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IJ-11	P C Rajesh Kumar K Janardhana Vincent Crasta	Crystal growth and third order NLO properties of a photonic material	Journal of Molecular Structure, 1059, 2014, pp 118-123	221

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NC	1	3	3	-	1	9	2	-	2	21
IC	1	4	4	7	2	6	1	2	1	28
NJ	-	2	-	1	1	5	4	-	3	16
IJ	2	3	11	6	3	26	4	-	10	65
TOTAL	4	12	18	14	7	46	11	2	16	130

NC- National Conference, IC– International Conference, NJ- National Journal, IJ- International Journal

COMPUTER SCIENCE AND ENGINEERING

A Review of Monitoring Techniques for Service-Based Application

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ABSTRACT

A Service-Based Application (SBA) is composed of a number of loosely coupled services available on the network which provide the desired functionalities. Service Based Applications execute in dynamic business environments and have to address evolving requirements. Hence they should be flexible to identify violations and adapt to changes in business requirements or context. Monitoring is the key element for adaptation. A Service Based Application can be viewed in terms of three layers i.e., Business Process Management Layer, Service Composition Layer and Service Infrastructure Layer. Application performance depends on the combined performance of components and their interactions within the SBA layers. Therefore it necessitates to constantly monitor the health of the application by monitoring activities occurring in SBA layers. In this paper we present a view of the monitoring approaches across the three layers .

A Survey on Cloud Performance Metrics Measurement and Analysis

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ABSTRACT

Services made available to users on demand through the internet from a cloud provider's servers or provided from company's owned servers, designed to provide easy scalable access to applications, resources and services which are managed by a cloud providers. The cloud service can dynamically scale to meet the needs of its users and supplies the resources which include e-mail services, hosted office suites and document collaboration services, database processing, managed technical support services and more. There are several factors that determine the performance of the Cloud (cluster, server, batch jobs etc.).Determining the cloud performance is one of the important jobs since the Cost of the cloud services doesn't reflect the value of the cloud. The cost needs to be justified based on the performance. Factors that we identified are response time, throughput, CPU time per execution, execution count/second, QOS metrics (availability, accessibility, reliability, regulatory, security etc). In this paper we survey existing work in these areas and discuss new research directions that can help improve cloud consumers perspectives of the cloud.

Application of Response Surface Methodology and Enhanced Non-dominated Sorting Genetic Algorithm for Optimisation of Grinding Process

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ABSTRACT

Optimisation of grinding process during grinding of Al6061-SiC composites is investigated in this study. Stir cast Al6061-SiC composites with varying volume percentage of SiC reinforcement were ground on a conventional grinding machine with diamond grit grinding wheel. Three grinding variables were studied for simultaneous optimization of material removal rate and surface roughness. Initially, the response surface models for grinding process parameters were developed using response surface methodology. Further, the developed models were optimized using enhanced elitist non-dominated sorting genetic algorithm (enhanced NSGA-II), a time saving algorithm in comparison to conventional NSGA-II. The suitable grinding conditions for multi-objective optimization of the grinding process were obtained from enhanced NSGA-II. Finally the confirmation tests were performed to validate the results obtained from response surface methodology and enhanced NSGA-II. It is observed that, experimental results and the results obtained from enhanced NSGA-II are in close conformance. Hence it is concluded that the developed algorithm can effectively be used for optimization of grinding process.

Intrusion Detection and Prevention Using Blocking and Back Tracking for IP Spoofing

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ABSTRACT

Forging, or" spoofing," the IP addresses of sender, intermediate or receiver nodes provides malicious parties with anonymity and novel attack vectors. Spoofing-based attacks complicate network operator's defense techniques, tracing spoofing remains a difficult and largely manual process. Hence we come up with a technique called Back Tracking using hashing approach. We use an efficient encryption and decryption technique to keep the message safe and we also append the IP addresses of sender, intermediate nodes through whom the message is either sent or forwarded, the receiver node will get the IP addresses of all such nodes along with the decrypted message.

CIVIL ENGINEERING

Behaviour of Tunnel and Surrounding Strata using 3Dec Numerical Modelling: Case Study of an U/G Metro Rail Project

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ABSTRACT

Tunnel serves various purposes including transportation. A case study of an underground metro rail project involving considerable length of the tunnel was taken up for this study. This paper presents the analysis carried out for a stretch of 350m long tunnel being constructed for an underground metro. Modeling was carried out at seven different cross sections of tunnel, using 3DEC software, incorporating the strata characteristics. Study was carried out for the stability of tunnel with and without support. Observations were made about the behaviour of tunnel under given conditions for Vertical Stress, Vertical Displacement, at points like crown of tunnel and at the surface. Minute displacement of 0.05mm was observed particularly at the chainage where the tunnel is completely passing strong rock at Chainage 9345m. Tunnel is passing through Moderately Weathered Rock at Chainage 9295m, and the analysis resulted in a displacement of 4mm without support which has reduced to 0.5mm after placing the lining. Higher displacements were observed at chainages where the tunnel is passing through Silty sand, HighlyWeathered Rock and Sandy Silt. Displacement at the tunnel crown increased to 18.6mm where the tunnel is passing through Silty sand (Chainage 9495m).

Analysis of Behaviour of a Tunnel and Surrounding Strata using 3 DEC Numerical Modelling: Case Study of an U/G Metro Rail Project

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ABSTRACT

Tunnel serves various purposes including transportation. Case study of an underground metro rail project involving different strata conditions was taken up for the study. Modeling was carried out at three different cross sections of tunnel, using 3DEC software, incorporating the strata characteristics, and stability of tunnel was assessed with and without support. Effect of building loads was also analysed. Observations were made about the behaviour of tunnel under given conditions for vertical displacement, at points like crown and floor of tunnel, and on the surface. Minute displacement of 0.52 mm was observed particularly where the tunnel is completely passing strong rock at Chainage 9345 m. Tunnel is passing through moderately weathered rock at Chainage 9295 m, and the analysis resulted in a displacement of 4.19 mm without support, which subsequently reduced to 0.32 mm after lining.

A Study on Surface Displacements Due to Phase Wise Excavation with Varying Tunnel Widths

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[2&3]Department of Civil Engineering, National Institute of Technology, Karnataka

ABSTRACT

Underground structures for transport lines, utility lines which are at shallow depths is common in most parts of the world. Upon excavating a tunnel, numerous changes take place in the Surrounding soil/rock mass and these changes reflect as settlements at the ground surface. In this paper the surface settlements due to single tunneling are predicted by a FEM software PLAXIS. The effect of varying excavation widths i.e 3m and 5m are studied in detail. Upon excavating the tunnel, settlement followed a Gaussian distribution curve. Excavation in smaller widths lead to greater settlements indicating faster the rate of tunnel progress lesser the settlement.

Groundwater Targeting in and around River Shambhavi, Karnataka, India: a Study based on Remote Sensing and Geographic Information System

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ABSTRACT

In this study an attempt has been made to delineate potential groundwater zones in parts of Shambhavi river basin, Dakshina Kannada, Karnataka. Geologically the area is mainly made up of laterite, granitic gneisses, alluvium etc. geomorphological units in the study area are alluvial plains, pedeplains, colluviums, rock exposures etc. Remote Sensing data provides synoptic view, repetitive coverage and multispectral information, can be used to generate thematic maps like geomorphology, drainage, land use/land cover, lineament map etc. In this study along with IRS 1C LISS III data, Survey of India topographical maps, Google images were also used to generate thematic maps. ERDAS and ArcGIS software's were used to generate thematic maps. Integration of thematic maps was done by using ArcGIS. Geomorphological map and geology map were integrated based on weightage analysis of GIS software. The area was then divided into five zones as 1- very poor, 2- poor, 3- moderate, 4- good and 5- excellent groundwater potential zones. Electrical resistivity survey is conducted to validate the results.

Behaviour of Tall Chimneys Considering Soil-Inclined Pile Interaction

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ABSTRACT

In the present paper, an investigation has been performed to examine the behavior of 100m tall chimney considering soil pile interaction for different soils such as very soft clay, loose sand, dense sand, hard clay and for different types of foundations such as annular raft, vertical pile foundation and inclined piles. The horizontal displacements at top of chimney examined for all the above cases for earthquake load by linear analysis using SAP2000 analysis package

Study on Soil-Inclined Pile Interaction and its Effect on Reducing Horizontal Displacement of Tall Chimneys

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ABSTRACT

In the present paper, an investigation has been performed to examine the behavior of 100m tall chimney considering soil pile interaction for different soils such as very soft clay, loose sand, dense sand, hard clay and for different types of foundations such as annular raft, vertical pile foundation and inclined piles. The horizontal displacements at top of chimney examined for all the above cases for wind load by linear analysis using SAP2000 analysis package.

Numerical Modelling Study of Behaviour of Consolidated Strata around Tunnel

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ABSTRACT

Tunneling in densely populated areas and under existing buildings is common in most of the cities around the world. Upon excavation there are changes that take place in the soil/rock mass and these changes can have an impact on the surface structures. In this paper an attempt is made to assess the behavior of the tunnel in given environment and the associated displacements due to tunneling in a highly consolidated soil/rock mass with two different conditions of earth pressure coefficient. A case study of a tunnel in South India was taken up for studies. 3-Dimensional Distinct Element Modelling code was used for the analysis. In the first stage, earth pressure coefficient Ko of 2.2 was taken for the top layers and 1.8 for bottom layer. In the second stage, a value of 2.2 was considered throughout the model. In the third stage displacement generated in the transverse direction, in presence and absence of the building load was taken into consideration and analysed. Vertical displacements were found to be of considerable magnitude at the crown, showing a decreasing trend towards the surface. Horizontal displacements were of negligible magnitude along the depth. However, maximum displacement was noted at springing level of the tunnel. Models incorporating weight of buildings showed no noticeable increase in settlements, as the soil/rock is already consolidated.

Study of Surface Displacements on Tunnelling Under Buildings Using 3DEC Numerical Modelling

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ABSTRACT

Underground structures at shallow depths are often constructed for metro lines, either in loose or dense layered soils. Tunnelling in urban areas is predominantly under surface structures and on tunnelling, innumerable changes in the form of distortion take place in strata surrounding the tunnel. Extent of displacement/damage to buildings or the tunnel-soil structure interaction depends on the type of building and nature of strata. Effect on displacements has been less studied in granular soils compared to other types of soils like clays. In this paper, parametric studies are conducted to find the displacements at surface, in granular soil conditions, due to varying building storeys and building eccentricities from the tunnel centre line. Effect of presence of geosynthetic layer under footings is further studied. Prior to the parametric studies, validity of the model used is checked with field data available for a stretch of tunnel in South India. Results of simulation studies reveal that inclusion of building reduces displacements at the surface in the dense strata. In very dense strata, the displacements increase as compared to the case without a building. As the centre of the building moves away from the tunnel centre line, settlement above the tunnel matches displacements in the case without building. Applicability of 3DEC software is checked with respect to the present study.

Effect of Varying Building Stories in the Presence of a Tunnel on Blast Induced Velocities and Displacements

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ABSTRACT

Blast induced excitations are common near construction sites. Buildings adjacent to tunnel with blasting at close proximity from structures are highly vulnerable to vibrations. A velocity time history generated due to an underground blast at 10m from the surface is applied at three different boundaries of the model. Building storeys were varied as 2, 4 and 8 storeys. 3 Dimensional Distinct Element code is used for the study. Response velocity spectrum generated due to blast is noted at various target points in the model. Study revealed that with an increase in number of storeys the displacement increased at the building top. Displacement values indicate that models subjected to input Velocity time history at the surface of model, led to greater displacement at various points of the tunnel and columns of the building compared to velocity time histories applied at other boundaries of the model.

Investigating the Workability and Strength of Concrete Mixes with Variation of Flaky Aggregates

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ABSTRACT

In this experimental investigation, the effect of flaky aggregates on fresh and hardened properties of concrete with different water cement ratios 0.5, 0.45 with superplasticizer of 0.6% was investigated. Concrete mix design of M25 grade was done according to IS: 10262-2009. Workability was measured in terms of slump test. Concrete cubes and cylinders were tested for compressive strength and split tensile strength. The test results are compared with different water cement ratios and the concrete made using water cement ratio of 0.45 with superplasticizer of 0.6% has the good workability & compressive strength. It was concluded that flaky aggregates beyond certain limit decreases strength and workability and hence the strength of concrete greatly depends on internal structure and shape of aggregates.

Rainfall-Runoff Simulation using HEC-HMS Tool: A Case Study of Nethravathi River Basin

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ABSTRACT

Continuous simulation of stream flow is useful for predicting the stream flow impacts of land-use changes and storm water management practices. Basin and river management includes precipitation-runoff modelling studies. Precipitation-runoff models have been widely used through the last century to formulate a reliable relationship between the precipitation (input of the model) and runoff (output of the model). In this study, Nethravathi Basin is selected as the application basin with the drainage area of 3000 km2. The catchment area has been divided into number of divisions. In order to estimate runoff from rainfall events, loss rate or infiltration parameters for the basin have to be calculated, which is a basic input for further rainfall runoff modelling. The infiltration capacity of the basin depends on the land use and soil property. Curve Number (CN) method is used for estimating infiltration characteristics of the watershed, based on the land use property and soil property. The results from the present study are compared with the results of the existing models for the study area.

A Review on Design of Reinforced Earth Wall

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ABSTRACT

The practice of adoption of Reinforced Earth (RE) walls in Highways and Railways in recent years has become substantial in India. Majority of the projects are designed based on BS code along with IS 1893:2000 for dynamic analysis. There are certain major differences between International codes with respect to design of RE wall. BS code considers the cohesive part of the soil also in the analysis. It uses the properties of soil under effective conditions for long term stability and undrained properties for short term stability. Australian code is more specific with respect to partial material factors, uncertainty and risk factors related to design. American Code gives formulation for seismic analysis apart from that provided by BS code. It does not allow using cohesion in the analysis. The long term tensile strength reduction factors by AS and AASHTO codes are comparatively high, therefore, there is an urgency in reviewing our designs following BS code.

ELECTRONIS AND COMMUNICATION ENGINEERING

Design and Development of Distinct Functions of PHY and MAC layer in WPAN

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[1]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru

ABSTRACT

IEEE 802.11 defines one medium access control (MAC) and several physical layer specifications for wireless connectivity for fixed, portable and moving stations (STAs) within a local area. The function of data scrambler and data whitener is implemented in PHY layer. Finally the transmitted and received information is analyzed using Analyzer.

A Novel Hybrid Scheme using MLE with Pulse Shaping for ICI Cancellation in OFDM Systems

Savitha H M[1], Muralidhar Kulkani[2]

[1]Dept. of Electronics and Communication Engineering St. Joseph Engineering College, Mangaluru
[2]Dept. of Electronics and Communication Engineering, National Institute of Technology Karnataka, Surathkal

ABSTRACT

Carrier frequency offset (CFO) in orthogonal frequency division multiplexing systems results in heavy degradation to the system performance. Pulse shaping and Maximum likelihood estimation (MLE) are two of the several techniques available in the literature for reducing the undesired effects caused by CFO using inter carrier interference (ICI) cancellation and CFO correction respectively. In this paper, we combine these two techniques to cancel ICI further, thereby achieving a better bit error rate (BER) performance than the BER achieved by either of the two above mentioned schemes. It has been shown that around 1.7 dB BER performance improvement could be achieved using the new hybrid scheme as compared to MLE technique with low pass filtering. Further, the hybrid scheme adopted in this work is less sensitive to CFO compared to pulse shaping scheme.

Advent of PHY and MAC Layer Operations in Wireless and Local Personal Area Network

Shama B N[1]

[1]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru

ABSTRACT

Carrier sense multiple access with collision avoidance (CSMA-CA) algorithm is implemented on AT86RF230 Trans-receiver, which is done in Physical layer. As the number of nodes is increased, power efficiency of CSMA-CA algorithm is decreased. Power efficiency is improved in terms of Throughput and Block acknowledgement. Fragmentation increases the reliability of correct transmission. Both high and low data rate can be supported through multirate design. Data Scrambler and Data Whitener is implemented. Finally the transmitted and received information is analyzed using Analyzer.

Cepstral Analysis of Speech for the Vocal Fold Pathology Detection

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ABSTRACT

It is possible to identify voice disorders using certain features of speech signals. A complementary technique could be acoustic analysis of the speech signal, which is shown to be a potentially useful tool to detect voice disease. The focus of this study is to compare the performances of mel-frequency cepstral coefficients (MFCC) and linear predictive cepstral coefficients (LPCC) features in the detection of vocal fold pathology and also bring out scale to measure severity of the disease. The speech processing algorithm proposed estimates features necessary to formulate a stochastic model to characterize healthy and pathology conditions from speech recordings. Two different set of features such as MFCC and LPCC are extracted from acoustic analysis of voiced speech of normal and pathological subjects. A linear discriminant analysis (LDA) classifier is designed and the classification results have been reported.

A Fourth-Order Partial Differential Equation Model for Multiplicative Noise Removal in Images

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[1]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru
[2]Department of Electronics and Communication Engineering, National Institute of Technology, Karnataka

ABSTRACT

In coherent imaging, the sensed images are usually corrupted with multiplicative data dependent noise. Unlike additive noise, the presence of multiplicative noise destroys the information content in the original image to a great extent. In this paper, we propose a new fourth-order Partial Differential Equation (PDE) model with a noise adaptive fidelity term for multiplicative Gamma noise removal under the variational Regularization framework. Variational approaches for multiplicative noise removal generally consist of a maximum a posteriori (MAP) based fidelity term and a Total-Variation (TV) regularization term. However, the second-order TV diffusion approximates the observed images with piecewise constant images, leading to the so-called block effect. The proposed model removes the multiplicative noise effectively and approximates observed images with planar ones making the restored images more natural compared to the second-order diffusion models. The proposed method is compared with the recent state-of-the art methods and the effective restoration capability of the filter is demonstrated experimentally.

