchanged boost push–pull DC–DC converter for venture up applications was proposed by Zheng. "The next solitary switch high advance up converter dependent

RESEARCH ARTICLE

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Model predictive controller–based quadratic boost converter for WECS applications

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Summary

This paper presents a simple method for the identification of controller for Permanent Magnet Synchronous Generator based Power Electronic Quadratic DC-DC Converter Inverter System. The PMSG source is used with cascaded three phase bridge rectifier. Quadratic Boost Converter Inverter System and three phase balanced load.

KEYWORDS

hysteresis controller, model predictive controller, proportional resonant control, quadratic boost converter

1 | INTRODUCTION

The regular assets utilized in the cohort of electronic power are draining, and this necessitates the utilization of sustainable power resources like sun-powered and breeze energy frame works. The sun-based photovoltaic (PV) modules are fit for delivering 20 to 40 V for every element, and the power is irregular in nature. Reorganized power group and dispersion empowers the cohort of intensity utilizing sun-based PV module, which is conveyed legitimately to DC stacks or infused in the lattice utilizing a DC/AC system.[1]

To give maximum advance up DC/DC converter change, the customary nonsolitude boost DC/DC converter is worked with most extreme duty ratio. The constraint of this methodology has elevated transmission misfortunes and this farthest point on the pivot ON–OFF period of the exchanging gadgets.[2] For elevated advance above and extensive transformation run, cascaded boost converters (CBC) are recommended in Reference 3, and this quadratic boost converter (QBC) configuration is inferred by falling two DC/DC converters in arrangement. The customary PIC configuration involves the found the middle value of typical of the converter, and the controller is altered dependent to make linear shape space arrived at the midpoint of typical of the converter.[4]

The progression reaction of peripheral interface controller–boost converter (PIC-BC) represents an exceed of 5% to 10% and consistent response of settling time, inside 5% to 20% exchanging time domain parameters[5] to conquer the constraint of customary controller, numerous control procedures such as PW authority, linearized quadratic controllers are suggested. This disadvantage of the systems is the utilization of improved powerful type of the DC–DC converter, except thinking about one and all imperatives info, output, and different factors,[6] and model predictive control[7] actualized in process ventures is utilized as controller for fundamental DC-DC converter topology.

Network Virtualization Incorporation and Projection System Technologies Using Block Chaining

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Abstract. With the proposed time-lock encryption method, mutually untrustworthy users will create a shared public key for the implementation in a completely distributed and asyncratic setting like internet or blockchain networks with time-critical privacy conservation applications such as e-voting or online auction. A "putting puzzles inside another puzzle" construction mechanism was proposed to resolve the probabilistic characteristics of the predicted key crack time. Experimental findings indicate that the solution proposed will deliver a more precise main break time, which would make it faster and more exact to reach the expected time limit. As described above, we can further estimate computing power by combining our scheme and the blockchain, to decode time-sensitive message. Miners are ready to supply under the updated PoW scheme.

Keywords: Blockchain networks, Online auction, IoT, Merkle proofs and data privacy

1. Introduction

In daily situations at a global level, internet of things (IoT) serves individuals. These IoT systems rely on numerous data collected by their sensors to allow intelligent decision-making. This system does not interact with end users in particular. Rather, it transmits signals inside itself [1].

If IoT devices work on a single mission, the hardware is supplied to complete the task. IoT instruments have very limited access by contrast to a great many materials, and can thus only execute the desired functional complications. Therefore, IoT relies primarily on cloud services that streamline the transmitted data and transfer results to the next PC in the underlying IoT programme process chain.

Not all IoT devices can link to cloud services directly via hardware. Intermediaries or couriers may help to fill this gap by municipal services, not necessarily networks of contacts. A fog computing layer can be built with the assembled virtualized broking nodes. This middleware is distributed because fog nodes have to be physically next to the customers linked [2]. In tandem with the fog computing paradigm, the Internet of Things provides even more grounds for new, increasingly evolving possibilities for the application of blockchain technologies.

Learning Based Download of Health Care Confidentiality Apps Iot with Power Storage

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Abstract. Remote cloud computing aims to provide a decent standard of computer-intensive experience for the healthcare of Internet of Things (IoT) users through the use of electricity. We suggest a privacy-aware download framework for strengthening learning (RL) to help IoT devices secure consumer privacy and privacy habits. In particular, this scheme allows an IoT system to choose a rate of discharge to maximise the measurement efficiency, protect the privacy of users and save the liveliness of the IoT device, deprived of understanding the confidentiality leak, IoT power requirements besides advanced machine model. In this software, transfer learning is used to minimise random experimentation during the initial education process besides a Dyna architecture is applied that offers virtual download experience to speed up the learning process. The recognised channel state model is used to further boost download quality in a state-learning system following decision. In the sense of the degree of anonymity, energy use and computing latency, we deliver the efficiency bound for three standard IoT offload scenarios. This scheme will reduce the delay of measurements, conserve energy usage and increase the level of privacy of an IoT healthcare device relative to the benchmarking scheme.

Keywords: Healthcare, data confidentiality, IOT, cloud storage, privacy standard

1. Introduction

In medical applications, IoT technologies such as digital health surveillance, exercise services, chronic ailments and assessment of elderly people are analysing and evaluating health information such as blood pressure, body infection, electrocardiogram and users' oxygen capacity for health intelligencesbesides warnings [1]. Healthcare IoT systems may put on the technologies of energy recycling for environmental energy, such as the atmospheric radiofrequency (RF) alsoform activity to prolong battery life [2]. The utilisation of the noticed healthcare information on edge platforms such as base positions operated, access point (AP) besides laptops that have improved processing besides energy resources [3] conserves fuel for remote Healthcare equipment.