A Complex Diffusion Driven Approach for Removing Data-Dependent Multiplicative Noise

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[1]Department of Mathematical and Computational Sciences, National Institute of Technology, Karnataka
[2]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru

ABSTRACT

In this paper we propose a second-order non-linear PDE based on the complex diffusion function. The proposed method exhibits better restoration capability of ramp edges in comparison to other second-order methods discussed in the literature. The proposed model is designed for Gamma distributed multiplicative noise which commonly appears in Ultra Sound (US) and Synthetic Aperture Radar (SAR) images. The fidelity/reactive term augmented to the complex diffusive term is derived based on the Bayesian maximum a posteriori probability (MAP) estimator as detailed in Aubert and Ajol ([10]). The regularization parameter is selected based on the noise variance of the image and thus this adaptive method helps in restoring the images at various noise variances without manually fixing the parameter. The results shown in terms of both visual and qualitative measures demonstrate the capability of the model to restore images from their degraded observations.

Hybrid Scheme for CFO Cancellation in OFDM Systems

Savitha H M[1], Muralidhar Kulkarni[2]

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[2]Dept. of Electronics and Communication Engineering, National Institute of Technology Karnataka, Surathkal

ABSTRACT

In this paper, we combine maximum likelihood estimation (MLE) technique with improved sinc power (ISP) pulse shaping to cancel inter-carrier interference caused by carrier frequency o□set in coded orthogonal frequency division multiplexing (OFDM) systems, thereby achieving an improved bit error rate (BER) performance as compared to the above two schemes. The BER performance of the OFDM system was checked for ISP pulse shaping alone, MLE technique with low pass filtering, and a hybrid scheme of MLE technique with ISP pulse shaping. It has been shown that, at normalized carrier frequency o□set of 0.2 and BER of 10−5, the hybrid scheme with convolutional coding could achieve a BER performance improvement of around 1.78 and 4.83dB, respectively, as compared to MLE technique with low pass filtering and ISP pulse shaping alone.

Vocal Fold Pathology Assessment Using Mel-Frequency Cepstral Coefficients and Linear Predictive Cepstral Coefficients Features

Jennifer C Saldanha[1], T Ananthakrishna[2], Rohan Pinto[1]

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[2]Department of Electronics and Communication Engineering, MIT, Manipal, India

ABSTRACT

It is possible to identify voice disorders using certain features of speech signals. A complementary technique could be acoustic analysis of the speech signal, which is shown to be a potentially useful tool to detect voice diseases. The focus of this study is to compare the performances of mel-frequency cepstral coefficients (MFCC) and linear predictive cepstral coefficients (LPCC) features in the detection of vocal fold pathology and also bring out scale to measure severity of the disease. The speech processing algorithm proposed estimates features necessary to formulate a stochastic model to characterize healthy and pathology conditions from speech recordings. Two different set of features such as MFCC and LPCC are extracted from acoustic analysis of voiced speech of normal and pathological subjects. A linear discriminant analysis (LDA) classifier, Principal component analysis (PCA)+Minimum distance classifier (MDC), Principal component analysis (PCA)+k-Nearest Neighbor(k-NN) classifier, PCA+LDA classifiers are designed and the classification results have been reported.

Content Based Image Retrieval Using Color Moment with SAD Method

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ABSTRACT

Today, as the creation and digitization of images and image retrieval have become easier, huge image databases have become more popular. The area of retrieve images based on the visual content of the query picture intensified recently, which demands on the quite wide methodology spectrum on the area of image processing.

Content Based Image Retrieval (CBIR) has therefore evolved into necessity. Due to the increased garbage value it is very important to design a CBIR system to retrieve images from the database in a very efficient manner. In this paper, Color image retrieval method based on the primitives of color moments is proposed. At the starting stage the image is divided into four segments. Then the color moments of all segments are extracted and clustered into four classes. At the next stage we will consider the mean moments of each class as a primitive of the image. All the primitives are used as features and each class mean is merged into a single class mean. The distance between the input query image mean with the corresponding database images are calculated by using SAD method.

Offline Handwritten Kannada and English Numeral Recognition using Wavelet Transforms

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ABSTRACT

This paper presents an OCR (optical character recognition) system for the handwritten Kannada Characters. A lot of work has been done in recognition of characters and numerals of various languages like Chinese, Gurmukhi and Arabic etc. But in case of handwritten English and Kannada script very less work has been reported. The feature can be extracted using Wavelet Transform. The feature set also contains the zonal densities of different zones of an image. In Database, 20 to 10 samples of each numeral character have been used. The character can be classified using Classifier.

Despeckling Low SNR, Low Contrast Ultrasound Images via Anisotropic Level Set Diffusion

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ABSTRACT

Speckle is a form of multiplicative and locally correlated noise which degrades the signal-to-noise ratio (SNR) and contrast resolution of ultrasound images. This paper presents a new anisotropic level set method for despeckling low SNR, low contrast ultrasound images. The coefficient of variation, a speckle-robust edge detector is embedded in the well known geodesic "snakes" model to smooth the image level sets, while preserving and sharpening edges of a speckled image. The method achieves much better speckle suppression and edge preservation compared to the traditional anisotropic diffusion based despeckling filters. In addition, the performance of the filter is less sensitive to the speckle scale of the image and edge contrast parameter, which makes it more suitable for the detection of low contrast features in an ultrasound image. We validate the method using both synthetic and real ultrasound images and quantify the performance improvement over other state-of-the-art algorithms in terms of speckle noise reduction and edge preservation indices.

A Nonlinear Level set Model for Image Deblurring and Denoising

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ABSTRACT

Image deblurring and denoising are fundamental problems in the field of image processing with numerous applications. This paper presents a new nonlinear Partial Differential Equation (PDE) model based on curve evolution via level sets, for recovering images from their blurry and noisy observations. The proposed method integrates an image deconvolution process and a curve evolution based regularizing process to form a reaction-diffusion PDE. The regularization term in the proposed PDE is a combination of a diffusive image smoothing term and a reactive image enhancement term. The diffusive and reactive terms present in the model lead to effective suppression of noise with sharp restoration of image features. We present several numerical results for image restoration, with synthetic and real degradations and compare it to other state-of-the-art image restoration techniques. The experiments confirm the favorable performance of our method, both visually and in terms of Improvement in Signal-to-Noise-Ratio (ISNR) and Pratt's Figure of Merit (FOM).

An Image Dehazing Model Considering Multiplicative Noise and Sensor Blur

P Jidesh[1], A A Bini[2]

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[2]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru

ABSTRACT

A restoration model considering the data-dependent multiplicative noise, shift-invariant blur, and haze has been introduced in this paper. The proposed strategy adopts a two-step model to perform a single image dehazing under the blurred and noisy observations. The first step uses the well-known dark channel prior method to estimate the transmission of the medium and atmospheric light that signifies the global color of the haze and dehaze the images. The second step performs denoising and deblurring under a Gamma distributed noise setup and a linear blurring artefact. The restoration under the above mentioned setup has quite a few applications in satellite and long-distant telescopic imaging systems, where the captured images are noisy due to atmospheric pressure turbulence and hazy due to the presence of atmospheric dust formation; further they are blurred due to the common device artifacts. The proposed strategy is tested using a large amount of available image-sets and the performance of the model is analysed in detail in the results section.

Image Enhancement under Data-Dependent Multiplicative Gamma Noise

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[2]Department of Electronics and Communication Engineering, St. Joseph Engineering College, Mangaluru

ABSTRACT

An edge enhancement filter is proposed for denoising and enhancing images corrupted with data-dependent noise which is observed to follow a Gamma distribution. The filter is equipped with three terms designed to perform three different tasks. The first term is an anisotropic diffusion term which is derived from a locally adaptive p-laplacian functional. The second term is an enhancement term or a shock term which imparts a shock effect at the edge points making them sharp. The third term is a reactive term which is derived based on the maximum a posteriori (MAP) estimator and this term helps the diffusive term to perform a Gamma distributive data-dependent multiplicative noise removal from images. And moreover, this reactive term ensures that deviation of the restored image from the original one is minimum. This proposed filter is compared with the state-of-the-art restoration models proposed for data-dependent multiplicative noise.

A Curvature-Driven Image Inpainting Approach for High-Density Impulse Noise Removal

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ABSTRACT

A PDE-based image inpainting method is proposed in this work for removing high-density impulse noise in images. In this model, the diffusion or inpainting process is driven by the difference curvature of the level curve. The proposed framework has two stages. In the first stage the noisy pixels are detected and they are piped to the second stage. In the second stage, these noisy pixels are inpainted using the information from their neighborhood. The connectivity principle is well realized and the edges and fine details are preserved well by the proposed model. The proposed method is compared (in terms of denoising capability) with the state-of-the-art impulse denoising models. The performance is quantified in terms of statistical quality measures. It is observed that the proposed method is capable of restoring images corrupted with high-density impulse noise (even up to 90 %). The experiments clearly demonstrate the effective restoration capacity of the proposed image inpainting model.

BER Performance Comparison of MIMO Systems using OSTBC with ZF and ML Decoding

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ABSTRACT

Multiple Input Multiple Output (MIMO) systems with multiple antenna elements at both transmitter and receiver ends are an efficient solution for wireless communication systems. They provide high data rates by exploiting the spatial domain under the constraints of limited bandwidth and transmit power. Space-Time Block Coding (STBC) is a MIMO transmit strategy which exploits transmit diversity and provides high reliability. Implementation of orthogonal spacetime block codes (OSTBCs) for a two transmitter–two receiver system under AWGN (Additive White Gaussian Noise) channel and flat fading channel is performed. Alamouti code is employed for the STBC. The modulation techniques used are BPSK, QPSK and 16QAM. Decoding is done using the Zero Forcing (ZF) algorithm and Maximum Likelihood (ML) algorithm. The BER Performance of each modulation scheme is compared with the un-coded version of the same. Performance comparison between the two decoding techniques is also done. It is found that ML detection offers a slightly better performance for BPSK and QPSK system than ZF detection.

BER Performance Comparison of Coded Communication Systems under Different Turbulence Conditions of Free Space Optical Channel

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ABSTRACT

The congestion and the limitations on bandwidths of the radio spectrum have posed a constraint for the growth of radio wireless systems. Wireless optical communication, also known as free space optical communication (FSO), is believed to be a long-term option for many wireless communication applications. Atmospheric turbulence is generally considered to be multiplicative noise source that reduces the capability of receiver to estimate the information contained in the modulated optical wave. This paper gives a comparative study of the behavior of the turbo/LDPC/convolutional-coded FSO system under different turbulence conditions. From the simulation results, it is clear that the turbo codes and LDPC codes are most suitable schemes for handling all the three cases of turbulences. They also provide a very good coding gain resulting in very low SNR requirements.

Performance Comparison of IEEE 802.11n HT PHY using OSTBC with ZF Decoding

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ABSTRACT

Wireless Local Area Networks are very popular among the users today due to the speed on offer, available security mechanisms and the mobility it provides. IEEE 802.11 set of standards for WLAN have undergone multiple revisions to support higher data rates and different operational frequency bands. IEEE802.11n High Throughput Physical layer device (HT-PHY) is an Orthogonal Frequency Division Multiplexing (OFDM) based Multiple-Input Multiple-Output (MIMO) PHY capable of supporting four spatial streams and data rates up to 600Mb/s. Space-Time Block Coding (STBC) is a MIMO transmission strategy that exploits transmit diversity and provides high reliability. The design aspects of an HT-PHY with dual spatial streams operating at 20MHz bandwidth supporting the modulation schemes of BPSK, QPSK and 16-QAM on a Field Programmable Gate array (FPGA) are discussed. Implementation of orthogonal space-time block codes (OSTBCs) for this two transmitter–two receiver system under Additive White Gaussian Noise (AWGN) channel and flat fading channel is performed. Alamouti code is employed for the STBC. Decoding is done using the Zero Forcing (ZF) algorithm.

ELECTRICAL AND ELECTRONICS ENGINEERING

Surface Electrical Stimulation Technology for Stroke Rehabilitation: A Review of 50 Years of Research

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ABSTRACT

Stroke is a disabling global health-care problem, and rehabilitation is a major part of patient care. Functional electrical stimulation (FES) refers to application of controlled electrical impulses to stimulate peripheral nerves innervating paralyzed or weak muscles to improve the impaired motor function. The present paper is an update on FES for stroke rehabilitation and a critical review of the first 50 years of FES-related research. In this paper, we first trace the basic design of a FES system for foot drop correction and provide an update on different feedback methodologies. Then we summarize the literature on advances in the technology and evaluate findings obtained from clinical trials. We made a pooled analysis of four clinical trials, involving 101 participants, comparing FES therapy with no intervention or conventional physiotherapy. Our results show significant improvements in walking speed (weighted mean difference: 0.17 m/s, 95% confidence interval: 0.06 to 0.28), cadence (weighted mean difference: 0.18 steps/sec, 95% confidence interval: 0.04 to 0.31), stride length (weighted mean difference: 13.75 cm, 95% confidence interval: 3.64 to 23.85), and functional ability measured by Fugl–Meyer scores (weighted mean difference: 0.08, 95% confidence interval: 0.03 to 0.12). FES group also had improvements compared to control group in two other outcomes, i.e., lower physiological cost index and higher step length, but the pooled effect was not statistically significant. Finally, we propose a conceptual framework and offer recommendations for optimizing the FES therapy for various research and clinical applications. Overall, our findings, and those of similar studies suggest that FES has a favorable effect on gait and motor recovery in stroke patients with foot drop. The possible barriers for implementation, clinical implications and the importance of future research in these directions are highlighted .

Functional Electrical Stimulation for Neuro Rehabilitation: A New Design Paradigm

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ABSTRACT

One of the most exciting recent advances in the neuroprosthetics field has been the application of biosignals in the design of functional electrical stimulation (FES) devices. An Electromyogram (EMG) measures the electrical activity in muscles and is often considered as ideal candidate biosignal for designing closed-loop controlled FES system. In this brief communication, we propose a novel design paradigm of a synergistic benefit of incorporating two different design principles in development of an EMG controlled FES system that hold promise for the future of rehabilitation of stroke and other neurological disorders. The proposed system will detect the residual EMG signals from the muscle and suitably adjust the stimulation current amplitude and stimulate the paralyzed muscles with a 'natural' EMG pattern envelope. We offer this design as a fruitful area for future research and clinical application.

Surface EMG Analysis and Changes in Gait Following Electrical Stimulation of Quadriceps Femoris and Tibialis Anterior in Children with Spastic Cerebral Palsy

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ABSTRACT

To evaluate the clinical feasibility and effect of neuromuscular electrical stimulation (NMES) therapy of quadriceps femoris (QF) and tibialis anterior (TA) muscles on improving gait and functional outcomes in children with spastic cerebral palsy (CP). Method: Ten children with spastic diplegic/hemiplegic CP who were in the age group of 7 to 14 years recruited from a rehabilitation institute were randomly assigned either to a control group or a NMES group. Both groups obtained conventional physiotherapy and muscle strengthening exercises. The NMES group in addition received surface electrical stimulation to QF and TA muscles for four weeks duration. Results: The NMES group showed significant improvements as compared to the control group in walking speed (mean difference: 7.83 meters per min, 95% confidence interval: 3.13 to 12.53, $p<;60;0.01$) and cadence (mean difference: 23.33 steps per min, 95% confidence interval: 5.90 to 40.77, $p<;60;0.01$). The NMES group also showed significant reduction in physiological cost index of walking or PCI (mean difference: -1.32 beats per meter, 95% confidence interval: -1.83 to -0.80, $p<;60;0.001$) indicating greater energy-efficiency of walking. No significant changes were seen in EMG parameters. Conclusions: The findings of this study suggests that NMES therapy together with conventional physiotherapy more efficiently improves walking ability and functional outcomes as compared to conventional physiotherapy alone in children with spastic CP.

Electrical Stimulation Devices for Cerebral Palsy: Design Considerations, Therapeutic Effects and Future Directions

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ABSTRACT

Cerebral palsy (CP) is a static encephalopathy; consequences are possibly nonprogressive and accompanied with postural disturbances. CP is a fairly common disease and the most important cause of childhood disability. Reducing spasticity and enhancing muscular coordination are goals of the majority of treatment modalities used in CP. Current therapeutic approaches for CP include physiotherapy involving muscle strengthening and balance improvement exercises. Orthotics, botulinum toxin injection, and surgical modalities are also commonly used. Although electrical stimulation (ES) for functional recovery in patients with stroke has been known for nearly 50 years and is fairly well established, its use in rehabilitation of CP is relatively new. The goal of the ES is to increase muscle strength and motor function. In this chapter, we have made an assessment of technology development and clinical deployment of ES therapy in CP children.