For e.g., an IoT system may allow the cardiac measurement to be measured and the healthcare diagnosis made. EH IoT healthcare devices must avoid eavesdroppers analysing sensing information

Deep Analysis of Covid-19 Receptors Recognition and Locating In Pulmonary Ultrasound

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Abstract. In the course of the latest COVID-19 flu epidemic, several projects have been carried out to test LD-based strategies for the helping diagnosis of lung diseases. Deeper learning (DL) has proven its effectiveness in radiography. Although the present study relies on CT scans, DL strategies for interpreting pulmonary ultrasound (LUS) images are being used in this article. In specific, we present a new, completely annotated LUS data collection obtained from multiple Italian institutions with labels showing the level of disease intensity in a shot, photo, and digit optimization mask. By using these data, we implement numerous profound models that deal with the related tasks of automated LUS image analysis. We introduce a new deeper network derived from Space Converter Networks, that continuously estimates the extreme disease score for an input frame and weakly controlled the location of pathological machines. We implement also a new approach for efficient video-level averaging of frames based on uninorms. Finally, we benchmark deep state-of-the-art models for estimating COVID-19 biomarker pixel classification. Experiment was conducted on the planned dataset show satisfactory results for all the tasks considered which will pave the way for potential DL studies for the diagnosis of LUS-based COVID-19.
Keywords: COVID-19, deep learning, receptors recognition, prediction, CT images

1. Introduction

The sudden global epidemic of SARS-CoV-2 resulted in treatment services becoming sparse. Besides the worldwide absence of mouth covers and mechanical fans, there were significant constraints of test capacity. Therefore, accused patients and hospital personnel were given preference for the testing [1]. However, comprehensive tests and diagnoses are necessary to control the pandemic effectively.

Indeed, the SARS CoV-2 virus was considerably contained in countries which were able to conduct massive monitoring of potentially infected individuals combined with comprehensive citizens' surveillance [2]. Consequently, inadequate testing capability was needed and alternative methods were pursued in most of the countries to diagnose COVID-19. Forewords are very dependent on swab technique and location [3] on the precision of the current Lab research, Reverse Transcription polymerase chain reaction collection.

The pneumonia of COVID-19 will advance very quickly to an extremely critical state. Radiological pictures were analysed in over 1,000 COVID-19 individuals, showing a significant number of acute respiratory dis-tension syndromes, such as bilateral and intra opacifications of the glass soil mostly

An Intelligent Wheelchair for Disabled Person

S. Prabhu, V. Nagaraju, P. Sailaja, and B. R. Tapas Bapu

Abstract Every new development in sensors and ultrasonic technologies has always been a bonus for electronics traveling aids (ETAs). This sets way to the development of smart vehicles for disabled people. These smart vehicles are used by physically disabled people. This electronic intelligent wheelchair is designed to help disabled people to move independently to any place without a caretaker. It consists of a smartphone app-based operation along with obstacle avoidance, fall detection and narrow way locomotion. An android application is used to control the wheelchair. This smart chair can function in full automatic mode. It uses GPS-guided system and magnetic compass to determine location and stores the location to return back to the location automatically. The fall detection system tilts the seat when it moves around any inclined plane and alerts the nearby caretaker with an SMS when a fall is detected. It has an intelligent collision avoidance system to avoid any type of obstacles including potholes and can move around narrow pathways and doors without being hit or bumped against any obstacle.

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Effect of energy storage material on a triangular pyramid solar still operating with constant water depth

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Abstract

In the current study, the impact of energy storage material on triangular pyramid solar still operating under constant water depth is investigated in an experimental setting. Experiments were carried out in a pyramidal solar still with various types of energy storage materials to determine their effectiveness. To increase the amount of freshwater that can be obtained from the solar still, materials such as quartz rock, mild steel, and sieved red bricks were utilized as a part of the construction of the basin material. The conventional correlation method was used to calculate the evaporative and convective heat transfer coefficients based on experimental data. It is dependent on the kind of material utilized within the basin for efficient energy storage as well as the depth of water maintained whether or not the output of fresh water improves. As a result of using 1 1/4" red bricks within the basin rather than a typical solar still, the results indicate that the utilization of thermal energy storage inside the basin increased the output of fresh water by 30 %. Additionally, the yield of fresh water obtained was found to be 3.5, 4, 4.3, and 4.2 for 14-inch quartz rock, 3/4-inch quartz rock, 1-1/4-inch red bricks, and mild steel scraps, while the yield of fresh water obtained was found to be 3.5, 4, 4.3, and 4.2 Litres/day.

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Effect of fins and silicon dioxide nanoparticle black paint on the absorber plate for augmenting yield from tubular solar still

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Abstract

The present study aims at enhancing the yield of tubular solar still (TSS) by employing fins and coating the absorber plate. We doped the SiO_2 nanoparticles into black paint at the weight concentration ranging from 10 to 40%. The solar still was tested in a bright sunny climatic condition of Chennai, Indian (lat. 13° 08′ N and long. 80° 27′ E). Under transient heat flux conditions, water, basin, and TSS glass temperatures with and without fin were measured. The rate of heat transfer by convection between the water and absorber plate was increased. Results revealed that the basin and water temperatures were improved by 10.49% and 10.88%, respectively when using black paint with SiO_2 nanoparticle in the concentration of 20%, coated on the absorber plate compared to that when using the ordinary black paint, while using the fins on the absorber plate enhanced the potable water produced by 55.18% when using 20% SiO_2 nanoparticle compared to that of conventional TSS. The cost per liter of water produced using the flat and finned absorber coated using 20% SiO2 nanoparticle in black paint is found as 0.0187 and 0.012 $/L respectively.

Introduction

Demand for energy and water is increasing daily with rapid growth in industrial development. The requirement for fresh and potable water has become growing in the world at a faster rate as human life depends on drinking water for survival. Solving the shortage of fresh and potable water is becoming an important issue globally (Elsheikh et al. (2018); Sharshir et al. (2018); Essa et al. (2020a, b)). Many health-related issues are present, especially in the remote and arid regions

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 Springer

Role of Surface Functionalized Crystalline Nano-silica on Mechanical, Fatigue and Drop Load Impact Damage Behaviour of Effective Stacking Sequenced E-glass Fibre-reinforced Epoxy Resin Composite

M S Heaven Dani[1] · N Venkateshwaran[2]

Abstract

This present investigation deals the role of surface functionalized crystalline nano-silica addition into epoxy resin on fatigue, fracture toughness and drop load impact damage behaviour with various stacking sequence of E-glass fibre. The main objective of this current investigation was revealing the importance of surface-functionalized crystalline nano-silica particle in E-glass fibre reinforced epoxy composite. Crystalline nano-silica of 20nm and E-glass fibre of 600 GSM was used as reinforcements. Both the particles and fibre was surface-functionalized using 3-Aminopropyletrimethoxyle (APTMS) via wet solution method. The hybrid composites were prepared via hand layup technique with different fibre stacking sequence. The mechanical results revealed that fibre pattern of L-A-L with 1.0vol.% of nano-silica gave highest tensile and flexural strength. The fatigue results revealed that the addition of 0.5 vol.% crystalline nano-silica into glass-epoxy composite (ES_1) gives highest fatigue life cycle of 38544 in 50% of tensile stress. Similarly, the fracture toughness results revealed that a highest fracture toughness of 31.5 MPa was observed for composite designation ES_2. The composite, which contains 1.0vol.% of surface functionalized crystalline nano-silica with L-A-L fibre pattern gives very high drop load impact resistance. Thus for high strength structural applications, automobile, aircraft and sports related applications these composites could be more suitable and replaced.

Keywords Polymer composites · Nano-silica · Surface-modification · Fatigue · Fracture toughness

1 Introduction

Fibre-reinforced polymer matrix composites are high promising materials to serve lot of light weight engineering applications such as in automobile, structural, aircraft, sports, sailing components and domestic appliances [1]. Fibre strengthening could be an easy and effective process in strengthening of polymer composite materials, where various natural and synthetic fibres could be layered in a definite sequence to effectively share the applied load [2]. In general fibre do share the applied load in macroscopic format and improves the strength of bare thermosetting plastics, but additions of nano particles could share and observe the load as micro level [3]. Example when a thermosetting plastic is dispersed with high toughness nano-clay or rubber particles the composite become high stiffer and tougher [4]. Though the composite is strengthened by fibrous material the micro load sharing particles are very important in high strength composite preparation [5]. The fibre layering stacking sequence could also fetch improvement in load sharing phenomenon by distributing the applied load throughout the matrix effectively. Many researchers have done research on the effect of various stacking sequences of fibres in matrix with their mechanical and fatigue behaviour. Gokul et al [6] investigated the effect of various stacking sequenced E-glass and Kevlar fibre in matrix. The proposed stacking sequences were symmetric layering & aligned orientation, alternative layering along with alternative orientation and accumulated layering aligned orientation respectively. The authors confirmed that stacking sequence of accumulated layering aligned orientation gives improved results in mechanical, drop load impact and fracture toughness of composites. Similarly, Guru et al [7]

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Applications of Two Separate Methods to Deal with a Small Dataset and a High Risk of Generalization

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D. K. Sharma ; Bhopendra Singh ; Mamoona Anam ; R. Regin ; D. Athikesavan ; M. Kalyan Chakravarthi   **All Authors** •••

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Abstract

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Abstract:

Dimensionality reduction means obtaining additional training data by supplementing this study with supervised learning to match input variables. A training dataset is used due to a lack of training examples in some domains and avoiding the fitting problem. A Convolution Neural Network (GAN) to augment a classification model for computer vision has shown to improve prediction performance. Using the augmented neural network, this study analyses whether transfer processing within the same GAN will improve prediction performance even further. This proposed a method for assessing the effect of data augmentation in the processing of microscopic charcoal images. Morphological transformations and sub-images were various steps to data augmentation that have been investigated. A post-Inception-v3 framework is also applied to educate a barbecue species classifier using the data available. The best value was observed using the micro methodology, which had an overall precision of 99.36%

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Micro structure and finite element analysis of fitness and unfitness square butt joint of aluminium based nano composite plates

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ABSTRACT

The main objective of this paper is analyzed the welding temperature and stress field distribution in aluminum based nano composite plates by varying the different welding parameters of Tungsten Inert gas welding (TIG). The residual stresses of the welded butt joint and unfitness joints of Aluminium based Nano Composite (ABNC) plates are predicted by conducting tensile test; as the results are shown with the unfitness of the weld joint, which had a greater impact on the welding residual stresses than that of the interval. The simulated and experimental results are compared with each other samples. With the help of a mathematical model, the effect of welding parameters such as heat input of the weld, preheating of the work piece and moving velocity of heat source on weld penetration in moderately thick plates are discussed in this experimental work. Hence the steady state temperature profiles of welded ABNC plates are solved by finite difference method. The simulated values are verified with the experimental results in addition to comparison with that of previous experiment result. The predicted values from the proposed ABNC models are compared favorably with the experimental data of welded ABNC samples.

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1. Introduction

Most of authors could not investigate the finite element analysis in Aluminium metal matrix composites (AMMC) weld joints because it was light weight structural materials joint application. It was widely used in aviation, aerospace, transportation and other areas for their excellent specific strength and good weld ability [1]. However, due to rapid local heating, the distributions of internal temperature in the weldments were uneven. This together with their larger thermal conductivity and lower high-temperature strength were often leading to greater residual stress and deformation of the welded components. This could be resulted in a series of issues such as low intensity, instability of the joint in size and small ductile deformation, limiting their further development of applications. The different welding methods and welded structures would produce different types of welding residual stress, which also brings a challenge to the assessment of the stability and reliability of the welded structures. With the development of numerical simulation technology, understanding of welding residual stress and deformation has not been dependent solely on the physical measurements; it can be also predicted quickly and accurately using finite element simulation methods [2–6]. This factor could give large discrepancies to the mechanical characteristics and properties of the structure and consequently would lead to inaccuracies in their predicted results. An attempt was made to present an appropriate way to model welded joints of ABNC plates in a structure using the finite element method. Initially, two single-plates were developed in 3-dimensional finite element model and then weld model of ABNC plate created. Later all three parts were assembled in CREO software. The two plates were joined together to form a single butt-joint of simple structure that involved gas tungsten arc welded (GTAW) joint. Mechanical characteristics of the butt weld joint structures of ABNC plates were determined experimentally.

Finite Element Analysis (FEA) was carried out in ANSYS software. A thermal-elastic plastic finite element method was developed to simulate the process of variable parameter for tungsten

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Research Article

Evaluating the Mechanical and Tribological Properties of DLC Nanocoated Aluminium 5051 Using RF Sputtering

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The diamond-like carbon- (DLC-) coating technique is used in the sliding parts of automotive engines, among other applications, to reduce friction and wear. In this work, DLC has been coated on the Aluminium 5051 sample to assess the mechanical and tribological properties. A sputtering deposition mechanism is used, and the DLC is coated using a graphite target. The developed DLC coatings are tested for adhesion strength, hardness, chemical composition using XRD, and wear behaviour. The developed DLC thin films have considerably increased the wear behaviour of the Aluminium 5051 sample and have fulfilled the objective of this study. The XRD data indicated the presence of amorphous carbon in the coating with a threefold increase to the hardness of the naked aluminium. This study provides insight into improving the aluminium wear resistance by developing a considerably hard coating.