Functional Electrical Stimulation for Stoke Rehabilitation

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ABSTRACT

Functional electrical stimulation (FES) is a promising motor rehabilitation technique that applies small electrical impulses to stimulate peripheral nerves innervating paralyzed or weak muscles in order to improve or restore their function. FES has been carried out with considerable success in different neurological conditions such as stroke, spinal cord or head injury. Hemiparesis is one of the most common and disabling sequelae of stroke. Clinical studies have proved that FES therapy is effective in improving functional outcomes after stroke. Most patients with post-stroke residual paralysis when treated with FES therapy, they experience an orthotic benefit (while the device is used) and a significant "carry-over effect" (COE), i.e. an improvement in motor strength and motor control even when a patient is not using the stimulator. The exact mechanism behind this two-fold beneficial effect remains unknown. Much of the previous explanations for COE have been centered on the relationship between FES and the reduction of spasticity of muscle groups. This hypothesis does not however explain why FES therapy fails to show appreciable COE in neurological conditions such as multiple sclerosis despite showing a reduction of spastic muscle tone in these patients. Also, it does not explain how COE can occur in paralyzed muscles with minimal or no spasticity. COE is more than a mere academic curiosity for biomedical researchers. It is intriguing to know how stimulation of a peripheral nerve could bring about an improvement in the motor deficit resulting from a lesion in the brain. In this brief communication, we propose an alternate explanation that can account for the carry-over phenomenon. In our view the "learned paralysis" hypothesis of painful phantom limbs also help in understanding the therapeutic effect of FES.

An Innovative Device to Predict Acute Hypotension Episodes in Critically ill Patients: Hypothesis and Prototype Development

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ABSTRACT

The development of medical diagnostic devices has been influential in the advance of biomedical engineering research in recent decades. In this paper, we present our hypothesis and prototype development of a novel electronic device for forecasting hypotension episodes caused by acute failures of circulatory function in critically ill patients. Acute hypotension episode (AHE), a clinical condition commonly observed in intensive care units (ICU), characterized by an abnormal low blood pressure values and circulatory collapse is associated with mortality rates as high as 70–90%. Early diagnosis and rapid institution of aggressive therapy offer the best chance for a satisfactory outcome in critically ill patients. Physicians working in ICUs and emergency departments often face difficulties in predicting AHE during the forecast window, i.e. before occurrence of overt hypotension. Invasive direct measures of circulation are generally not a practical option in clinical settings. Recently, computer-based predictive algorithms are presented as potential predictors of AHE, but the predictive accuracy of these models depends on the number of parameters inputted and on pattern recognition and classification algorithms. It is well known that the sympathetic ("fight or flight") and parasympathetic ("rest and digest") systems work together in tandem to maintain a state of homeostasis in the body. The galvanic skin response reflects sympathetic tone and is often used as an indirect measure of psychological or physiological arousal. In this brief correspondence, we propose a hypothesis that galvanic skin response-GSR (skin conductance or electrodermal activity) could be used for prediction of AHE in critically ill patients.

Integrated Design and Real-Time Implementation of an Adaptive, Predictive Light Controller

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ABSTRACT

Daylight–electric light integrated schemes encompassing soft computing models have been perceived as a lucrative option for lighting energy conservation. This paper exploits the quintessence of design and real-time implementation of an adaptive predictive control strategy for robust control of a daylight–electric light integrated scheme. To elicit daylight variations, occupancy detection and user preferences an online self-adaptive, predictive control algorithm is structured for real-time control of electric lights and window blinds. The adaptive, predictive model entails integration of an online, adaptive daylight illuminance predictor in conjunction with an electric light intensity control algorithm for interior illuminance regulation and a fuzzy-logic based window blind control algorithm to eliminate glare and solar heat gain. The control algorithm modelled with real-time sensor information administers an online process of identification, prediction and parameter adaptation. The prototype controller is successfully implemented in a test chamber. A real-time user-friendly simulator provides an online visualisation of illuminance performance indicators and control of the process. The anticipated synergetic effects of the online control algorithm validated in the test chamber highlights the benefits of the scheme in terms of glare control, illuminance uniformity and energy efficiency.

A Wearable Device for Monitoring Galvanic Skin Response to Accurately Predict Changes in Blood Pressure Indexes and Cardiovascular Dynamics

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ABSTRACT

Predicting acute hypotensive episode (AHE) in patients in emergency rooms and in intensive care units (ICU) is a difficult challenge. As it is well accepted that physiological compensatory adaptations to circulatory shock involve blood flow redistribution and increase in sympathetic stimulation, we recently investigated if galvanic skin response (GSR) or electro-dermal activity (EDA), a measure of sympathetic stimulation, could give information about the impending danger of acute hypotensive episode or circulatory collapse (Subramanya and Mudol, 2012). In this current study, a low-cost wearable device was developed and tested to help progress towards a system for predicting blood pressure (BP) and cardiovascular dynamics. In a pilot study, we examined hypotheses about the relation between GSR values and four BP indexes (systolic BP, diastolic BP, mean arterial pressure and pulse pressure) in apparently healthy human volunteers before and immediately after treadmill exercise. All four BP indexes had significant relationship with GSR, with pulse pressure possibly the strongest predictor of variations in the GSR and vice-versa. This paper opens up opportunities for future investigations to evaluate the utility of continuous monitoring of GSR to forecast imminent cardiovascular collapse, AHE and shock, and could have far-reaching implications for ICU, trauma and critical care management. Listed among top 15 technologies that promise to shape technology news in 2016 and beyond by EDN magazine. (www.edn.com)

A Simple Model for Bedside Evaluation of Current for Neuromuscular Electrical Stimulation in Cerebral Palsy

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ABSTRACT

Customization of stimulation parameters for individual patients is gaining considerable clinical importance in the context of increasing emphasis on personalized neuromuscular electrical stimulation (NMES) therapy. In the current study, the relationship between stimulation current intensities, muscle parameters and pulse width was ascertained using the method of theoretical modeling and testing in a group of children with spastic cerebral palsy (CP) receiving surface NMES therapy. Contrary to the commonly held assumption, the present work provides evidence of a significant relationship between muscle parameters and stimulation currents. We used routinely available clinical anthropometric measurements to predict current intensities for NMES of quadriceps femoris and tibialis anterior muscle in children with CP, so that current dosages could be designed to produce therapeutically desirable effects. This model is a simple, inexpensive and noninvasive for bed side point-of-care clinical practice and follow-up.

Development of a Wearable Device for Monitoring Electrodermal Activity and Predicting Changes in Different Blood Pressure Indexes

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ABSTRACT

In this paper, we present a pilot study, wherein we developed a low-cost wearable device to monitor galvanic skin response (GSR) or electro-dermal activity (EDA), a measure of sympathetic stimulation, and tested hypotheses about the relationship between skin conductance values and four blood pressure (BP) indexes (systolic BP, diastolic BP, mean arterial pressure and pulse pressure) in apparently healthy human volunteers before and immediately after tread-mill exercise.

Implementation of DSP Based Sinusoidal Pulse Width Modulation for Three Phase Inverter

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ABSTRACT

This paper presents the implementation of sinusoidal pulse width modulation for a three phase Bridge inverter. Basically three sinusoidal reference signals which are phase shifted by120 degree apart from each other and compliment of these three sinusoidal signals are compared with the carrier signal to generate six different PWM signals for six switches of three phase inverter.LC filter is employed to reduce higher order harmonics in the three phase inverter output voltage. Closed loop operation is carried out. Hardware is implemented for open loop system where the SPWM algorithm is implemented in DSPIC30F2010. The efficiency of the inverter is high and offers less harmonic distortion. The proposed technique is simulated using MATLAB-Simulink model and THD is measured.

Bidirectional DC/DC Converter System for Solar and Fuel Cell Powered Hybrid Electric Vehicle

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ABSTRACT

The future trend in vehicular design for which environmental concerns is must, for that electric drive is a choice. This study is about the hybrid electric vehicle (REV) with new topology Powered by the bidirectional DC/DC converter with the eco-friendly sources like solar energy and fuel cell. Ecofriendly sources with the integration of bidirectional DC/DC converter have improved efficiency and are making tough competition for fossil fuel driven vehicles. Electric energy generated by these ecofriendly sources is stored in energy storage system (ESS) and used for propulsion. In this paper the discharge of energy during acceleration of vehicle is recharged by braking in vehicle i.e. Propulsion machine and charge is stored in battery by bidirectional converter. The operation of solar with MPPT, fuel cell, bidirectional converter, and electric drive wheels are investigated by simulation in this paper.

An Adaptive Predictive Framework to Online Prediction of Interior Daylight Illuminance

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ABSTRACT

Aiming to solve an open problem of designing a appropriate daylighting controllers, there has been growing interest in the use of nonlinear technique to perform prediction of interior daylight illuminance. Interior illuminance modeling and prediction approach provides an objective way to predict the future value of interior daylight illuminance from time series model. The urge to consider adaptive predictive technique lies in the fact that daylight is highly dynamic and nonlinear in nature. This manuscript elucidates and evaluates the performance of three nonlinear models: Nonlinear Autoregressive (NLARX), Time Delay Neural Network (TDNN) and Adaptive Neuro Fuzzy Inference Scheme (ANFIS) for accurate real time series prediction of interior daylight illuminance from online exterior and interior sensor measurements. By adopting an online tuning of model parameters by an online RLS adaptation algorithm, error between the actual system dynamics and identified model is scaled down. The exterior and interior illuminance data set for modeling are experimentally acquired from respective illuminance sensors mounted outside and inside the test chamber at Manipal (13°13'N, 77°41'E). NLARX, TDNN and ANFIS model prediction results have been validated with the real time experimental measurements. In essence, performance index comparisons of three models indicate ANFIS as a lucrative tool for the online prediction of the dynamic interior illuminance. A practical aspect of proposed ANFIS computational prediction model elevates an opportunity to couple within computer/embedded system based algorithms to perform as a real time artificial light controllers.

Phase Shedding in Multiphase Buck Converters to Improve the Efficiency

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ABSTRACT

With industry moving to higher performance platforms, efficiency of the power converter is critical. To improve the efficiency in this paper Phase Shedding is implemented in multiphase synchronous buck converter. In order to obtain the more efficiency in different loads in multiphase synchronous buck converter there is a requirement of phase shedding. Phase Shedding is disconnecting of phases in multiphase synchronous buck converter at different loads to get maximum efficiency in a particular load current. Working of multiphase synchronous buck converter with phase shedding is verified with the help of Mat lab / Simulink software.

INFORMATION SCIENCE & ENGINEERING

Discovery of Students' Academic Patterns Using Data Mining Techniques

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ABSTRACT

Knowledge discovery is an emerging field which combines the techniques from mathematics, statistics, algorithms and Artificial Intelligence to extract the knowledge. Data mining is a main phase of Knowledge Discovery in Databases (KDD) for extracting the knowledge based on the patterns and their correlation by the application of appropriate association rules to the informations available from the data set. The outcome of the KDD is used to analyse or predict on the future aspects in any area of considerations. In this paper we propose an analysis and prediction of students placements based on the historical informations from the database by considering the students information at different confident levels and support counts to generate the association rules. The widely used algorithm in data mining ie, apriori algorithm is specifically considered for the extraction of the knowledge.

Distributed File System Using Storage Clusters

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ABSTRACT

The purpose of this document is to present a detailed description of Distributed File System implemented using storage clusters. Targeted market for this application is Small to Medium scale Enterprises (SME's) that cannot afford dedicated data storage systems. It intends to provide fault tolerant storage by distributing data across a cluster of workstations that are connected by a robust network backbone guided by a central observer that maintains cluster info and metadata. In this paper we will discuss the existing data storage systems and how the same can be produced with available resources. It also discusses the purpose, features, interfaces and operational profile during node failures and external attacks. The paper concludes with the advantages of the newly developed application and the future enhancements that can be made.

Implementing Digital Signature Based Secured Card System for Online Transactions

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ABSTRACT

The RSA and other allied cryptographic mechanisms are widely used to provide security to the data during any online web based transactions. It has been proved that the Zhang proposed RSA cryptosystem could be easily cracked by an intruder. So, the security of the information in the network is becoming an important aspect in any web based communications. A new mechanism based on RSA to further enhance security is to make use of digital signatures to ensure the receiver that the message was created by a known sender, and that it was not altered in transit. In this paper digital signature mechanism based on the proposed scheme by Lin & Lei is implemented to describe the improved security given to the information while they are in transit during web based online transactions. It provides the security between two servers in IIS, which can be further improved and deployed in various technologies.

Cloud Computing Architectures and Dynamic Provisioning Mechanisms

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ABSTRACT

Cloud computing is a prodigious modern technology committed to provide pool of resources to the on-demand customers. The resources in a cloud are virtualized as a collection of services using the virtualization technology. Efficient provisioning of resources is a lofty problem due to the lively nature and the need to support heterogeneous applications with diverse performance requirements. The performance guarantee from the cloud datacenter requires efficient utilization of the resources. The efficient resource utilization towards any specific Service Level Agreement (SLA) or constraint on Quality of Service (QoS) alone is not sufficient for the cloud computing environments. Thus, cloud computing requires to strike a balance between the performance based on the negotiated QoS as well as the energy consumption at the datacenter during the process of resource provisioning. In this paper, we provide a detailed review of cloud computing architectures and provisioning mechanisms for delivering the computing as a service. We classify the cloud computing architectures discussed in literature based on their significance in cloud services provisioning mechanism. The paper presents taxonomy of dynamic provisioning mechanisms from the cloud utility point of view and brings out salient features/evaluation of existing mechanisms.

A Taxonomy of Live Virtual Machine Migration Mechanisms in Cloud Computing Environment

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ABSTRACT

The resources in a cloud environment are efficiently governed by employing virtualization technology. Virtualization allows multiple operating system instances to run simultaneously on a single computer. The administration of virtual machines (VMs) in the datacenter of cloud computing environment is a challenging task which requires live migration techniques. Live migration transfers running virtual machines between different physical machines without yielding control over its resources and network connections for maintaining the load balancing. The main aim of VM migration is to minimize the number of physical machines serving the given task/job with least energy consumption by switching off the idle nodes. In this paper, we provide a detailed review of different live migration techniques. The authors also define the taxonomy of live migration mechanisms based on their utilization in specific cloud environments by bringing out their salient features in the respective domains of service.

Fatigue Detection Alarm System

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ABSTRACT

The driver fatigue resulting from sleep disorders or lack of sleep is an important factor responsible for number of accidents. In this paper, we discuss how the proposed system detects the fatigue level of the driver. The main aspect is to keep the driver safe and prevent accidents by frequently measuring the fatigue level. The proposed Fatigue Detection Alarm System (FDAS) helps to reduce the above causes by notifying the driver about his drowsiness via an alarm procedure. The system also works well under reasonable light conditions. Database stores information about the driver and it keeps track of the duration of drive and the number of times driver has fallen asleep in that duration. Finally it generates a report which provides the drowsiness status of the driver.

Smart Mailing System for Secure Transmissions

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ABSTRACT

Email system has become the widely preferred means of information transfer in the modern business. Conventional email system is secured by a password system leading to a single layer of protection which is insufficient for guaranteed security. Modern businesses are more relying on electronic mail for communication with their clients and colleagues revealing the need for more privacy of sensitive information. The email is connected through many routers and mail servers on its way to the recipient by becoming vulnerable to both physical as well as virtual eavesdropping. The current industry standards do not place much emphasis on security as the information is transferred in plain text and the mail servers will be regularly performing the backups of the emails passing through. This leaves a digital paper trail that can be easily inspected months or years later which can be read by any cracker who gains access to an unprotected router. The proposed system helps to secure the sensitive information sent through email by providing a three layer authentication mechanism.
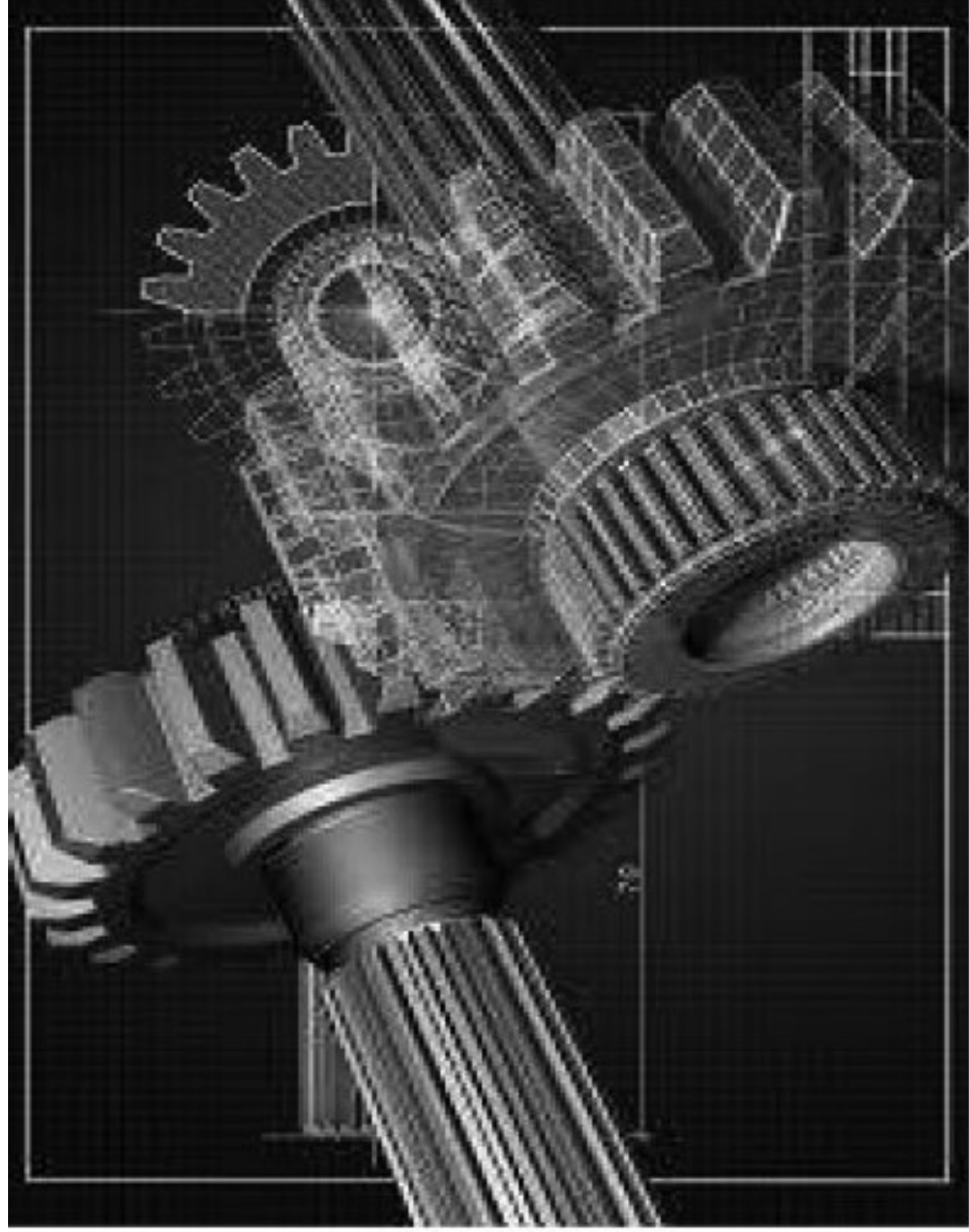
MECHANICAL ENGINEERING