1. Introduction

In today's machinery sector, surface engineering is critical. Hard coatings extend the service life of tools and moulds, yet hard coatings are difficult to apply to machine parts built of soft materials such as aluminium [1]. Thin films with high hardness can bear higher loads, but as the substrate is a soft material, the substrate fails the coating and the thin film too shall fail [2]. Surfaces take up a very little area in a matter when compared to the bulk. Still, they are extremely difficult to investigate [3] due to the very asymmetric nature of the forces acting on the surfaces. Pristine surfaces are highly susceptible to impurities and flaws. When two extremely pure surfaces come into contact, adhesive force is created, and

energy is used to separate those surfaces [4]. Adhesion energy is the energy exerted by atoms on the outer surfaces of nearby atoms when they come into contact with each other [5]. A simple van der Waal, covalent, ionic, or electrostatic force can be used as adhesive forces [6]. Cohesive forces hold atoms together in bulk materials. Atoms are held together by a cohesive force, and it takes a lot of force to rip a substance in half [7]. The breaking of cohesive links between atoms causes the metal to tear. The atoms with broken cohesive bonds on the new surfaces generated after breaking the parent material will be readily attracted to the new atoms [8]. Surface energy is the excess free energy per unit area on a crystal's surface. It is denoted by and plays a crucial role in thin-film adherence to the substrate. Surface tension

Research Article

Experimental Investigation on Mechanical Properties of Carbon Nanotube-Reinforced Epoxy Composites for Automobile Application

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Carbon nanotubes are established as a superior form of carbon. These have superior characteristics in terms of mechanical and chemical properties when compared to the other fibres available. High-strength fibres can be employed in a composite in a short form and mass-produced to fulfil high demands in composite applications. These composites can meet the strength requirements of nonstructural and structural components in a wide range of industries. Because of their light weight and excellent strength-to-weight ratio, these composites can be used in a wide range of applications. With Young's modulus as high as 1 TPa and tensile strength up to 63 GPa, they are among the stiffest and strongest fibres. There is currently a lot of interest in using carbon nanotubes in a matrix to take advantage of these features. There have been a variety of polymer matrices used, and nanotube/ceramic and nanotube/metal composites are gaining popularity. The study of these materials is an ongoing process, as researchers and design engineers have yet to realize their full potential. Carbon nanotubes (CNTs) are used in this study to create the composite with the resin. The percentage of CNT used as a filler material in the composite is varied from 1 to 4 percent, with the best percentage chosen for optimal mechanical properties.

1. Introduction

Carbon nanofibres (CNF) and carbon nanotubes (CNT) have had increasing potential in recent decades. Researchers from all around the world are attempting to apply the better qualities of these nanocomponents to a variety of applications [1]. The application range between biosensors and bat-teries of the new age CNTs has outstanding mechanical properties due to the two-dimensional arrangement of carbon atoms in a graphene sheet [2]. Due to this, massive out-of-plane distortions will happen while the strength of carbon-carbon in-plane bonds keeps the graphene sheet extremely strong against any in-plane distortion or fracture [3]. CNTs have a high aspect ratio and excellent electrical

Research Article

Processing and Characterization of Carbon Nanofibre Composites for Automotive Applications

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Currently, numerous studies have shown that carbon nanofibres have mechanical properties that are replaced by other widely used fibres. The high tensile strength of the carbon fibres makes them ideal to use in polymer matrix composites. The high-strength fibres can be used in short form in a composite and mass-produced to meet the high demands of automotive applications. These composites are capable of addressing the strength requirement of nonstructural and structural components of the automotive industry. Due to these composite lightweight and high-strength weight ratios, the applications can be widely varying. The research for these materials is a never-ending process, as researchers and design engineers are yet to tap its full potential. This study fabricated phenolic resin with different wt% of carbon nanofibre (CNF). The percentage of the CNF as a filler material is varied from 1 to 4 wt%. Mechanical properties such as hardness, tensile strength, and XRD were investigated. Phenolic resin with 4 wt% of carbon nanofibre (CNF) exhibits maximum tensile strength and hardness of 43.8 MPa and 37.8 HV.

1. Introduction

Nanocomposites provide a new class of material having combined properties of matrix and filler [1]. Nanocomposites using different fillers such as carbon nanotubes, nanofibres, silicates, clays, and metal nanoparticles can be prepared and applied in different fields like biomedical engineering, environmental applications, surface science, and the pharmaceutical field [2]. High-performance engineering materials with innovative properties were prepared through nanocomposite fabrication [3]. From the past few decades, the potential of carbon nanofibres (CNFs) and carbon nanotube (CNT) has been expanding [4]. Researchers around the globe are working to utilise the superior properties that these nanocomponents possess for various applications. The applications range from biosensors to new-age batteries

[5]. The high surface area with less volume of CNF is suitable to suppress the defects that can be raised [6]. For micromechanical interlocking, the CNTs should exhibit some surface defects. This may include bonds in the CNT structure due to nonhexagonal defects and variation in diameter [7]. This kind of adhesion is very poor in CNT reinforced polymer composites because CNTs possess an almost smooth surface [8]. Chemical bonding includes ionic or covalent bonding capable of making changes in the smooth surface structure of CNTs. This helps to improve the effective stress transfer between the filler and matrix [9].

Depending on the carbon atom layer orientation in the CNF, the properties have varied. Carbon sp^2 filaments are stacked, and the CNFs are formed [10]. Depending on the stacking of the graphite planes, the CNF has different shapes [11]. Magesh et al. developed MWCNT incorporated

Retraction

Retracted: Improvement on Mechanical Properties of Submerged Friction Stir Joining of Dissimilar Tailor Welded Aluminum Blanks

Advances in Materials Science and Engineering

This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.
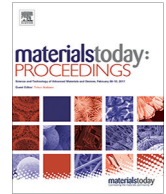
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Analysis the mechanical properties and material characterization on Magnesium Metal Matrix Nano composites through stir casting process

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ABSTRACT

The main objective for this work are explored and evaluate the feasibility of fabrication of Magnesium Metal matrix Nano composites (MMNCs) using Stir casting process. It has increasingly used becoming attractive materials in advanced industrial applications. Since it has high demands for energy saving as well as lightweight materials attract a large amount of research interest. Here Magnesium used as basic matrix composite in fabrication of MMNCs. Hence Magnesium as lightweight structural metal and high strength-to-weight ratio of alloys are usually a major reason for considering these materials in engineering designs as well as fabrication of composite material. This magnesium alloys are widely used in automotive, aerospace and chemical applications in wide scale that is because of their low density. However, their applications are quite restricted within their low strength and ductility. By addition of nano size reinforcements in the base matrix magnesium alloy, thus for giving them excellent properties are to be a hopeful choice for many applications as well as for improving their mechanical properties. In this paper aims to study the effect of reinforcement on the microstructure and mechanical properties like tensile strength, yield strength, ductility, strain and micro structure analysis of Magnesium metal matrix nano composite.

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1. Introduction

During the last two decades, a lot of research has been conducted on metal matrix composites (MMCs) in commercial laboratories and small businesses. As result of these activities, many new applications have been established, and most of these have found insertion within the commercial sector. Magnesium metal matrix composites are widely used in application of aerospace and infrastructure industries are enabled by functional properties including high structural efficiency, excellent wear résistance, and attractive thermal and electrical characteristics [1]. Challenging technical issues are overcome including compatibility between reinforcement and matrix, affordable primary and secondary processing techniques capable of adequately controlling reinforcement distribution, engineering design methodologies, and characterization and control of interfacial properties [1].

Recent investigations find that the incorporation of nanoparticles into the Magnesium matrix could enhance the hardness,

the yield and ultimate tensile strength considerably, while the ductility is retained. The great enhancement in strength values of these composites are attributed to grain refinement, strong multidirectional thermal stress at the matrix/nano particle interface, small size of nano particles, good distribution of the nano particles and low degree of porosity which leads to effective transfer of applied tensile load to the uniformly distributed strong nano particulates. The strength of composites is expected to be influenced by the dislocation density, dislocation to-dislocation interaction and constraint of plastic flow due to the resistance offered by particles [11–18]. It is reported that due to the thermal mismatch stress, there is a possibility of increased dislocation density within the matrix which leads to local stress and increasing strength of the matrix and the composite. More than 50% improvement in yield strength of A356 alloy was observed with only 2.0% (mass fractions) nano-sized SiC particles [2].Traditional monolithic materials are limitations in achieving their Mechanical properties such as strength, stiffness, toughness and density. To overcome these diffi-

Characterization and effect of the use of safflower methyl ester and diesel blends in the compression ignition engine

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Abstract. Energy is vital to the profitable growth of every nation and to stimulate new research. Only natural resources can meet the growing energy demand in recent years, biodiesel has become very interested in the energy as well as environmental advantages that it can be combined with mineral diesel fuel in any quantity. The research focuses on the study of the replacement of diesel with a safflower methyl ester. The engine tests shall be performed using the safflower methyl ester as fuel in the DI diesel engine. The combustion, emission and performance characteristics were studied using alternative fuels and mixtures. Safflower Methyl Ester 80% (SAME80) and SAME100 have high heat release rates. Nitrogen oxides were higher by about 50%, carbon monoxide decreased by 10%, unburnt hydrocarbon was slightly higher and the thermal efficiency was higher for the SAME than for diesel fuel.

1 Introduction

The use of powerful diesel engines needs help in the future, as the fuel consumed is lower and potent greenhouse gases such as carbon dioxide are substantially reduced (Antolin *et al.*, 2002). The growing use of diesel, huge trade flows and environmental issues have led to developing nations like India finding an environmentally friendly alternative to diesel fuel. The country's dependence on oil-rich countries is growing due to a highly accountable energy shortage (Demirbas, 2007). It raises the country's import bill. The rise in the bill is a major concern for the lack of global trade tools and the energy supply shortages are highly responsible. Petroleum products are commonly used by transport, agriculture and industries. In the modernised agricultural sector, it plays a crucial role (Dorado *et al.*, 2003). The eradication of Internal Combustion (IC) engines cannot be achieved. To use current engines in an effective way, alternative fuel is the solution and it must be obtainable (Kinoshita *et al.*, 2004). There have been some considerations concerning the selection of suitable alternatives to petroleum-based fuels. Several steps to encourage the conservation of petroleum resources have been taken (Murugan *et al.*, 2008). These include improved refining energy production and increased transport fuel efficiency.

Furthermore, the exhaust of the engine accumulates in the air pollutants. To minimise the impact on the environment of exhaust gas emissions and the depletion of fossil fuel reserves, alternative fuels are needed. Alternatives such as fuel injector, transportation of fuel, storage and transmission should be compatible with the current engines (Schlick *et al.*, 1988).

Biofuels are typically more efficient than fossil-fuel production, but their use can lead to reducing transportation pollution (Lesnik *et al.*, 2020). In developing countries, energy demand is projected to increase by 90% and about a third of this energy will come from renewable energies, including biofuels. The only alternative to fossil fuels available in the world is biofuel from extracted biomass (Vignesh *et al.*, 2021). Safflower methyl ester oils, on the other hand, have been much favoured worldwide as edible raw material for biodiesel processing. The Compression Ignition (CI), as alternative fuel without motor modification due to high viscosity and density, is not fed with clean biodiesel up to 100% (Soares and Rocha, 2018). However, it has been shown that pure biodiesel can be used without significant engine changes in diesel engines (Ozsezen and Canakci, 2011). Oil is a material that is largely suitable for the generation of biomass fuel, particularly in oil-importing countries all over the world, such as Turkey, as an alternative source of renewable energy.

In other words, the biodiesel fuel produced from safflower oil, which is not consumed by people in this

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Research Article

Effect of Design Parameters on Fresh Water Produced from Triangular Basin and Conventional Basin Solar Still

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This paper reported the experimental testing of a triangular and conventional basin solar still (TBSS and CBSS). Solar basin and absorber are made of glass and a polyethylene cover, respectively, with an area of $0.25\,\mathrm{m}^2$. Square and triangular absorber with the same area of $0.25\,\mathrm{m}^2$ with square and triangular glass cover for condensation was fixed. Experimentations were conducted during the month of December 2018, and different natural criteria such as intensity, wind speed, and surrounding ambient temperatures were considered. Also, the modified model was compared to the CBSS on its performance and efficiency characteristics. The experimental results also revealed that the temperature of the water inside the TBSS was higher as compared with that of the CBSS. The daily yield obtained from CBSS and TBSS was found to be 2.7 and $3.2\,\mathrm{kg/m}^2$, respectively. Also, the daily efficiency of the TBSS was improved by 11.36% than the CBSS.

1. Introduction

Renewables appear to be the one of the source which is inexhaustible, clean, ecofriendly, and cost economic. Also, it appears to be the competitive energy among the other nonrenewable energy sources. Due to their abundance and its potential to use in the globe, they differ from the use of fossil fuel. Renewables will not even produce any kind of greenhouse gases which normally affect the climate which includes the reduction in annual rainfall and increased ambient temperature [1–4].