Effect of Microstructure on Wear Characteristics of Spray Cast Al-Si Alloys

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ABSTRACT

In the present study, the effect of microstructure on the wear characteristics of spray cast Al-15Si and Al-20Si alloys has been investigated and compared with that of vertical axis centrifugal cast and chill cast alloys. The spray cast alloys have been subjected to Hot Isostatic Pressing for porosity reduction. HIPing has reduced the porosity in the spray cast Al-15Si and Al-20Si alloys from 19% to 8% and 19% to 2% respectively. The microstructures of spray cast alloys consisted of finely divided globular shaped Si particles with sizes varying from 2–10 μm. The Si particles have been distributed uniformly throughout the Al matrix. On the contrary coarse and segregated microstructures have been observed in vertical axis centrifugal cast and chill cast alloys. The sizes of primary and eutectic Si in vertical axis centrifugal cast alloys are smaller than that in chill cast alloys. The wear rates are the lowest for spray cast alloys and highest for chill cast alloys over a wide range of sliding velocity. The reasons for better wear resistance of spray cast alloys have been discussed in the light of the microstructural features evolved during spray casting.

Investigation on the Wear Properties of Primary Si Modified Al–20Si Alloy

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ABSTRACT

In the present study, Al–20Si alloy has been modified by Cu–13P master alloy to obtain Al–20Si–0.1P alloy. The wear properties of Al–20Si–0.1P alloy have been investigated and compared with that of Al–20Si alloy. The microstructure of Al–20Si–0.1P alloy consisted of primary and eutectic silicon distributed in the Al matrix. The size of primary Si is much smaller than that observed in Al–20Si alloy. Wear tests have been conducted over a wide range of loads and sliding velocities. It has been observed that the wear rates of Al–20Si–0.1P alloy are lower than that of Al–20Si alloy. The coefficient of friction is more or less constant in both the alloys but is low in Al–20Si–0.1P alloy. The better wear resistance of Al–20Si–0.1P alloy is discussed in the light of its modified microstructure evolved during solidification.

Dry Sliding Wear behavior of Potassium Titanate Whisker Reinforced Epoxy Based Polymer Matrix Composites

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ABSTRACT

This paper deals with the study of tribological properties of Potassium Titanate Whisker (PTW) reinforced epoxy based polymer matrix composite systems. Epoxy composites filled with PTW in various content of 0-15 wt% were prepared using the casting technique. Wear tests were conducted as per ASTM G99 standard on pin-on-disc machine at different loads, sliding velocities and sliding distances. Experimental results revealed that small content of PTW contributed to largely improve the dry sliding wear performance of neat epoxy. The coefficients of friction of the composites increased and wear rate value decreased with increasing PTW. Scanning electron microscopic (SEM) investigations showed that the worn surfaces of Epoxy/PTW composites were smoother than pure epoxy under given sliding conditions. This paper also highlights the possible reasons for variation in the tribological properties of developed polymer composites.

Modified Method for Estimation of the Specific Cutting Pressures for Mechanistic Cutting Force Models

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ABSTRACT

In order to obtain the higher productivity, quality products and reduction in production cost, new and easy methods of estimation of specific cutting pressures for the face milling process is under research for a long time. This paper presents a new method of estimation of specific cutting pressures for mechanistic cutting force models for the face milling process. The proposed method describes a) The characteristic study of specific cutting pressure b) Relationship between specific cutting pressure and measured cutting force c) Effects of cutting parameters. Accurate modeling of the specific cutting pressure results in predicting the cutting forces, vibration, surface quality, and stability of machining processes.

Effect of Ceramic Micro-Whiskers on Tribo-Performance of Epoxy Resin Composites-A Taguchi Approach

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ABSTRACT

This paper reports the development and wear performance evaluation of a new class of epoxy based composites filled with ceramic micro-whiskers namely Potassium Titanate Whiskers (PTW). The PTW were reinforced in epoxy resin to prepare whisker reinforced composites of different compositions. Dry sliding wear trials were conducted using a standard pin-on-disc test set up following a well planned experimental schedule based on Taguchi's orthogonal arrays.Taguchi's technique helps in saving time and resources for large number of experimental trials and predicts the wear response of epoxy composites within the experimental domain. The findings of the experiments indicate that the wear rate is greatly influenced by various control factors. Analysis of variance (ANOVA) is performed on the measured data and signal-to-noise (S/N) ratios. An optimal parameter combination is determined which leads to minimization of the wear rate. The results showed that whisker content was the major factor influencing the wear rate of the composite. Thus inclusion of the PTW in epoxy resin improved the wear resistance of the composite greatly.

Optimization of Dry Sliding Wear Performance of Ceramic Whisker Filled Epoxy Composites using Taguchi Approach

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ABSTRACT

This study evaluates the influence of independent parameters such as sliding velocity (A), normal load (B), filler content (C), and sliding distance (D) on wear performance of potassium-titanate-whiskers (PTW) reinforced epoxy composites using a statistical approach. The PTW were reinforced in epoxy resin to prepare whisker reinforced composites of different compositions using vacuum-assisted casting technique. Dry sliding wear tests were conducted using a standard pin on disc test setup following a well planned experimental schedule based on Taguchi's orthogonal arrays. With the signal-to-noise (S/N) ratio and analysis of variance (ANOVA) optimal combination of parameters to minimize the wear rate was determined. It was found that inclusion of PTW has greatly improved the wear resistance property of the composites. Normal load was found to be the most significant factor affecting the wear rate followed by (C ,) D), and (A). Interaction effects of various control parameters were less significant on wear rate of composites.

Effect of Nanoparticles Additives on the Performance of an Externally Adjustable Fluid Film Bearing

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ABSTRACT

This paper presents the effect of CuO, TiO_2 and Nano-Diamond nanoparticles additives in API-SF engine oil, on static characteristics of an externally adjustable fluid-film bearing. Modified form of Reynolds equation is solved numerically for various simulated operating conditions. Static characteristics evaluated are in terms of load carrying capacity, end leakage and friction. This study predicts that, a bearing having negative radial and negative tilt adjustments, and operating with API-SF engine oil blended particularly with TiO_2 nanoparticles, results in better load capacity with reduced end leakage and increased friction, as compared to API-SF engine oil and Base oil without nanoparticle additives.

Mechanical Properties of Potassium Titanate Whisker Reinforced Epoxy Resin Composites

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ABSTRACT

This paper deals with the study of mechanical properties of Potassium Titanate Whisker (PTW) reinforced epoxy based Polymer Matrix Composites (PMCs). Epoxy composites filled with PTW in various content of 0-20 wt% were prepared using the casting technique. Data on neat epoxy is also included for comparison. All tests were conducted at room temperature and as per ASTM standards. It was observed that inclusion of PTW affected most of the mechanical properties of neat epoxy. Density, hardness and heat deflection temperature of neat epoxy were found to increase with the PTW content. However tensile and flexural properties of the developed composites exhibited a varying trend with respect to PTW content. Epoxy filled with 10 wt% PTW showed good improvement in tensile strength and flexural strength of neat epoxy. It was observed that PTW is not beneficial in improving the impact strength of neat epoxy. Composites with 20 wt% PTW exhibited least impact strength. This paper also highlights the possible reasons for variation in the mechanical properties of developed polymer composites.

Finite Element Analysis of Thermal Characteristics of Annular Fins with Different Profiles

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ABSTRACT

The selection of a particular fin configuration in any heat transfer application depends on the space, weight, manufacturing technique and cost considerations as well as the thermal characteristics it exhibits. Radial or annular fins are one of the most popular choices for enhancing the heat transfer rate from the primary surface of cylindrical shape. Different profiles have profound influence on the thermal characteristics of annular fins. In the present study, a detailed work has been carried out to develop a finite element methodology to estimate the temperature distribution for steady-state heat transfer and thermal stresses induced by temperature difference in a silicon carbide (SiC) ceramic finned-tube of the heat transfer equipment. Finite element method (FEM) was used to compute the temperature and the stress fields. An extensive study was carried out using ANSYS, a powerful platform for finite element analysis. Results obtained were presented in a series of temperature and thermal stress distribution curves for annular fins with rectangular, trapezoidal and triangular profiles for a wide range of radius ratios. It was found that the radius ratio and fin profiles are the significant parameters affecting the temperature and thermal stress distribution in annular fins.

Analysis of Contact Stresses in Altered Tooth-Sum Spur Gearing

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ABSTRACT

Contact stress between the gear teeth in mesh determines the ability of the gear to transmit the power safely. In improving the contact strength of gear teeth, profile shift is found to be the best option beyond the use of high strength materials and surface treatment techniques. This paper discusses an alternate yet simple method of improving contact strength by the way of altering the tooth-sum. Altering the tooth-sum working between a specified center distances for a given module changes the operating pressure angle and hence necessitates profile shift. Using this profile shift gears can be designed to advantage. Few cases are considered for the purpose of discussion for clear understanding of the presentation. Large volume of monographs are developed which the practicing engineers can use.

Study of Tooth Profile in Altered Tooth-Sum Gearing when Altered By +4 Teeth with Aspect of Spur Gear Tooth Bending Strength

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ABSTRACT

Gears are used to transmit motion or power from one shaft to another. Spur gears are used to transmit power between two parallel shafts. This paper deals with the comparative study of tooth profile with aspect of spur gear tooth bending strength in altered tooth-sum gearing. Using profile shift it is possible to alter the tooth-sum of a gear pair operating between a specified center distance and module. The described procedure implies research of tooth profile parameters influence on spur gear tooth bending strength for a tooth-sum of 100 when it is altered by + 4 teeth for a pressure angle of 20° and module 2 mm and operating between a specified center distance by introducing a negative profile shift. In order to compare the bending stress of meshed gear teeth for gear pairs with different tooth profile the comparative diagrams are made. Many conclusions about the influence of tooth profile parameters of spur gear tooth bending strength for altered tooth-sum gearing can be obtained from those diagrams. With the help of these comparative diagrams it is possible to select the optimal values of addendum modification coefficients and radius of root curvature for a particular gear pair (104 teeth) with aspect of tooth bending strength.

Experimental Investigation of Fatigue Behavior of Spur Gear in Altered Tooth-sum gearing

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ABSTRACT

This paper deals with the contact stress, power loss, and pitting of spur gear tooth in altered tooth-sum gearing for a tooth-sum of 100 teeth when altered by _4% tooth-sum. Analytical and experimental methods were performed to investigate and compare the altered toothsum gearing against the standard tooth-sum gearing. The experiments were performed using a power recirculating type test rig. The tooth loads for the experimental investigations were determined considering the surface durability of gears. A clear picture of the surface damage was obtained using a scanning electron microphotograph. The negative alteration in the tooth-sum performed better than the positive alteration in a tooth-sum operating between specified center distances.

Effect of Compression Ratio and Preheated Air on the Performance and Emission Characteristics of C.I. Engine Fuelled with B20 Blend of Pongamia Methyl Ester

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ABSTRACT

In this study Pongamia oil methyl ester was obtained by transesterification reaction. The B20 blend was prepared by mixing 80% of diesel and 20% of pongamia oil methyl ester. The properties like density, flash and fire point, viscosity, calorific value were determined. It was seen that properties of B20 blend closely match the values of conventional diesel. A study was done on the engine performance for this B20 blend of pongamia oil biodiesel for different compression ratio's i.e 16, 17 and 17.5. A preheater was fabricated to increase the temperature of intake air and experiments were carried out for 40°, 50° and 60°C and the results were obtained.

It was observed that by increasing the compression ratio of engine which was fuelled with B20 blend of pongamia oil biodiesel brake thermal efficiency increases, brake specific fuel consumption decreases, whereas in case of emissions it was observed that Oxides of Nitrogen increases, this increase is due to increase of temperature inside the cylinder. CO and HC emissons decreases, this is due to better combustion within the engine cylinder. It was concluded that at 17.5 compression ratio for B20 blend of Pongamia biodiesel, better performance and emission results are obtained.

A preheater was fabricated to heat the intake air and test were conducted on B20 blend of pongamia biodiesel for 40°, 50° and 60°C temperature and at 17.5 compression ratio of the engine. It is observed that as the temperature of intake air increases, the brake thermal efficiency increases slightly, brake specific fuel consumption decreases. Among the emissions, it is observed that, the oxides of nitrogen increases, emission of CO and HC decreases .

Comparative Study on Tensile Creep Behavior of Sn-9Zn, Sn-0.7Cu and Sn-49Zn-1Cu Solders

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ABSTRACT

Solder plays an important role in various applications like microelectronic packaging and mechanical joining. Tinlead solder has been used in electronics assemblies for many years. Its adequate mechanical, electrical and thermal properties, combined with its low material cost, have made it the material of choice for joining active and passive components. However, lead being highly toxic and with the arrival of legislative restriction on the use of leaded solders there arose a need to initiate the search for acceptable, alternate joining materials. In this regard the commercial industries are rapidly implementing lead-free assembly strategies. As a result many binary, ternary and quaternary solder alloys are proposed. Although many of these alloys possess higher strength than traditional solders there still exists reliability problems such as creep. In this paper, an attempt is made to investigate tensile creep behavriour of three lead-free solders. Among the solders studied, Sn-49Zn-1Cu solder exhibited better creep resistant behaviour than Sn-0.7Cu and Sn-9Zn solders.

Comparative Study on Corrosion of Sn-37Pb, Sn-3.5Ag and Sn-9Zn Solders in Acidic Environment

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ABSTRACT

The corrosion behaviour of Sn-37Pb, Sn-3.5Ag and Sn-9Zn solder alloys in hydrochloric acid and sulphuric acid solutions has been studied over a range of acid concentrations by Tafel Extrapolation electrochemical technique. The study revealed that the corrosion rates of different alloys increase with the increase in concentration of sulphuric and hydrochloric acid media. The corrosion resistance of lead based solder was found to be superior to lead-free solders in the acidic environments investigated. Significantly higher corrosion current density and corrosion rates were observed with lead-free solders.

Effect of Copper and Iron on the Wear Properties of Spray Formed Al–28Si Alloy

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ABSTRACT

In the present study the effect of copper (Cu) and iron (Fe) on the wear behavior of spray formed Al–28Sialloy has been investigated. The spray formed Al–28Si alloy exhibited equiaxed grain morphology with fine and uniform distribution of Si particles in Al matrix and spray formed Al–28Si–5Cu–4Fe alloy exhibited similar morphology with small needles of b-Al4FeSi intermetallics and globular shaped h-Al2Cu precipitates spread along the boundaries and junctions of grains. Hot pressing has considerably reduced the porosity in spray formed alloys. On the contrary the microstructure of as-cast Al–28Si alloy consisted of coarse primary and eutectic Si unevenly distributed in Al matrix and that of as-cast Al–28Si–5Cu–4Fe alloy consisted of coarse Si particles, long needles of b-Al4FeSi2 and h-Al2Cu phases in Al matrix. Spray formed and hot pressed Al–28Si–5Cu–4Fe alloy exhibited higher value of hardness compared to the other alloys. The wear behavior of these alloys under dry sliding conditions showed that the spray formed and hot pressed Al–28Si–5Cu–4Fe alloy exhibited maximum wear resistance and minimum coefficient of friction, while as-cast Al–28Si alloy showed minimum wear resistance and maximum coefficient of friction over the entire range of loads. The high wear resistance of spray formed and hot pressed Al–28Si–5Cu–4Fe alloy is explained in light of its microstructural modifications induced during spray forming and the topography of worn surfaces.