The utilization of solar energy in the distillation process appears to be an economical method to produce fresh water [5–8]. Manokar et al. [9] reviewed the different types of techniques employed in pyramidal solar still (PSS) for fresh water improvement. The different heat exchange mechanism employed in solar still for enhanced fresh water was reviewed by Kabeel et al. [10]. Similarly, Sathyamurthy et al. [11] surveyed the different geometries employed in cover and absorber of solar still for enhanced yield. The factors that affect the performance of PSS with a triangular basin and cover were experimentally studied by Sathyamurthy

ELSEVIER

Experimental analysis on single and double basin single slope solar still with energy storage material and external heater

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ABSTRACT

This work presents the experimental investigation on a single and double basin solar still equipped with external heater in the lower basin with continuous circulation. The increased temperature of water with the electric heater in the lower basin of solar still increased the temperature of water in the upper basin while continuous evaporation from both the basin occurs. Similarly, the water temperature is increased by 15% by solar radiation in the upper basin. The results of water produced from single basin and double basin were observed as 2.74 and 5.78 kg/m^2 day respectively whereas, the yield from double basin solar still with electric heater is found as 6.72 kg/m^2 day.

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Technological Advancements in Materials Science and Manufacturing.

1. Introduction

Water is the most essential component for human to survive. The amount of water available for drinking is depleting due to continuous extraction, increased ground water pollution, and climate change. One of the feasible methods in getting fresh water is through desalination process. Among which use of renewable energy is the most emerging one as it uses ecofriendly energy and available in low cost [1-11]. Patel et al. [12] used evacuated tube solar collectors integrated to single and double basin solar still for enhancing the productivity of distillate. Results showed that the average improvement in the distillate by 13% compared to solar still with single basin and evacuated tubes. Similarly, the addition of evacuated tubes improved the distillate by 65% than solar still without ETC. Hashim [13] used a different approach on single slope solar still and modified it as a double basin solar still and analysed the external mirror on distillate and efficiency. It was reported that the solar still with double basin and external mirror showed higher distillate output while compared to solar still with single basin. Rajaseenivasan et al. [14] used a different approach on double slope solar still on adding additional basin on the top of solar still for enhancing the rate of condensed water. Additionally, porous, energy storage and wick materials were added to enhance the productivity. Results showed that distillate

produced was decreased on increased depth of water. Also, the production of fresh water was increased by 85% using an additional basin compared to single basin using mild steel scraps inside the basin. This work presents the effect of external heater on fresh water with continuous circulation on an experimental basis is presented.

2. Experimental setup and procedure

Figs. 1 and 2 present schematic diagrams of the SB and DB solar still with compartments used in this study. Two solar stills having similar basin areas were constructed and tested at Mohamed Sathak Engineering College, Tamil Nadu, India during the month of March – May. The inner dimensions of both still were 0.5 m × 0.5 m. Lower basin area is 0.25 m^2. The SB still basin was made up of 1.4 mm thickness mild steel plate and height of the basin is 18 cm. 4 mm thickness clear window class was used as transparent cover and it placed over the iron frames of the basin. It is placed 30° inclinations to the horizontal. The system has the capability to collect distillates from two points (South and North). The DB still consists of a lower and upper basin. Lower basin was constructed as same as SB still and the upper basin was made of 4 mm clear window glass and the inclination is 30°. The height of the upper basin is 14 cm. To separate the upper basin as different compartment, 7 cm height of glass is used and it is fitted in the glass cover using Silicon glue. Window glass of 4 mm thickness is

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Evaluating the Hardness and Microstructural Analysis of Reinforcing the Nano Silicon Carbide and Nano Zirconium Oxide in Hybrid Al6061 Metal Matrix Composite

V. Deepakaravind and P. Gopal

Abstract Aluminium alloy (Al6061) matrix composite is reinforcing of β phase APS silicon carbide nanoparticle at scale range of 50 nm in the weight percentage of 2% along with β phase APS zirconium oxide of nanoparticle at 45 nm scale range in the weight % of 2.8, 3.0 and 3.2%. By progressing, the reinforcement element is carried out using the stir casting method to form the hybrid aluminium-based metal matrix nanocomposite samples. Microstructure and hardness properties are analysed in fabricated aluminium-based metal matrix nanocomposite samples. These metal matrix nanocomposites are characterized by scanning electron microscope (SEM). Hardness tests are carried out in order to identifying hardenability in the aluminium-based metal matrix nanocomposite. The results revealed that Al metal matrix nanocomposites are containing 2% of nano silicon carbide along with 3.2 wt% of nanoparticle of zirconium oxide (ZrO_2) samples to improve the hardness strength among the other samples of hybrid aluminium (Al6061) metal matrix nanocomposite.

Keywords Aluminium (Al6061) · Aluminium metal matrix nanocomposite(AMMNC) · Scanning electron microscope(SEM) · Zirconium oxide(ZrO_2) · Nano metre (nm)

1 Introduction

Advanced technology used for preparation of material with a familiar combination of properties, it could not be melted in the material, metal alloy, polymeric and ceramics materials. Generally, a composite was defined as combination of two or more similar and dissimilar materials to have a distinct interface between elements. Resulting properties were larger than specific components constituents.

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Optimization of Shell and Tube Condenser for Low Temperature Thermal Desalination Plant

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Abstract: In the current work, attempt for enhancing the heat exchanger of the shell and tube by analyzing the various parameters. The heat exchanger is a device used to transfer heat between at least two fluids. In the different kinds of heat exchangers utilized in various industries, shell and tube heat exchangers are presumably the most adaptable and widely heat exchangers utilized in most industrial areas. Based on the relationship between different parameters such as tube velocity, overall heat transfer coefficient, mass flow rate, and pumping power, analysis is carried out. Results show that the tube velocity increases the overall heat transfer coefficient, total pressure drop and mass flow rate of water, Pumping Power, up to the certain limit and starts to decrease. So that the parameters can be optimized by conducting the experiments based on different input parameters. The parameters which influence the optimal result are researched and recommended.

1. Introduction

Sea water desalination is achieving extending thought of present-day technique makers, especially with the making demands that development, masses impact, inconsistent precipitation and ground water contamination on the delicate standard resources [1]. Low temperature thermal desalination is one system that uses the availability of a temperature incline between two water bodies [2], the oceans thermal gradient that depicts temperature variety over the significance of the oceans, to gain new water. The open heat slant between more intense surface water and colder significant seawater is utilized by streak evaporating [3].The Low-Temperature Thermal Desalination (LTTD) plant runs on the rule of flash purifying by evaporating heat surface seawater in a chamber kept up under and therefore melting the subsequent fume in a condenser [4]. A Shell and Tube heat exchanger, in which 12ºC remote ocean cold water streams inside cylinder group, was chosen considering its different points of interest, for example, low-pressure drop, multi-tube pass course of action, simple support and Rugged mechanical development [5]. The exchanger contains Cu-Nickel tubes encased inside a SS-304L shell in which fume streams. The cylinders are exposed to high vibrational bowing loads and destructive experts that may prompt cylinder disappointment [6]. Consumption can be relieved by

picking the correct material for shell and cylinder packs though vibrations can be alleviated by proper structure against the disappointment of cylinders with the goal that stream actuated vibration is viewed as a basic piece of the heat plan [7]. Liquid flexible uncertainty, arbitrary excitation, vortex shedding or intermittent wake shedding, and acoustic reverberation bring about cylinder vibrations in shell-and-cylinder heat exchanger [8]. Among these excitation systems, the most serious vibration component is liquid versatile shakiness, which may cause tube harm following scarcely any long stretches of activity and striking because of stream choppiness causes almost no vibration, which causes tube divider diminishing, due to worrying, such reasons for vibration must be dodged [9]. For firmly single cylinder clusters with a pitch proportion of less than 2, the vortex shedding deteriorates into broadband ferocious vortexes bringing about tempestuous astounding [10]. Due to cross flow, choppiness increments in tube packages as the liquid streams over the cluster geometry and, in that capacity [11-12], the cylinders are exposed to tempestuous striking [13].

Shell and tube heat exchanger configuration can be optimized by changing the tube length which shows the impact of shell frequencies recurrence [14], tube characteristic recurrence, critical velocity, bundle cross flow,and vortex shedding proportion [15-16]. All the above investigations depend on an essential recurrence

Mn-doped nickeltitanate ($Ni_{1−x}Mn_xTiO_3$) as a promising support material for PdSn electrocatalysts for methanol oxidation in alkaline media

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Nickeltitanate (Ilmenite) has been prepared with stoichiometric variation by substituting Mn in the 'A' site, using the sol−gel method in a highly active form. The PdSn electrocatalyst was then impregnated with nickeltitanate by a microwave-assisted polyol method. The physiochemical characterisation of the synthesized electrocatalyst PdSn–$Ni_{1−x}Mn_xTiO_3$ was done by X-ray diffractometry, UV-visible spectrophotometry, Raman spectroscopy and transmission electron microscopy. The elemental composition was obtained using energy dispersive spectra which confirmed the presence of Ni, Mn, Ti, O, Pd and Sn. Electrochemical characterization using cyclic voltammetry and polarization experiments showed that the synthesized PdSn–$Ni_{1−x}Mn_xTiO_3$ exhibited an enhanced catalytic activity and better stability in the alkaline medium, compared to conventional PdSn/C catalysts. It was observed that the charge transfers from the support material ($Ni_{1−x}Mn_xTiO_3$) to the PdSn electrocatalyst boosted the oxidation reaction. By varying the methanol concentration from 0.5 M to 2.0 M, the resulting current density also varied from 129 to 151 mA cm^{-2}. This result demonstrated that the prepared material PdSn–$Ni_{1−x}Mn_xTiO_3$/C electrocatalyst is an excellent candidate for the methanol oxidation reaction.

1. Introduction

Energy plays an essential part in the development of human civilization. Scientists and technologists are facing two problems: meeting the fast-growing demand for energy and reducing the pollution to the environment that results from the burning of fossil fuels. Various efforts are in progress all over the world to develop advanced energy systems that are eco-friendly such as fuel cells, lithium-ion batteries and photo-electrochemical systems that could provide unlimited energy supply.[1] Small organic molecules like ethylene glycol, glycerol, formaldehyde and ethanol have gained considerable traction because of their small size which can be used in the Proton Exchange Membrane Fuel Cell (PEMFC).

Direct methanol fuel cell is a suitable system for energy conversion, because of that pollution-free process and high efficiency in energy conversion system.[2] However, there are still

some obstacles limiting the large-scale applications of PEMFC. The main problems are low electrocatalytic activity and easy deactivation of catalysts with regards to molecular oxidation. The noble metals platinum, gold and ruthenium are commonly used as electrocatalysts in fuel cells, among which palladium-based catalyst is the most cost-effective choice and relatively abundant on the earth.[3] These noble metals lose their performance while being used as catalysts in the fuel cell for a longer period because Nafion is unstable during methanol oxidation in a fuel cell. This peculiar problem was attributed to the action of hydroxyl and hydroperoxyl free radicals on the Nafion.[4–6]

In the direct methanol fuel cell, activated carbon is used as support material, whereas commercially Vulcan carbon XC-72R is in use, because the latter one has high active surface area, more stability and high charge transfer. However, the self-agglomeration and deterioration behaviour of activated carbon leads to reduce the efficiency of the charge transfer kinetics between the metal particles and the support materials resulting in the decrease of performance of the fuel cell.[7–10] To avoid the deterioration of activated carbon in electrocatalyst, a support material based on metal oxides have been used for the electro-oxidation reaction.[11–14] The metal oxide support for the electrocatalyst materials has a significant role in oxidation reaction and they have a large surface area and high oxygen vacancy on the surface of the oxide materials. They have a particularly good electrical conductivity that confirms better

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Research paper

Enhanced photocatalytic degradation efficiency of graphitic carbon nitride-loaded CeO$_2$ nanoparticles

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ARTICLE INFO

ABSTRACT

In the present study, we have evaluated the photocatalytic potentials of ceria (CeO$_2$) loaded graphitic carbon nitride (GCN; g-C$_3$N$_4$) composite towards the degradation of two different organic dyes. The CeO$_2$/GCN composite following its formation by the co-precipitation route, the physicochemical properties like crystallinity, functionality, optical, and morphology are being studied using various instrumental techniques such as powdered X-ray diffraction (XRD), Fourier transforms–infrared spectroscopy (FTIR), UV–Vis diffuse reflection spectroscopy (UV–Vis), and field emission scanning electron microscopy (FESEM). From the analysis, the XRD studies indicated that the composite has the cubic structure of ceria and hexagonal phase for the GCN. The FTIR analysis supported for the successful formation of CeO$_2$/GCN composite and UV–Vis provided the optical properties indicated to have the bandgap energy values of 3.12 and 2.86 eV for pure CeO$_2$ and CeO$_2$/GCN composite (respectively). Also, the FESEM confirmed for the surface morphology of CeO$_2$/GCN composite, and finally, the test of photocatalytic activity studied in the presence of visible light irradiation towards the degradation of Methyl blue (MB) and Rhodamine-B (Rh-B) dyes indicated for the superior activity of CeO$_2$/GCN composite as compared to the single-phase GCN and pure CeO$_2$. Based on the cumulative analysis of results, it can be informed that the CeO$_2$/GCN composite can be useful for the sustainable means of degradation of organic dyes (MB and Rh-B) by taking advantage of the synergistic impact of the two components of CeO$_2$ and GCN.