Effect of Secondary Processing on the Microstructure and Wear Behavior of Spray Formed Al–30Mg2Si–2Cu Alloy

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ABSTRACT

In the present work, Al–30Mg2Si–2Cu alloy has been spray formed and subsequently hot pressed for densification. The alloy is then subjected to solutionizing and isothermal aging treatments. The microstructural features, hardness and wear behavior of spray formed and secondary processed alloys have been evaluated individually and compared with that of as-cast alloy. The microstructure of spray formed alloy showed refined and globular shaped primary Mg2Si intermetallic particles and Al2Cu precipitate particles uniformly distributed in Al matrix. The microstructure was refined further after hot consolidation. The microstructure after solution heat treatment appeared similar to that of the spray formed alloy but aging led to a further refinement in the microstructure compared to that of the hot pressed alloy. The evaluation of wear behavior of these alloys, under dry sliding condition, showed that the age hardened alloy exhibits maximum wear resistance and minimum coefficient of friction over the entire range of applied load (10–50 N) at a sliding speed of 2 m/s followed by hot pressed, spray formed and solution heat treated alloys. The as-cast alloy showed the least wear resistance and highest coefficient of friction. Similar trend has been observed even in their hardness values too. The wear resistance of the alloys is discussed in light of their microstructural modifications induced during spray forming and subsequent secondary processing and also the topography of worn surfaces.

Wear Behaviour of Secondary Processed Spray Formed Al-28Si-5Cu-4Mg Alloy

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ABSTRACT

In the present study Al-28Si-5Cu-4Mg alloy has been spray formed and hot pressed for densification. Hot pressing refined the microstructure and reduced the porosity in the spray formed alloy from 10 to 1%. The microstructure of spray formed and hot pressed alloy exhibited equiaxed grain morphology with fine and uniform distribution of both primary and eutectic Si with fine needles of Q-Al12Si7Mg4Fe intermetallics and Chinese script like θ-Al2Cu precipitates in α-Al matrix. The size of Si particles ranged from 3–10 μm. In contrast the microstructure of as-cast alloy consisted of coarse primary and eutectic Si, long needles of Q-Al-Si-Mg-Cu-Fe phase and bright grey θ-Al_2Cu phase in the α-Al matrix. The size of primary Si varied from 30–250 μm. The spray formed and hot pressed alloy exhibited a higher hardness compared to the as-cast alloy. The wear behavior of both the alloys, under dry sliding conditions, showed an increase in the wear rate with an increase in the load. However, the spray formed and hot pressed alloy exhibited maximum wear resistance and minimum coefficient of friction, while as-cast alloy exhibited minimum wear resistance and maximum coefficient of friction over the entire range of applied load. The high wear resistance and high hardness of spray formed and hot pressed alloy are explained in the light of its microstructural modifications induced during spray forming and subsequent hot pressing and also the topographical features of worn surfaces and morphology of debris particles.

Effect of Cu and Mg on the Wear Properties of Spray Formed Al-22Si Alloy

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ABSTRACT

In the present study, the effect of Cu and Mg on the wear behavior of spray formed Al-22Si alloy has been investigated and the same has been compared with that of its counterpart as-cast alloy. Al-22Si and Al–22Si–4Cu–1.7Mg alloys prepared by spray deposition process were hot pressed to reduce the porosity. The microstructures were examined by optical and scanning electron microscopes. The microstructure of spray formed Al-22Si alloy is fine and homogeneous and primary silicon phase distributed in the aluminum matrix evenly are fine and faceted having a mean size of 12 μm. The microstructure of spray formed Al–22Si–4Cu–1.7Mg alloy exhibited equiaxed grain morphology with fine and uniform distribution of both primary and eutectic Si with fine Q-Al-Si-Mg-Cu phase and θ-Al2Cu precipitates dispersed evenly in α-Al matrix. In contrast the microstructure of as-cast Al–22Si alloy consisted of coarse plates of primary Si of size 350 μm and eutectic Si needles. The as-cast Al–22Si–4Cu–1.7Mg alloy consisted of coarse primary Si with Chinese script like θ-Al2Cu precipitates and needles of Q-Al-Si-Mg-Cu phase in α-Al matrix. The wear study of both as-cast and spray formed and hot pressed alloys under an applied load of 10 to 50 N and sliding velocity of 0.4 to1.5 ms-1 indicated two distinct regimes of mild and severe wear. In both the regimes, the spray-formed and hot pressed alloys consistently indicated a low wear rate compared to that of as-cast alloys. The high wear resistance of spray formed and hot pressed Al–22Si and Al–22Si–4Cu–1.7Mg alloys were explained in the light of their microstructural modifications induced during spray forming and subsequent hot pressing.

Performance of HSS and Carbide Drills on Micro Filler Filled Glass Fabric Reinforced Epoxy Composites

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ABSTRACT

The objective of this study is to evaluate the performance of HSS and Carbide drills by measuring the various drilling parameters such as thrust, torque, delamination, specific cutting pressure and surface roughness. Two micro-fillers viz. Alumina and Graphite were used. The amount of fillers addition was 5 wt% in G-E composite. All composites were fabricated using hand lay-up technique followed by compression moulding. Drilling experiments were conducted with HSS and carbide drills under various cutting conditions, keeping diameter of the drill constant. Topography of drilled hole surfaces were analyzed through SEM micrographs. From the experimental investigation, it was found that plain/neat composites produced better quality holes compared to particulate filled composites when machined with HSS drills. Carbide drills produced better quality holes in particulate filled composites, especially with graphite filled ones.

Hybrid Effect of Ceramic Whiskers and Graphite Flakes on Mechanical and Dry Sliding Performance of Epoxy Composites

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ABSTRACT

This experimental study reports the results of adding ceramic whiskers (15 wt%) and graphite flakes (2.5 wt%) on mechanical and tribological characteristics of epoxy based polymer composites. Sliding wear experiments were conducted on a pin-on-disc test rig under dry contact conditions. Coefficient of friction and specific wear rate were determined as a function of sliding velocity (0.5m/s, 0.75m/s and 1m/s), normal load (10N, 20N and 30N) and sliding distance (500m, 1000m and 1500m). Density and hardness of epoxy was found to increase with addition of fillers. Strength properties were found to decrease after addition of ceramic whiskers where as it improved after graphite addition. However, both fillers acted to improve the stiffness under tensile and flexural loading conditions. Friction coefficient of polymer was found to increase after whisker addition, and decreased considerably after adding graphite lubricant. Both fillers significantly improved the wear resistance of epoxy composite. Microscopic study of tensile fractured surfaces and worn out surfaces of samples was carried out to identify different fracture mechanisms.

Modeling and Analysis for Wear Performance in Dry Sliding of Epoxy/Glass/PTW Composites using Full Factorial Techniques

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ABSTRACT

The dry sliding friction and wear behavior of epoxy hybrid composites reinforced with glass fibers and a varying amount of potassium titanate whiskers (PTWs) fabricated by vacuum hand layup method were studied. The influence of normal load, sliding velocity, and whisker content on both friction coefficient and specific wear rate was investigated on a pin-on-disc machine. The tests were conducted at ambient conditions based on the 3 × 3 (3 factors at 3 levels) full factorial design. Analysis of variance (ANOVA) was performed to obtain the contribution of control parameters on friction coefficient and wear rate. The density and hardness of the composites were found to be enhanced with the PTW loading. The friction coefficient and wear resistance of the hybrid composites were found to be improved with the whisker content and were also greatly influenced by normal load and sliding velocity. A correlation between dry sliding wear behaviors of composites with wear parameters was obtained by multiple regressions. The worn out surface of selected samples was observed under scanning electron microscope (SEM) to identify wear mechanisms. This study revealed that the addition of the ceramic micro fillers such as PTW improves the wear performance of the epoxy/glass polymer composites significantly.

Effect of Cutting Parameter on Cutting Force and Surface Roughness of Aluminums Components Using Face Milling Process - A Taguchi Approach

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ABSTRACT

Aluminium is used excessively in the modern world, and the uses of the material are extremely diverse due to many unusual combinations of mechanical and chemical properties. They have been widely used in industries, especially aerospace industries. However, machining of Aluminium involves expensive tooling cost at expense of getting good surface finish. The study investigated the optimum parameters that could produce significant good surface finish and optimum cutting force whereby reducing tool cost. It employed Taguchi design methods to optimize the surface roughness quality and cutting force in Computer Numerical Control (CNC). The milling parameters evaluated are cutting speed, feed rate and depth cut. An L_9 (3^4) orthogonal array, signal-to-noise (S/N) ratio and analysis of variance (ANOVA) are employed to analyze the effect of these cutting parameters. The analysis results indicated that the optimal combination for low resultant cutting speed, low feed rate and good surface finish are high cutting speed, low feed rate and low depth of cut. The study shows that the Taguchi method is suitable to solve the stated problem with minimum number of trials as compared with full factorial design.

A Study of the Performance and Emission Characteristics of a Compression Ignition Engine using Methyl Ester of Simarouba and Jatropha at Different Injection Pressures

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ABSTRACT

Environmental concerns and limited amount of petroleum fuels have caused interests in the development of alternative fuels for internal combustion (IC) engines. As an alternative, biodegradable, and renewable fuel, ethanol is receiving increasing attention. Efforts are being made throughout the World to reduce the consumption of liquid petroleum fuels wherever is possible. Biodiesel is recently gaining prominence as a substitute for petroleum based diesel mainly due to environmental considerations and depletion of vital resources like petroleum and coal. According to Indian scenario, the demand for petroleum diesel is increasing day by day hence there is a need to find out an appropriate solution. Under Indian condition only such plants can be considered for bio diesel, which produce non edible oil in appreciable quantity and can be grown in large scale on non cropped marginal lands and waste lands. However, the current utilization of non-edible oilseeds is very low .Bio-diesel has become more attractive recently because of the fact that it is made from renewable resources. In the present work, biodiesel has been prepared from edible and non edible oils. As in India the non-edible oil like simarouba glauca and Jatropha oil are available in abundance, which can be converted to biodiesel. The performance and emission characteristics of simarouba oil and Jatropha oil at 20% blend with diesel have been studied. Tests were carried out for analyzing various parameters such as thermal efficiency, brake specific fuel consumption (BSFC), emission of CO, HC and NOx gases in exhaust. S20 is more suitable biodiesel compare to J20.

Mechanical and Abrasive Wear Behavior of Metal Sulphide Lubricant Filled Epoxy Composites

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ABSTRACT

The present work reveals the effect of the addition of commercial MoS2 (10wt%) particles on mechanical and two-body abrasive wear behavior of epoxy with/without glass fiber mat reinforcement. The composites were fabricated using casting and simple hand lay-up techniques followed by compression molding. The mechanical properties such as density, hardness, tensile, and flexural properties were determined as per ASTM standards. The abrasive wear testing was carried out using pin-on-disc wear tester for different loads and abrading distances at constant speed of 1m/s. A significant reduction in wear loss and specific wear rate was noticed after the incorporation of MoS2 filler allowing less wear of matrix during abrasion which in turn facilitated lower fiber damage. However the incorporation of MoS2 particles had a detrimental effect on most of the mechanical properties of the composites. The worn surface features were investigated through scanning electron microscopy (SEM) in order to investigate the wear mechanisms.

Effect of Potassium Titanate Whiskers on the Performance of Vacuum Molded Glass/Epoxy Composites

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ABSTRACT

Effect of potassium titanate whiskers on the mechanical and tribological properties of glass/epoxy composite systems has been investigated experimentally. Composite laminates were prepared by hand lay-up technique followed by vacuum bagging by varying the percentage of potassium titanate whiskers addition. Mechanical properties of the developed composites were evaluated as per ASTM standards. Tribological tests were conducted under dry sliding conditions on a pin on disc test rig. The tests results indicated that addition of the potassium titanate whiskers has significant effect on the properties of glass/epoxy composites. Density, hardness, stiffness properties, friction coefficient and wear resistance of the composites were found to improve with the potassium titanate whiskers loading. However, strength properties of the glass epoxy composites were found to reduce with whisker content. The mode of failure after the tensile tests and worn surface of some selected samples were studied using scanning electron microscope.

Abrasive Wear Performance of Epoxy / Glass / PTW Composites

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ABSTRACT

This paper discusses two-body abrasive wear behaviour of Potassium Titanate Whisker (PTW) reinforced vacuum moulded epoxy/glass composites. The effects of whisker content, sliding distance, normal load and abrasive grit size on wear behaviour of composites were evaluated by pin-on-paper abrasion tests. The tests were conducted at ambient conditions and constant disc speed of 200 rpm. The wear loss of composites was found increasing with the increase in normal loads, abrading distances and coarser abrasive papers. The effect of whisker content to minimize wear loss was highly dependent on abrasive grit sizes. The friction coefficient has shown decreasing trend with normal load and mixed trend with sliding distance and whisker content. The scanning electron microscope (SEM) images of composite specimen worn at higher loads, distances and for finer abrasive grit sizes were evaluated and results indicate more severe damage to epoxy/glass composites as compared to PTW filled epoxy/glass composites.

Transforming Higher Education with Lean Six Sigma

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ABSTRACT

The time is right for higher education administrators, faculty, and staff to begin applying Lean management to their business because the competition in today's higher education marketplace is fierce. Naturally, providing a quality, affordable education is of the utmost importance to students and their families. But schools can also improve their chances of attracting students by improving the levels of service they offer in every "customer facing interaction"—which often times necessitates improving internal work processes. In this paper, we show that lean six sigma is a transformative approach to tackle these challenges. Since much what we do from the time we wake up to the time we go to bed, including all that we do at work, is a series of repetitive activities, lean six sigma really is for life, meaning that we must all think, work, and live the lean six sigma way. Lean Six Sigma, combining the emphasis of Lean Analysis on speed and efficiency with that of Six Sigma on error reduction, can be applied in higher education in a variety of ways. In this paper, we explain what lean six sigma is, clarify the synergy attained by integrating Lean Flow and Six Sigma into a consolidated approach, validate how Lean Six Sigma can be utilized to improve the ways higher education institutions manage documents—and the information they contain.

Enhancing Performance of the Health Information Department of a Hospital Using Lean Six Sigma Methodology

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ABSTRACT

The study addresses the issue of longer turn around time (TAT) of health records preparation process in the health information department (HID) of a corporate hospital in India. Because of the longer TAT of the health records preparation process, other activities of the department were held up, creating a work in process inventory of records in the department. This paper explores how a small-capacity corporate hospital can use a systematic methodology to move towards world-class quality level. A rigorous Lean thinking and Six Sigma define-measure-analyse-improve-control (DMAIC) approach was used to analyse the existing process and root causes of longerTAT. Lean operational principles were used to improve and sustain the process. As a result of the project, average TAT was reduced from 52 min to 39 min and standard deviation was reduced to 0.43 min from 2.33 min for a batchof 10 health records.

Investigation of the Effect of Aging Variables on the Impact Behaviour of Al 6061 Alloy and its Composites

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ABSTRACT

In this paper, an attempt has been made to find out the effect of aging variables on the Impact behaviour of Aluminium 6061 alloy and Silicon Carbide particulate reinforced Aluminum 6061 Metal Matrix Composites. The Taguchi's Design of Experiment technique was used to identify the heat treatment conditions for optimizing the properties of the selected materials. The composite material of was prepared by using stir casting method. Homogenization annealing was performed on the as-cast materials to obtain uniform grain size before carrying out the required heat treatment. The experimentation was planned on the basis of Taguchi's orthogonal array. Fractional factorial experimentation was performed using three levels for the parameters volume percentage of reinforcement and the three heat treatment variables namely, solutionizing time, aging temperature and aging time. The results indicated that the predicted values using developed mathematical model for Impact strength properties were in close agreement with experimental results. All the parameters and the interaction of the parameters had significant contribution to the impact strength of the materials. The volume fraction of reinforcing particles was found to be most significant in affecting the impact strength of the materials followed by the aging temperature.

Statistical and Experimental Investigation of the Effect of Ageing Variables on the Tribological Properties of Al 6061-SiC Particulate Composite Material

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ABSTRACT

In this present investigation an attempt has been made to find out the effects of ageing variables on the Abrasive Wear behaviour of Silicon Carbide reinforced Aluminum Metal Matrix Composite. The Taguchi's Method was used to identify the heat treatment conditions for optimized properties of the material. The composite material of Silicon Carbide particulate reinforcement in Aluminum 6061 alloy matrix, prepared by stir casting, was used in the investigation. The as-cast material was homogenized to obtain uniform grain size before carrying out the required heat treatment process. The experimentation was planned on the material based on the Taguchi's orthogonal array. Fractional factorial experimentation was performed using three levels for volume percentage of reinforcement and the three heat treatment variables namely, solutionizing time, ageing temperature and Ageing time. The results indicated that the predicted values using developed mathematical model for Abrasive Volumetric Wear Loss were in close agreement with experimental results and also the effect of volume fraction of reinforcing particles was found to be significant in determining wear loss of the materials.

Adaptation of Six Sigma Concepts in a Technical Process: A Case Study in a Small Scale Industry

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ABSTRACT

Six Sigma has been a powerful and successful tool in medium to large manufacturing industries to reduce the rejection and to improve productivity. This paper presents a Six Sigma case study in reducing rejection of a leaf spring manufacturing process at a small scale industry foundry shop in India. The systematic step-by-step DMAIC (Define–Measure–Analyse–Improve–Control) approach has been followed to identify the root causes and to improve the process yield. This paper provides empirical evidence on Six Sigma implementation in a technical field of a manufacturing process from scratch, to lift the quality to world-class level. The project also reveals the bottlenecks in the implementation of Six Sigma methodologies in a small organization. As a result of this project, the overall rejection was reduced from 48 percent to less than one percent, which was a remarkable achievement for this small scale industry. This in turn resulted in a financial saving of US$ 8000 per annum due to reduction in the rejection rate.