1. Introduction

The recent increase in the research and development of nanotechnology tools and associated techniques is to create defect-free hybrid materials (unlike the existing ones) with fine-tuned fundamental properties of traditional materials and thereby expanding their applications to various other sectors [1-3]. The many different kinds of next-generation hybrid materials with advanced electrochemical and superconducting properties include metal oxide nanoparticles (NPs), graphene, carbon nanotubes (CNTs), etc and these are suitable for the applications of storage media, electronics, solar power panels, and catalysis [4-8]. As an example, the graphitic carbon nitride (g-C$_3$N$_4$; termed as GCN) has been investigated to be an active photocatalyst because of its eco-friendly nature, low cost, ease of synthesis, and well-maintained bandgap energy in the visible region provided by the presence of strong covalent bond between the carbon and nitrogen [9]. Also, the availability of high surface area for this GCN material is due to the 2D stacking of π conjugated planes which is analogous to graphite. However, this material suffers from the limitations of the high rate of recombination of photogenerated electron-hole pairs [10-12] and also can create heterojunctions followed by non-metal doping [13] and thereby restricting its usage towards the development of next-generation

SPECIAL ISSUE ARTICLE

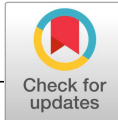WILEY

Brain–computer interface for assessment of mental efforts in e-learning using the nonmarkovian queueing model

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Abstract

The rapid advancement in information and communication technology has made e-learning an alternative learning method for many learners. In the last few years, a huge number of learners around the world have registered in massive open online courses (MOOCs) provided by various online learning platforms. However, MOOC platforms have a vital task for the online course provider to provide enhanced students' learning experiences and satisfaction. In this work, we developed a brain–computer interface for gathering data and detecting a learner's mental situation by observing MOOC videos and electroencephalogram (EEG) devices based on John Sweller's Cognitive Load Theory. The acquired EEG signals are preprocessed with two different normalization methods to scale signals. To validate the introduced framework, the system adopted three machine learning algorithms (random forest using non-Markovian model, support vector machine, and k-nearest neighbors) to develop a model with preprocessed training data and test the classifiers to validate their ensemble classifiers' performance. Finally, experimental analysis showed that the random forest classifier with the non-Markovian approach achieved more than the other two techniques in the form of overall accuracy (99.15%) and F-measures (99.21%).

KEYWORDS
brain–computer interface, EEG signal, machine learning, MOOCs, mental effort, non-Markovian model

1 | INTRODUCTION

The rapid development in the Internet has significantly improved the level of educational activities. We need to accept the fact that internet innovations are now turning out to be an integral part of our regular daily existence [34]. This has modified the manner in which we observe data and how we communicate with one another. As an outcome, the education field has likewise witnessed a revolution [14]. Certainly, an ever-increasing number of educational programs integrated with computerized culture into the courses has been indicated through e-learning [38]. Massive open online courses (MOOCs) standout amongst the most well-known e-learning methods on both computers and cell phones [13], which delivers an opportunity to an infinite number of students to obtain innovative skill-sets, grow their insights and get online gradations with low cost [16].

A MOOC contains a wide range of video lectures, coursework, tests & assessments, and a conversational

ULTRASONIC VELOCITY STUDIES OF BENZOIC ACID AND SUBSTITUTED BENZOIC ACIDS IN AQUEOUS MIXED SOLVENT SYSTEMS

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ABSTRACT

The ultrasonic velocity of benzoic acid and substituted benzoic acids such as para chloro benzoic acid, para nitro benzoic acid and meta nitro benzoic acid in ethanol-water binary solvent mixtures of several compositions were evaluated. It finds immense applications in the field of several technological and industrial processes such as petrochemical, pharmaceutical and in the manufacture of dyes. The results of ultrasonic velocity determination are remarkably important in the determination of liquid mixtures that are made up of polar and non-polar compounds. The structural modifications of ethanol get into a 3-D network of linkages made up of hydrogen bonds in liquid mixtures. In the present study, it is inferred that a weak molecular association exists between ethanol and the substituted benzoic acids through weak dipole-dipole interactions. The probability of the development of donor-acceptor complexes has also been examined and subsequently discussed. In addition, the effect of substituents like the nitro and the chloro group at the para and meta positions has also been interpreted.
Keywords: Benzoic Acid, Ultrasonic Velocity, Solute-solvent Interactions

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INTRODUCTION

The results of ultrasonic velocity studies are extremely useful in identifying the acoustical and thermodynamic parameters that are significantly perceptive to molecular interaction studies.[1,2] The structure of molecular liquids can be speculated from the results of thermodynamic and transport properties. The results also throw light on the presence of intermolecular interactions that exist in the liquid mixtures.

Alcohols are highly self-associated liquids. Both inter and intramolecular hydrogen bonding is found in alcohols.

The most important property of alcohols is their application as solvents and they are of a major utility in biology, chemistry and pharmaceutical studies. Likewise substituted benzoic acids like p-chloro benzoic acid, m-nitrobenzoic acid and p-nitrobenzoic acid are mainly used in a variety of industrial applications. The 3-D network of hydrogen bonding in alcohols makes it an interesting aspect to highlight the diverse types of molecular interactions and associations in organic ternary mixtures having alcohol, a self-associated liquid in the mixtures. It can associate with any other compound which has a group that is susceptive to polar associations.

The variation of ultrasonic velocity unravels the changes associated with the structure of the weakly associating and strongly associating components in the binary liquid mixtures.[3-5] The molecules of benzoic acid are connected by hydrogen bonds and exist as a dimer with D_2h symmetry. There are several chances for ethanol to interlink and form a complex which is hydrogen-bonded with benzoic acid and the substituted benzoic acids. The structure may be due to the nature of ethanol which can act both accept hydrogen bonds strongly as well as act as a weak hydrogen bond donor.

Thus, mixing the different substituted benzoic acids in aqueous ethanol mixtures gives interesting results due to the presence of specific interactions that may arise due to the charge-transfer forces, dipole-dipole interactions, donor-acceptor properties and hydrogen bonding of the mixtures.