Failure Analysis of Cast Tubular Specimens of Al–5Zn–1Mg While Processing at Room Temperature by Equal Channel Angular Pressing (ECAP)

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ABSTRACT

The ECAP process is a promising technique for imparting large plastic deformation and breaking down the ingot cast structure without a resultant decrease in cross sectional area. In the present study, the suitability of this technique for processing cast Al–5Zn–1Mg tubular specimens at room temperature has been investigated. Tubular specimens were extruded through an ECAP die with an angle of 150° between the two intersecting channels without a back pressure. Sand was used as a mandrel during pressing. The tubular specimens failed miserably in the first pass itself. A failure analysis was carried out using SEM, and cause for failure was determined.

Effect of Spry Forming on the Microstructure and Wear Properties of Al-Si Alloys

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ABSTRACT

In this study an attempt is made to investigate the effect of spray forming over chill casting. The microstructures of spray formed Al–12Si and Al–20Si alloys consisted of a fine dispersion of Si particulates of size ranging from 2–10 μm in Al matrix, whereas microstructures of chill cast alloys are coarser. The hardness is higher and wear rate is lower for spray formed alloys than that of chill cast alloys. The better wear and hardness properties of spray formed alloys are explained in light of their microstructural features evolved during spray forming and morphology of worn-out surfaces.

Investigation on Humidification and Dehumidification in a Silica Gel Packed Bed by SSR Model

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ABSTRACT

In the present study a Solid Side Resistance model has been developed for Heat and Mass Transfer in the desiccant packed bed of silica gel during adsorption and desorption processes by convection and diffusion phenomena in porous spherical particles. The diffusion at each spherical silica gel particle is found along the radius of the sphere and along the length of the bed according to the Knudsen and Surface diffusion. The rate of adsorption of moisture for different time steps has been evaluated throughout the bed by coupling the various governing equations. These governing equations were solved by Runge-Kutta, Euler's and Crank Nicholson methods by assuming the initial and boundary conditions and the same was implemented by MATLAB program. The results of the developed model are in agreement with the experimental results and better than that of PGC model.

Effect of Filler Content on the Performance of Epoxy/PTW Composites

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ABSTRACT

This paper presents the mechanical and tribological characteristics of potassium titanate whisker (PTW) reinforced epoxy composites. The effect of various test variables and material parameters on the friction and wear behavior of epoxy/PTW composites has been studied systematically. Tribological tests were conducted on a pin-on-disc apparatus under dry sliding conditions. Addition of PTW was found to improve the wear resistance of the composites and 15wt% PTW filled epoxy exhibited lowest specific wear rate and highest friction coefficient compared to other test samples. PTW additions showed beneficiary effect on density, hardness, and stiffness properties of composites; however, strength properties and ductility were found to decrease with the increasing content of PTW. Scanning electron microscope (SEM) images of tensile fractured surfaces and worn-out surfaces of selected samples revealed different fracture mechanisms.

Study of TiO₂ Nanoparticles as Lubricant Additive in Two-Axial Groove Journal Bearing

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ABSTRACT

Load carrying capacity of an oil lubricated two-axialgroove journal bearing is simulated by taking into account theviscosity variations in lubricant due to the addition of TiO₂nanoparticles as lubricant additive. Shear viscosities of TiO₂nanoparticle dispersions in oil are measured for various nanoparticleadditive concentrations. The viscosity model derived from theexperimental viscosities is employed in a modified Reynolds equation to obtain the pressure profiles and load carrying capacity oftwo-axial groove journal bearing. Results reveal an increase in load carrying capacity of bearings operating on nanoparticle dispersions as compared to plain oil.

Static Characteristics of a Fluid Film Bearing with TiO$_2$Based Nanolubricant using the Modified Krieger-Dougherty Viscosity Model and Couple Stress Model

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ABSTRACT

Static characteristics of a journal bearing operating on TiO$_2$ based nanolubricant is obtained by a variable viscosity approach. The predicted shear viscosities of TiO$_2$ based nanolubricant at differentvolume fractions and aggregate particle sizes are obtained using modified Krieger-Dougherty model and are found to be in good agreement with experimental shear viscosities. The modified Reynolds equation considers the Krieger-Dougherty viscosities and couple stress effects of TiO$_2$ nanoparticle additives at different volume fractions and particle sizes. Results reveal a significant improvement in load carrying capacity of journal bearing operating on TiO$_2$ based nanolubricant as compared to plain oil without TiO$_2$ nanoparticles.

A Variable Viscosity Approach for the Evaluation of Load Carrying Capacity of Oil Lubricated Journal Bearing with TiO$_2$Nanoparticles as Lubricant Additives

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ABSTRACT

Influence of TiO$_2$ nanoparticle lubricant additive on the load carrying capacity of a journal bearing is studied. Increase in lubricant viscosity due to presence of TiO$_2$ nanoparticles is modelled using a modified Krieger-Dougherty viscosity model. Validity of modified Krieger-Dougherty model in simulating the viscosities of TiO$_2$ nanoparticle dispersions in engine oil is experimentally verified. The pressure distribution and load carrying capacity are theoretically evaluated using a modified Reynolds equation for various TiO$_2$ nanoparticle concentrations and aggregate sizes. Results reveal an increase in load carrying capacity of journal bearing using TiO$_2$ nanoparticle lubricant additive as compared to plain oils without nanoparticle additive.

Enhanced Mechanical and Wear Performance of Epoxy/Glass Composites with PTW/Graphite Hybrid Fillers

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ABSTRACT

Epoxy/glass composite containing two different micro-fillers was developed by vacuum bagging technique. The effect of ceramic whisker (7.5 wt %) and solid lubricant filler (2.5 wt%) on mechanical and dry sliding wear behavior of epoxy/glass composites was studied. The mechanical property characterization included evaluations of tensile, flexural and impact properties as per ASTM standards. The dry sliding wear tests were conducted on pin-on-disc arrangement with steel disc as counter face. Experimental results indicated that single incorporation of ceramic whisker can improve stiffness, friction coefficient and anti wear abilities of epoxy/glass composites significantly. The strength properties of composites were slightly reduced after whisker addition. However, incorporation of solid lubricant as secondary filler resulted in improvement of both mechanical and tribological properties of composites. It was also found that tribological properties of filled epoxy/glass composites were closely related with sliding conditions such as applied load and sliding velocity. The deformation and failure mechanisms under tensile loading and dry sliding were investigated using SEM photographs.

Implementation of Taguchi Design for Dry Friction Coefficient of Epoxy Composites

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ABSTRACT

The sliding friction behaviour of 5%, 10% and 15% Potassium Titanate Whiskers (PTW) filled epoxy composites under dry sliding conditions is studied on pin-on-disc configuration. The tests are conducted as per L27 orthogonal array of Taguchi design of experiments. Analysis of signal-to-noise (S/N) ratio is carried out to determine optimal combination of test parameters such as sliding velocity (A), normal load (B), filler content (C) and sliding distance (D) for minimizing the frictional performance of developed composites. Analysis of variance (ANOVA) is carried out to identify the contribution of control parameters on the output performance. A multiple regression model is developed to correlate the friction coefficient with control parameters. The present study demonstrated the suitability of Taguchi method for minimizing the frictional performance and optimizing test parameters under dry sliding conditions.

Application of Lean Six Sigma Methodology to Reduce the Cycle Time of Out-Patient Department Service in a Rural Hospital

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ABSTRACT

This article discusses the implementation of Lean Six Sigma (LSS) methodology in decreasing cycle time of out-patient department service of a rural hospital. The lean principles and Six Sigma define measure, analyse, improve, and control process (DMAIC) approaches have been used to achieve this result. This article explains the step-by-step approach of LSS implementation in a rural Indian hospital for quality improvement and timely service to the community. This resulted in decreased cycle time of the process from 4.27 minutes to 1.5 minutes. Owing to the project a 97% reduction in average waiting time in the system and 91% decreases in queue length were reported. During this study, data was collected on all possible causes. Statistical techniques and GEMBA were used to analyse the data. Based on analysis conclusions were made. Lean tools such as Kanban, 5S, ergonomic design of work place, etc., were effectively used to improve process and sustain the process.

Application of Lean Six Sigma Methodology in the Registration Process of a Hospital

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ABSTRACT

Purpose – The purpose of this paper is to study the scope of Lean Six Sigma (LSS) strategy and toexplore its successful deployment in the Indian healthcare sector.

Design/methodology/approach – The research reported in this paper is based on a case studycarried out using the LSS DMAIC (Define-Measure-Analyze-Control) approach and its application inimproving the registration process in the Health Information Department (HID) of a Medical Collegehospital in India.

Findings – The study describes improvements in the HID through the power of LSS. Cycle time of theprocess was reduced from three to 1.5 minutes and the SD was reduced to 21.2 from 61 seconds.The project has shown a 94 per cent reduction in patients' average waiting time. The study alsoreported a 91 per cent reduction in queue length and 48 per cent reduction in percentage of scheduledutilization of staff for the process.

Research limitations/implications – The paper is based on a single case study executed in a hospitaland hence there is limitation in generalizing the specific results from the study. But the approach adoptedand the learning from this study can be generalized. The study is of use to healthcare practitioners seekingto implement or develop LSS further in their organizations.

Originality/value – Although LSS being extremely successful in the last two decades, theapplication of LSS to the healthcare industry in general and HID in particular has been limited.This study illustrates how its application can improve the performance of the process and thusproductivity in the department.

Application of Six Sigma Methodology in a Small-Scale Foundry Industry

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ABSTRACT

Purpose – The purpose of this article is to illustrate how the Six Sigma methodology was applied to a small-scale foundry industry to reduce the rejections and rework in one of its processes.

Design/methodology/approach – The research reported in this paper is based on a case study carriedoutinanindustryusingtheSixSigmaDefine-Measure-Analyze-Improve-Control(DMAIC)approach and its application in improving the leaf spring manufacturing process of a foundry shop.

Findings – The root causes for the problem of rejection and rework were identified through data-based analysis at different stages in the project. The process parameters were optimized and measures for sustainability of the results were incorporated in the process. As a result of this study, the overall rejection was reduced from 48.33 to 0.79 per cent, which was a remarkable achievement for this small-scale industry. This was leading to improvement in on-time delivery to the customer. The finance department of the company estimated the annualized savings due to the reduction in rejection and was to the tune of USD8, 000 per year.

Research limitations/implications – The paper is based on a single case study executed in a company, and hence, there is limitation in generalizing the specific results from the study. However, the approach adopted and the learning from this study can be generalized.

Originality/value – This article illustrates the step-by-step application of Six Sigma DMAIC methodology in a small-scale foundry industry to solve an age-old problem in the organization. Thus, this article will be helpful for those professionals who are interested in implementing Six Sigma to such industries.

Performance and Emission Characteristics of Cotton Seed Oil Methyl Ester and Diesel blend on CI Engine at Elevated Inlet Air Temperature

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ABSTRACT

Vegetable oil methyl esters have attracted a great deal of interest as substitutes for petrodiesel to reduce dependence on imported petroleum and provide a fuel with more benign environmental properties. In this study, usage of cotton seed oil methyl ester has been examined as an experimental material. Cotton seed methyl ester was obtained by transesterification process. Physical and chemical properties of methyl ester were determined in the laboratory. Blends of cotton seed methyl ester (B15, B20 and B25) and diesel were tested at elevated inlet air temperature of 440C, in a computerized single cylinder (VCR) diesel engine. The effect of test fuels on brake specific fuel consumption, brake thermal efficiency is computed and CO, HC, NOx and Smoke emissions were measured and compared with diesel. Brake specific fuel consumption was found to be decreasing and brake thermal efficiency was found to be increasing for biodiesel blends at elevated inlet air temperature compared with diesel. However CO, HC and smoke emissions were reduced compared to diesel as fuel. Slight increase in oxides of nitrogen was found for blends.

A Study on Influence of Altering the Tooth-Sum on Bending Stress in External Spur Gears under Static Loading

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ABSTRACT

Gears are used to provide a nonslip drive in power transmission. While transmitting power, if specific requirements like load carrying capacity, wear characteristics, noise level etc. are imposed, then the shape and size of the tooth become critical parameters for analysis, thus necessitating a detailed study and modification of tooth geometry. Of the above, the load carrying capacity depends on the bending strength of the gear tooth which is normally computed using Lewis Equation. Usually standard tooth geometry is modified by profile shift using S-gearing, may be so or S+ type, with the former being more common. Tooth geometry can also be modified by way of altering the tooth-sum for a given center distance and module. This study is focused on introducing the profile shift by way of altering the tooth-sum and investigating its effect on tooth bending strength and contact ratio. Involute spur gears having tooth-sum 100, 2 mm module and 20 degree pressure angle are considered. When compared to standard gears, a reduction in bending stress by 12% for HPSTC loading and 35.28% for tip loading is observed with negative teeth alterations while 24.05% increase in contact ratio is observed with positive teeth alterations. Such betterment in performance aspects can be traded off to derive several other gearing benefits. Hence altered tooth-sum way is a unique and novel approach to profile shift in gear design. The unique advantage of this method is that it needs no structural modifications as there is no change in center distance.
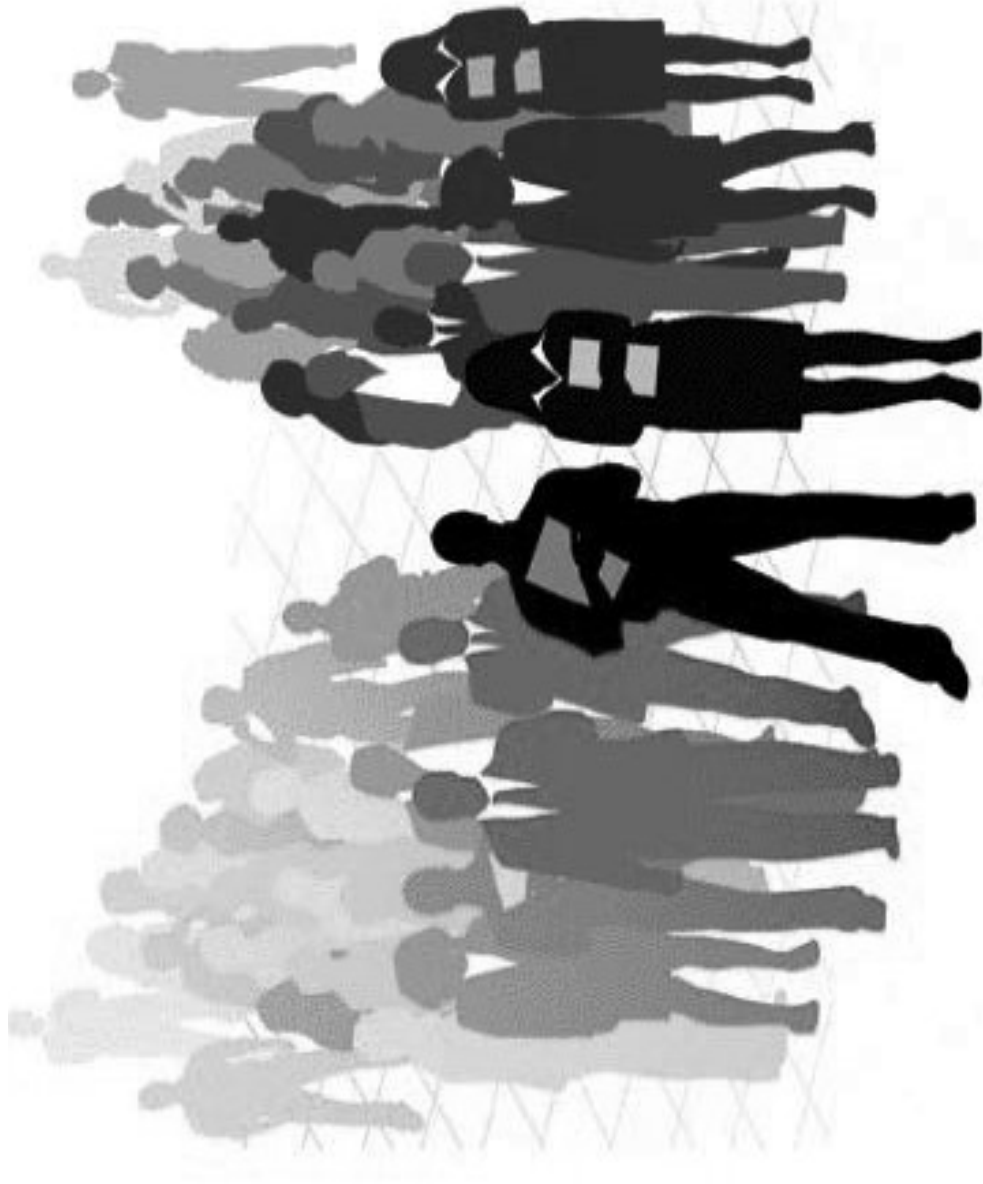
MANAGEMENT & BUSINESS ADMINISTRATION

A Study on Random Walk of Equity Futures Market with Reference to National Stock Exchange, India

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ABSTRACT

Efficient market emerges when new information is quickly incorporated into the price so that price becomes information. Efficient market hypothesis[EMH] is the idea that information is quickly and efficiently incorporated into asset prices at any point in time, so that old information cannot be used to foretell future price movements. The study is conducted to test the random walk of futures prices. It comprises of the daily returns of Nifty futures and 19 individual stock futures of the National Stock Exchange. The study is based on the data compiled for the period of 3 years, i.e., from 19th December 2008 to 20th December 2011.

Market Reaction to Bonus Announcements: Empirical Evidence from Bombay Stock Exchange

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ABSTRACT

A capital market in which stock prices fully reflect all available information can be termed as informationally efficient market. A number of studies have empirically tested the response of security prices to the release of different information. The objective of this study is to find evidence of semi - strong form of efficiency in the Indian stock market. The paper examines the share price reaction to bonus issue announcements around the announcement date by using the event study methodology. Bonus announcements of companies listed on the Bombay Stock Exchange in 2010 and 2011 is taken as a sample for the study. The abnormal returns are calculated using the Market Model and t-tests is conducted to test the significance.

Anomalies in Indian Stock Market: Evidence of the Day-of-the-Week Effect with Reference to National Stock Exchange, India

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ABSTRACT

Efficient Market Theory (EMT) states that, the prices in the stock market depict all relevant information, therefore it is impossible to beat the market as an investor is fully informed. Till the late seventies this view was supported by many empirical studies and many market models related to security valuation have been based on the concept of informational efficiency of capital market. However, late seventies and eighties brought in evidence questioning the validity of market efficiency and highlighting the anomalies existed in the stock market. One of the anomalies observed against the EMT is the day of the week effect. This effect relates to the difference in the returns across different days of the week. This paper examines the days of the week effect in the two sectoral indices of National Stock Exchange, India for the period from 1st April 2009 to 31st March 2011. Daily stock prices are converted in to daily returns by taking natural log of the difference in the price at day t and the price at day t-1. To test the equality of means for different days of the week Kruskal-Wallis H test is used. The study discovered that three companies in Auto sector and four companies in Pharma sector had highest mean returns on Wednesdays. While subjecting the daily stock returns to KWH test, during the study period it is found that the mean returns are statistically significant on Wednesday only in Auto sector.

Work-Life Balance: The Conceptual Framework and Review of Corporate Best Practices

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ABSTRACT

Today, the employee engagement and retention are, undoubtedly, the issues of paramount concern for most organisations. A close study of the existing literature on 'employee attrition' documents that one of the potent forces challenging the 'employee retention' drive in most organisations is employee 'work-life' issues. The surging competition coupled with strenuous work culture at office and unending commitments at home, paved the way for juggling between work and family life. As a matter of fact, today, employees seek career in organisations which they perceive as 'family-friendly'.

Issues and Challenges in Striking the Balance between Work and Family Life: An Empirical Appraisal

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ABSTRACT

It is indubitable fact that the changing landscape of business has brought about rampant and radical changes both in the work and workplace practices. The thrust of all companies is to leverage the bottom-line and surge ahead of the competitors. As a sequel, the work has become highly demanding and more challenging in all spheres of business. The companies solicit more time and energy from the employees to cope with realities and pressure of competitive business environment. These changes have made the employees to redefine their approach and attitude towards the work. The flip side of this change is, work began to interfere with the family life and erased the boundary between the two. This article attempts to bring out the intricacies of personal and professional commitments of employees working in the selected new generation private sector banks and their effects on both family and work life.

Impact of Investment in Information Technology on Performance of Banks and National Economy: A Study with Respect to Karnataka Bank Ltd

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ABSTRACT

Banks are the essential supply chain partners of the Indian financial system to boost the growth of the national economy. The banking sector is afflicted by many challenging forces. One such is the technology impact that has led to the emergence of E-Banking by shunning the traditional system of pen and paper. Banks have to be financially sound in their operations when the investment in Information Technology is on the incline. It is of utmost importance to all – be it policy makers, bankers, researchers and scholars to assess the impact of investment in information technology on the financial and operating performance of the banks. The paper studies the impact of investment in Information Technology of Karnataka Bank Ltd. on its financial and operating performance for a period of ten years from 2001 – 02 to 2010 – 11. An attempt is made to investigate whether the investment in information technology of the bank is related to the growth of the national economy.

Principles Based Accounting and Rules Based Accounting Standards and Value Relevance of IFRS

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ABSTRACT

International Financial Reporting standards (IFRS) refers to the entire body of IASB pronouncements including standards and interpretations approved by IASB, IASC and their interpretations produced by the Accounting Standards Interpretations Committee (IASIC). The paper lays out the pros and cons of Principles based accounting and Rules based accounting systems. It also puts forth the value relevance and global challenges of implementation of IFRS.

Stock Price Response to Bonus Announcements Using Event Study Approach Evidence from National Stock Exchange, India

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ABSTRACT

This paper contributes to understand the effect of the bonus issues on the market. The sample comprises of twenty four companies from different sectors listed on NSE 100 for the period 2007 to 2011. Market model, market adjusted return model, mean adjusted return model and raw return model have been used to calculate expected returns and t test is employed to test the significance at various levels. Empirical results from the study reveal that there are abnormal returns on the event day providing substantiation that the Indian stock market is inefficient in semi-strong form.

Analysis of Pre-Merger and Post- Merger Performance of Select Indian Companies

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ABSTRACT

Mergers and Acquisitions are of vital importance to healthy expansion of business firms. The present paper studies the impact of mergers and acquisitions on company's performance. It compares the pre merger and post merger financial performance of sample companies involved in mergers and acquisitions. EPS, MPS, DPS, PE ratio, PBDIT, RONW and ROCE are the performance indicators used in the study. A sample period of 5 years from 2008 to 2012 consisting of 60 companies has been taken. The findings reveal that in the post merger period there is a decrease in the performance of EPS, DPS, MPS, PE ratio, RONW and ROCE of the merged companies.

A Study on Effect of Rights Issue Announcement on Stock Market in the Bombay Stock Exchange

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ABSTRACT

The paper examines the impact of rights issue announcement on the share price performance of companies listed on the Bombay Stock Exchange. The study consists of a sample of 78 companies which have made rights issue announcement for the period 2008-2012. The study uses the market model to arrive at the returns. The outcome of the study shows statistically significant positive average abnormal returns on the day of the announcement at 5% and 10% level. The study concludes that the Indian market reacts quickly to rights issue announcements.

Day-of-the-Week Effect: Empirical Evidence from the Indian Stock Market

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ABSTRACT

Efficient Market Theory (EMT) states that, the prices in the stock market depict all relevant information, therefore it is impossible to beat the market as an investor is fully informed. Till the late seventies this view was supported by many empirical studies and many models related to security valuation have been based on the concept of informational efficiency of capital market. However, late seventies and eighties brought in evidences questioning the validity and highlighting various anomalies related to the capital market efficiency. One of the anomalies observed against the EMT is the day of the week effect which takes the form of significantly negative mean returns on the first day of the week (i,e. Monday) and abnormally high mean returns on the last day of the (i,e.Friday).

This paper investigates the presence of day-of-the-week effects in four major indices of national Stock Exchange, India viz., S&P CNX Nifty, CNX Nifty junior, CNX Midcap and CNX 200 for a period of 4 years from April 1, 2008 to March 31, 2012. The study is based on closing prices of these four indices. Contrary to the earlier findings, the study observes that the indices under study reports positive mean returns on Monday and Wednesday. By subjecting the daily returns to KWH test, it is found that there does not exist a pattern in the daily returns of stock prices of all the four indices. The study discovers that the daily returns of the four indices do not exhibit statistically significant differences across days of the week for the period under study.

MASTER
OF
COMPUTER APPLICATIONS

Identification of Bilingual Segments for Translation Generation

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ABSTRACT

We present an approach that uses known translation forms in a validated bilingual lexicon and identifies bilingual stem and suffix segments. By applying the longest sequence common to pair of orthographically similar translations we initially induce the bilingual suffix transformations (replacement rules). Redundant analyses are discarded by examining the distribution of stem pairs and associated transformations. Set of bilingual suffixes conflating various translation forms are grouped. Stem pairs sharing similar transformations are subsequently clustered which serves as a basis for the generative approach. The primary motivation behind this work is to eventually improve the lexicon coverage by utilizing the correct bilingual entries in suggesting translations for OOV words. In the preliminary results, we report generation results, wherein, 90% of the generated translations are correct. This was achieved when both the bilingual segments (bilingual stem and bilingual suffix) in the bilingual pair being analyzed are known to have occurred in the training data set.

Identification of Bilingual Suffix Classes for Classification and Translation Generation

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ABSTRACT

We examine the possibility of learning bilingual morphology using the translation forms taken from an existing, manually validated, bilingual translation lexicon. The objective is to evaluate the use of bilingual stem and suffix based features on the performance of the existing Support Vector Machine based classifier trained to classify the automatically extracted word-to-word translations. We initially induce the bilingual stem and suffix correspondences by considering the longest sequence common to orthogonally similar translations. Clusters of stem-pairs characterized by identical suffix-pairs are formed, which are then used to generate out-of vocabulary translations that are identical to, but different from, the previously existing translations, thereby completing the existing lexicon. Using the bilingual stem and suffix correspondences induced from the augmented lexicon we come up with 5 new features that reflect the (non-)existence of morphological coverage (agreement) between a term and its translation. Specifically, we examine and evaluate the use of suffix classes, bilingual stem and suffix correspondences as features in selecting correct word-to word translations from among the automatically extracted ones. With a training data of approximately 35.8K word translations for the language pair English-Portuguese, we identified around 6.4K unique stem pairs and 0.25K unique suffix pairs. Further, experimental results show that the newly added features improved the word-to-word classification accuracy by 9.11% leading to an overall improvement in the classifier accuracy by 2.15% when all translations (single- and multi-word translations) were considered.
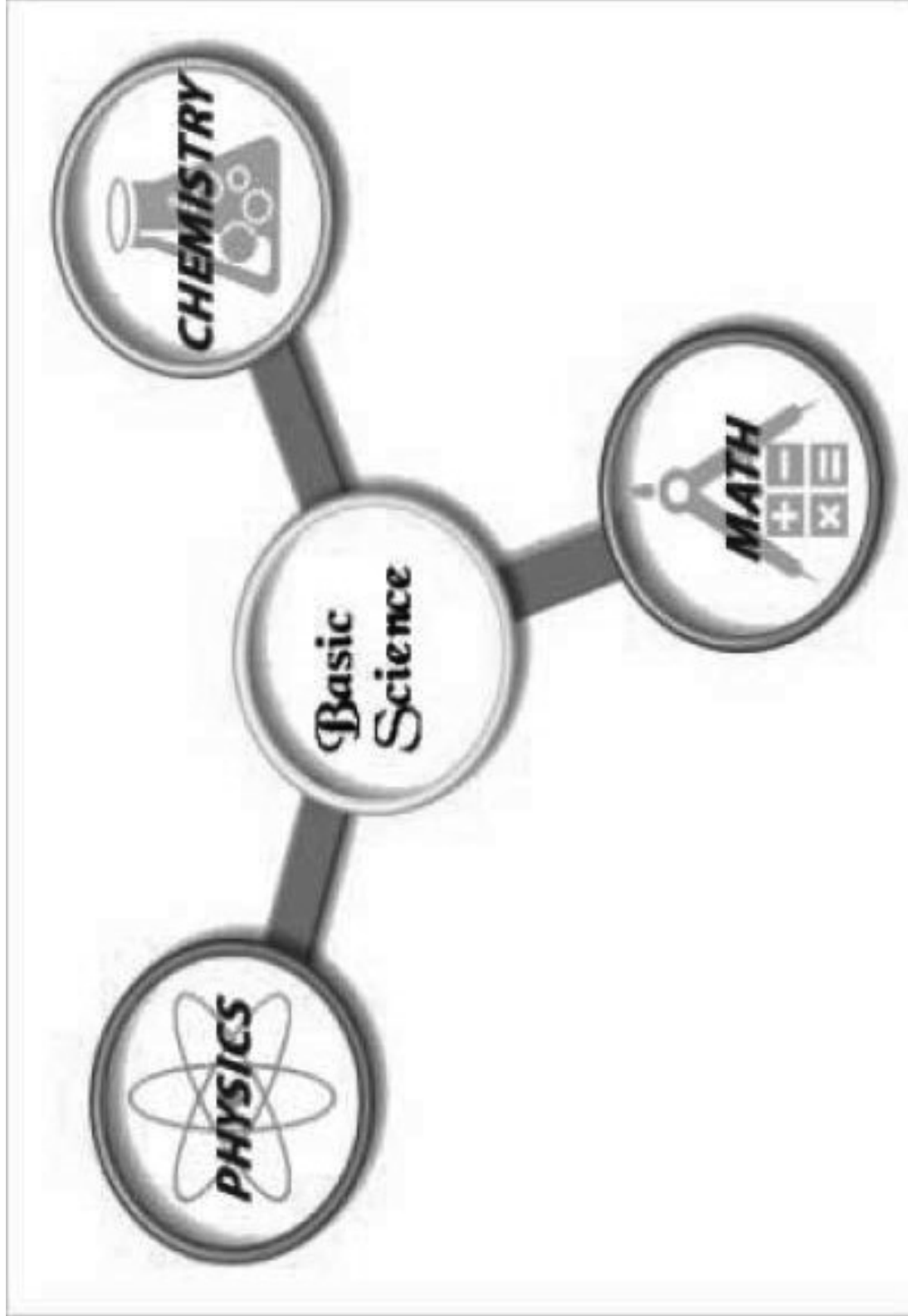
N-[(4-Chlorophenyl) sulfonyl] acetamide

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ABSTRACT

The asymmetric unit of the title compound, C8H8ClNO3S, consists of two crystallographically independent molecules (A and B). The dihedral angles between the benzene ring and amide C—C (O)—NH– plane are 87.6 (3) (molecule A) and 86.0 (3)_ (molecule B). In the crystal, the independent molecules are alternately linked by N—H_ _ _O hydrogen bonds into an infinite chain along the b axis. Short intermolecular Cl_ _ _Cl contacts [3.2882 (5) and 3.2812 (5) A °] are also observed.

N-[(4-Methylphenyl)sulfonyl]acetamide

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ABSTRACT

In the title compound, C9H11NO3S, the dihedral angle between the benzene ring and the amide group is 76.7 (3)_. In the crystal, molecules are linked by pairs of C—H_ _ _O hydrogen bonds into inversion dimers with R2 2(8) ring motifs. The dimers are further connected by N—H_ _ _O and C—H_ _ _O hydrogen bonds into an infinite tape running parallel to the b-axis direction.

Synthesis, Characterization, Thermal and Antimicrobial Studies of Substituted Sulfanilamide Derivatives

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ABSTRACT

Four sulfanilamide derivatives N-[4-(phenylsulfamoyl)phenyl]acetamide (1), 4-amino-N-phenylbenzenesulfonamide(2), N-[4-(phenylsulfamoyl)phenyl]benzamide (3) and N-{4-[(3-chlorophenyl)sulfamoyl]phenylbenzamide (4) were synthesized and characterized by Infra-Red (IR), Nuclear Magnetic Resonance (NMR) and UV–visible (UV–Vis) spectra. Also Liquid Chromatographic (LCMS) and High Resolution Mass Spectrometric (HRMS) methods were used. Crystal structures of 1–4 were determined by single crystal X-ray diffraction (XRD) and their conformational and hydrogen bond (HB) network properties were examined with survey of the literature data. Compounds 1 and 2 crystallize in the same orthorhombic Pbca symmetry with equivalent molecular conformation (tilted V-shape) but showed distinct packing and hydrogen bonding models. Compounds 3 and 4 crystallize in monoclinic and triclinic crystal systems, albeit exhibiting identical molecular conformation (L-shaped). Same donor acceptor pairs both on 3 and 4 result to different kind of HB network. Thermogravimetric (TG) and differential scanning calorimetric (DSC) methods were used to evaluate thermal properties of the substances. All sulphanilamide derivatives have melting points between195–227 _C, initiation of thermal decomposition between 259–271 _C and enthalpies of fusion DHT fus = 38.96, 36.60, 46.23 and 44.81 kJ mol_1 were determined for 1–4, respectively. The derivatives were screened for their antibacterial and antifungal activities against various bacterial and fungal strains. It is observed that there is no significant antibacterial activity with the introduction of the benzene ring.

Some Properties of Atomistic Lattices

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ABSTRACT

A characterization of codistributive elements in an atomistic algebraic lattice is given. Let L be an atomistic lattice satisfying the ascending and descending chain conditions. It is proved that Con L is isomorphic to set of all standard elements of L, every congruence relation of L is representable and every homomorphic image of L is an atomistic lattice. Further for a given finite distributive lattice D with n join-irreducible elements, a method of constructing an atomistic lattice K with n + 3 atoms such that Con K is isomorphic to D is given

Linear Operators on Parallel Lines

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ABSTRACT

In this paper, we look into set of all matrices which are linear operators having one eigen value 1. We prove that, for any two parallel lines, there is a matrix with one eigen value 1. Conversely, for any matrix A with one eigen value 1 we can find two parallel lines L1 and L2 such that the matrix A transfers points of L1 to L2

Structural and Optical Properties of a New Chalcone Single Crystal

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ABSTRACT

A new nonlinear optical material 1-(4-methylthiophenyl)-3-(4-methoxyphenyl)prop-2-en-1-one with molecular formula C17H16O2S was synthesized by using the Claisen–Schmidt condensation reaction method. The Various functional groups present in the compound were identified using recorded FT-IR spectrum. The crystal growth parameters have been studied using solubility test and acetone is found to be a very good solvent for the crystal growth at an ambient temperature. The transparent high quality single crystals up to a size of 26_2_2mm3 were grown using the slow evaporation solution growth technique. UV–visible study was carried out and the spectrum reveals that the crystal is transparent in the entire visible region and absorptive in the UV region. The refractive index is determined using Brewster's angle method. The optical energy band gap of the material is measured using Tauc's plot and the direct method. The single crystal XRD of MMPP crystal shows the following cell parameters: a=5.9626(2) Å, b=15.3022(6) Å , c=16.0385(7) Å , $\alpha=\beta=\gamma=90^0$, volume=1463.37 (10) 'A^3 with a space group of Pna21. The compound MMPP exhibits optical nonlinearity (NLO) and its second order NLO efficiency is 3.15 times to that of urea. The effect of functional groups OCH3 and SCH3 on the non-linearity as well as the structural property of the compound has been discussed. The crystal is thermally stable. High NLO efficiency, good thermal stability, good transparency and ability to grow as a high quality single crystal make this material very attractive for opto-electronic applications.

Linear and NLO Properties of an Organic Single Crystal

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ABSTRACT

Organic compound of 1-(4-methoxyphenyl)-3-(2-methoxy 5-bromophenyl)prop-2-en-1-one [MMBPP] with molecular formula C16H11BrO3 was synthesized using Schmidt condensation method. A FT-IR spectrum was recorded to identify the various functional groups present in the compound. The single crystals were grown using slow evaporation solution growth technique. The high quality transparent crystals up to a size 10x7x5 mm3 are obtained with in fifteen days. UV-Visible spectrum reveals that the crystal is transparent in the entire visible region. The single crystal XRD study shows that the compound crystallizes in orthorhombic crystal system with a space group P212121 and the observed cell parameters are a =7.6095(13) Å, b =13.049(2) Å, c = 15.525(3) Å, Volume 1541.6(5) Å^3. The third order Nonlinearity was confirmed by Z-scan technique and non-linear parameters were determined.

Nonlinear Optical Studies of a Novel Pyrazoline

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ABSTRACT

A novel pyrazoline, 3-(phenyl)-5-(4-hydroxyphenyl)-1-(2, 4-dinitrophenyl)-2-pyrazoline (PHDP) was synthesized using standard method and its chemical structure was confirmed using FTIR studies. The linear and non linear optical properties of the compound were studied using UV-Vis and Z-scan techniques. UV-Vis spectrum shows that the compound is transparent in the visible region and absorption in the UV region. The z-scan study shows that the compound possesses third and higher order optical nonlinearity. The calculated optical absorption cross sections indicate that the operating nonlinear mechanism is reverse saturable absorption type. The real part of the third-order nonlinear optical susceptibility χ3 was estimated and the closed aperture data shows that PHDP possess negative nonlinearity.

Free Volume Dependent Fluorescence Property of PMMA Composite: Positron Annihilation Studies

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ABSTRACT

The free volume related fluorescence properties of chalcone chromophore [1-(4-methylphenyl)-3-(4-N, N, dimethylaminophenyl)-2-propen-1-one doped Poly(methyl methacrylate) have been studied using fluorescence spectroscopy and Positron Annihilation lifetime spectroscopy techniques. The fluorescence spectra show that the fluorescence behavior depends on the free volume dependent polymer microstructure and varies with dopant concentration with in the composite. The origin and variation of fluorescence is understood by twisted internal charge transfer state as well as free volume. The Positron annihilation study shows that the free volume related microstructure of the composite is vary with doping level.

Studies of the Effect of Nanoparticle Dopants and Blending of Different Polymers on Physical, Electrical, Optical and Micro Structural Properties of PVA - A Review

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ABSTRACT

This paper is a review on effect of nanoparticles dopant on Poly vinyl alcohol (PVA), that has been studied many intensively due to its several interesting physical properties and which are useful in technical applications in various fields. The important feature of semi crystalline PV A is that the presence of crystalline and amorphous regions and its physical properties, which are resulting from the crystal-amorphous interfacial effects. Many research groups were reported the effect of dopant and blending of different polymers on physical, chemical, electrical, optical and micro structural properties of PYA. The change in the physical properties of PV A due to doping depends on the chemical nature of the doping substance and the ways in which they interact with the host matrix. This type of processing of the polymers is a field of continuing research. Additions of the dopant to the PV A matrix also modify the optical energy band gap, which mainly depend on the type and magnitude of defect concentration. The investigations on the optical absorption near the band edge and the resulting absorption spectra impart important information relating to various processes occurring in polymers. It is important to study microstructure of the polymer and their properties. Hence in this present study the PV A have been the subject of interest for both theoretical and experimental studies, because of the physical and chemical properties needed for specific application may be obtained by adding or doping with some nanodopant which can revolutionize the materials for used the present day technology.

Third Order Nonlinear Optical Studies of 1-(4-Chlorophenyl)-3-(4-imethylaminophenyl) Prop-2-En-1-One

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ABSRACT

A chalcone, 1- (4-chlorophenyl) -3- (4-dimethylaminophenyl) prop-2-en-1-one, abbreviated as CDAC was synthesized by the Claisen–Schmidt condensation method and single crystals were grown by the slow evaporation technique at ambient temperature. The structural confirmation was done using 1H-NMR, FT-IR, powder XRD and single crystal XRD studies. The crystal crystallizes in the monoclinic space group P21/c with a=33.082(3)Å, b=14.4722(13) Å, c=6.0799(5) Å α=90, β=92.030(4)1, γ=90.1 and Z=8. The high temperature DSC shows a phase transition at temperature141.53 ^{0}C that corresponds to the melting point of the crystal. This is confirmed in DTA study which shows an endothermic dip corresponding to this melting point. The optical studies were made with UV–visible and Z-scan techniques. The nonlinear absorption and nonlinear refraction coefficients of the sample were obtained by performing the Z-scan experimental measurements. The real and imaginary parts of third-order bulk susceptibility χ(3) were evaluated. The coefficient of nonlinear refraction (γ) of the compound is found to be negative as revealed by the signature of closed aperture data.

Third Order Optical Non-Linearity of a Novel Chalcone Derivative through Z Scan Technique

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ABSTRACT

A novel chalcone derivative 4-{(1E,3Z)-3-(4-bromo phenyl]-3-[2-(2,4-dinitrophenyl) hydrazinylidene] prop-1-en-1-yl} phenol [BPDP] has been synthesized and structurally characterized by NMR and FTIR studies. The third order non-linear optical properties of the BPDP have been studied using single beam Z scan technique with a nanosecond-pulsed Nd: YAG laser source at 532 nm. The coefficient of non linear refraction (γ) of the compound is found to be negative as revealed by the signature of closed aperture data. The results obtained under open aperture configuration indicate that the material exhibits reverse saturation absorption. The magnitude of real part of third-order optical susceptibility ($\chi^{(3)}$) and of molecular second order hyperpolarizability (γh) are found to be -3.5×10^{-20} m^{2}V^{-2} and -5.9×10^{-48} m^{5}V^{-2}, respectively. The thermo gravimetric analysis shows that the material possesses a very good thermal stability up to 203 ^{0}C.

Investigation of Third-Order Nonlinear Optical Properties of Pyrazoline-Doped Polyvinyl Alcohol Films

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ABSRACT

A 2-pyrazoline, 3-(phenyl)-5-(4-N,N-dimethylaminophenyl)-1H-2-pyrazoline (PDAP) was synthesized and characterized by Fourier transform infrared, nuclear magnetic resonance, ultraviolet (UV)–visible, and Z-scan techniques. The PDAP-doped polyvinyl alcohol composite films were prepared by solvent casting method using dimethyl formamide as solvent. The optical properties of the composites were studied using UV–visible, steady state fluorescence, single beam Z-scan technique and degenerate four wave mixing (DFWM) technique. The optical constants such as band gap and optical activation energy were evaluated. The steady state fluorescence data showed both emission peak wavelengths and intensity change with PDAP-doping level in the composites. The open aperture Z-scan of the composite films displayed reverse saturable absorption. A self-focusing effect was observed under closed aperture configuration and the nonlinear refractive index of the film was observed increasing with the increase of doping. The third-order nonlinear susceptibility was compared with that obtained with picoseconds pulses through DFWM technique. The thermogravimetry analysis shows that the composites are thermally stable up to 260 ^{0}C.

Microstructural and Mechanical Studies of PVA Doped with ZnO and WO3 Composites Films

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ABSTRACT

Polymer composites of ZnO and WO3 nanoparticles doped polyvinyl alcohol (PVA) matrix have been prepared using solvent casting method. The microstructural properties of prepared films were studied using FTIR, XRD, SEM, and EDAX techniques. In the doped PVA, many irregular shifts in the FTIR spectra have been observed and these shifts in bands can be understood on the basis of intra/intermolecular hydrogen bonding with the adjacent OH group of PVA. The chemical composition, phase homogeneity, and morphology of the polymer composites of the polymer film were studied using EDAX and SEM. These data indicate that the distribution of nanosized ZnO and WO3 dopants is uniform and confirm the presence of ZnO and WO3 in the film. The crystal structure and crystallinity of polymer composites were studied by XRD. It was found that the change in structural repositioning and crystallinity of the composites takes place due to the interaction of dopants and also due to complex formation. The mechanical studies of doped polymer films were carried out using universal testing machine (UTM) at room temperature, indicating that the addition of the ZnO andWO3 with weight percentage concentration equal to 14% increases the tensile strength and Young's modulus.

Advancement in Microstructural, Optical and Mechanical Properties of PVA (Mowiol 10-98) Doped by ZnO Nanoparticles

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ABSTRACT

The current paper explores the preparation of PVA nanocomposites by doping with zinc oxide (ZnO) nanoparticles using the method of coagulation and solvent casting technique. The dopant zinc oxide nanoparticle is prepared by simple precipitation method and is confirmed by the X-ray diffraction (XRD) studies. The XRD studies explore that the average particle size of the synthesized nanoparticles is 55nm and show that the crystallinity factor of PVA nanocomposites is influenced by the interaction occurring between the PVA main chain and the ZnO nanoparticle. The FTIR spectroscopy suggests that the formulation of complexes occurring between the dopants and the PVA main chain is due to inter or intra molecular hydrogen bonding. UV-vis spectra explore the dramatic decrease in the optical energy gap of nanoparticles doped polymer composites and the variations of Urbach energy (Eu) related to crystallinity for various dopant concentrations.The mechanical properties of the PVA nanocomposites were explored using universal testing machine (UTM) that reflects that, for $x = 15\%$ doping concentration, there is an increase in the tensile strength, stiffness, and Young's modulus, whereas, for $x = 7.5\%$ concentration, the percentage total elongation at fracture is found to be the maximum. The morphological behavior and homogenous nanoparticle distribution in the composites were examined by scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDAX).

Crystal Growth and Third Order NLO Properties of a Photonic Material

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ABSTRACT

Organic compound 1-(4-bromophenyl)-3-(4-N, N dimethylaminophenyl) prop-2-en-1-one [BDPP] was synthesized using Claisen–Schmidt condensation reaction method. Single crystals were grown using slow evaporation solution growth technique. The FTIR study was carried out for structural confirmation. The UV–Visible spectrum reveals that the crystal is transparent in the entire visible region and absorption takes place in the UV-region. Third order non-linearity has been explored using Z-scan technique. The material exhibits non-linear absorption which can be attributed to reverse saturable absorption. This study also exploits the optical limiting behavior of the material. The theoretical study using Mopac confirms the non-linearity of the compound at the molecular level. The structural parameters were determined by using single crystal XRD. The thermal study confirms the good thermal stability of the material.

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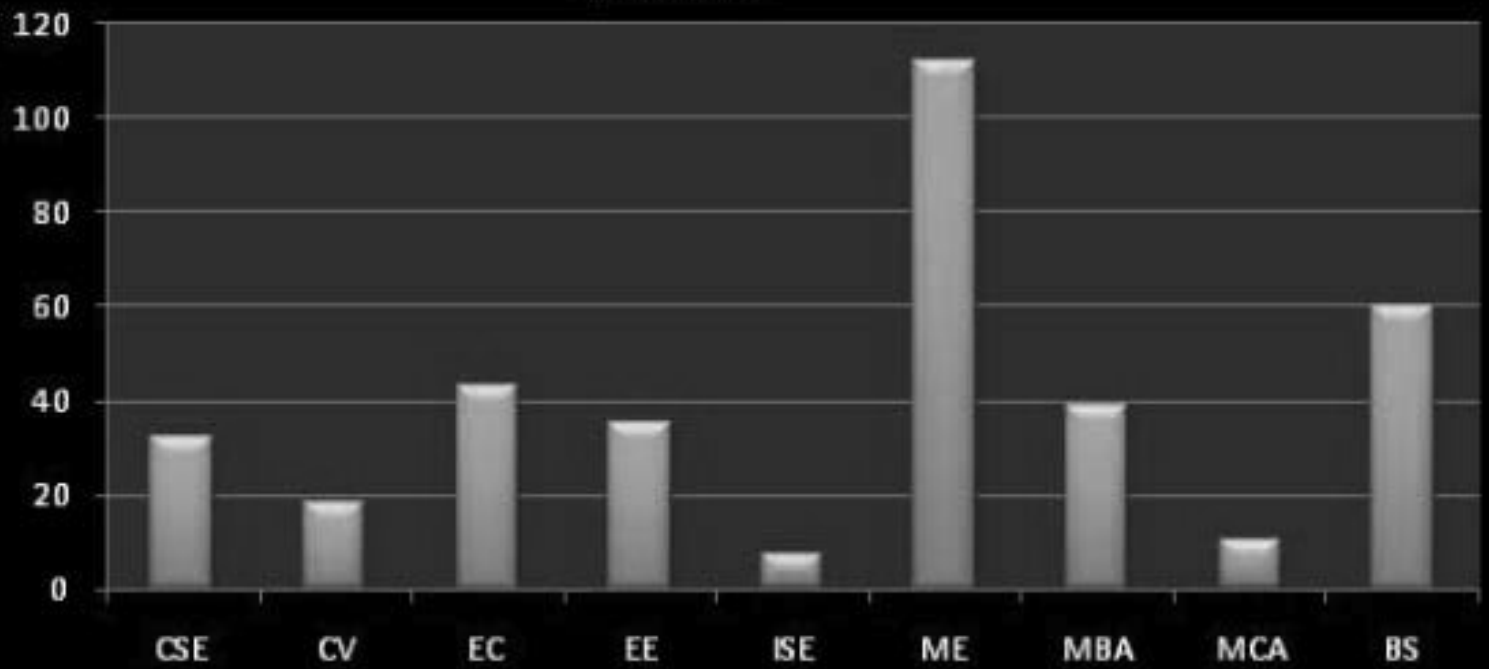
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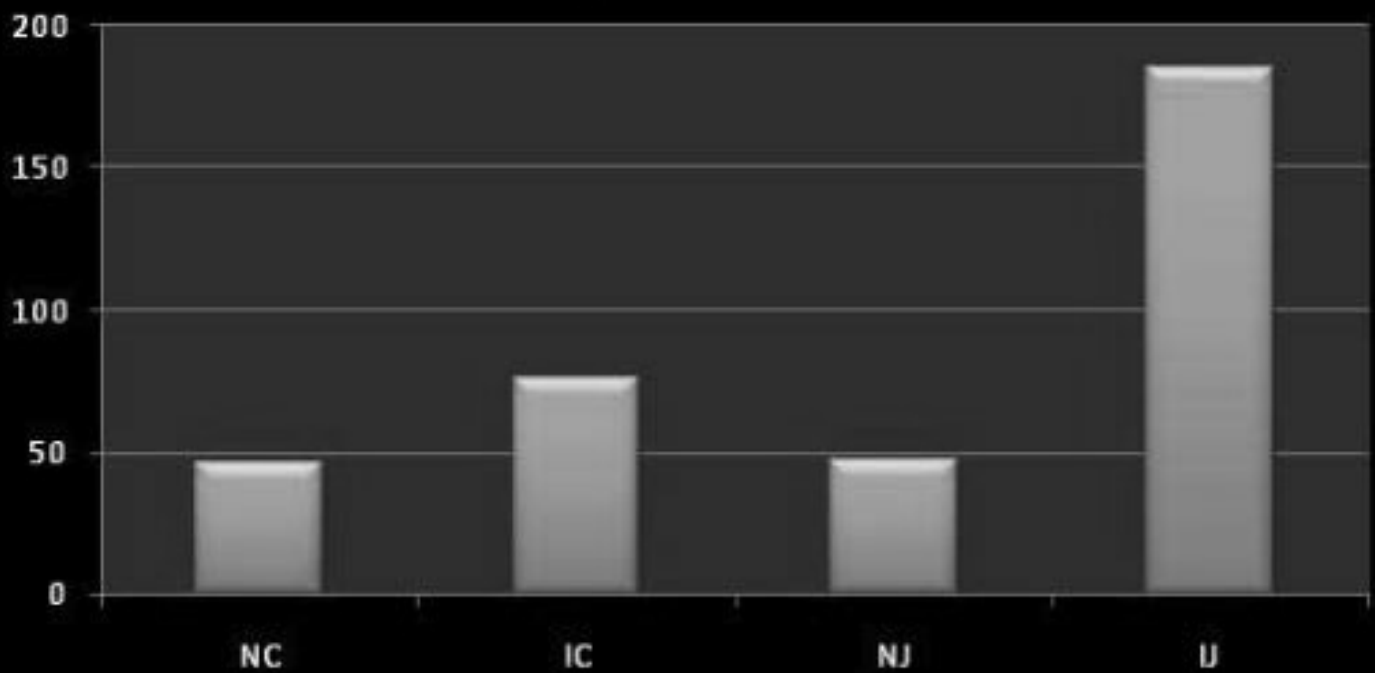
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