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Rural Development Technology

105 **Design and Evaluation of Portable Compound Cattle Feed Pelleting Machine for Farm-level Feed Production**

Shrinivasa D J, S M Mathur & Abhijit Khadatkar

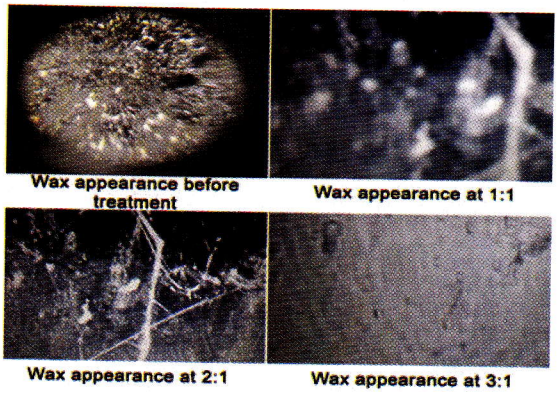
Imbalanced nutrition, besides shortage of feed is one of the major factors responsible for low livestock productivity in conventional feeding. But, as time elapsed, there has been gradual shift from traditional pattern to compounded cattle feed (CCF), either in mash or pellet forms. The pellet form is the most preferred form of CCF among other due to its various advantages. In India, compound feeds are produced at industrial level and there is about 57% of gap between demand and supply. Any disruption in trade may cause cattle pellets expensive and unaffordable for the average dairy farmer. Feed pellet production at farm level by using locally available feed resources (which are within easy reach of the farmers and at low cost) is an alternative to the high cost feed pellet available in the market. The feed pelleting machines available in the market are expensive and individuals are unable to own them. Considering this, an attempt was made to design and develop the portable feed pelleting machine for farm level compound cattle feed pellet production. The physical properties of the feed mixture (viz. particle size, moisture content, bulk density, coefficient of friction and angle of repose) were determined and used/considered for design of feed pelleting machine wherever found necessary.

Chemical Technology

115 **Solvent Treatment on Cloud Point for Dewaxing in Crude Oil Industries**

Amita Tripathy, Ganeswar Nath, Gourishankar Sahoo & Rita Paikaray

Phase change in dewaxing of crude oil is controlled at a certain temperature where solids are dissolved in the fluid producing hazy appearance called cloud point formed by the processes of precipitation. Ultrasound techniques was applied in Indian crude oil to confirm an optimum blended chemical which changes the thermo dynamical equilibrium with a suitable operating environment capable to decrease the cloud point temperature to improve the quality of crude oil analysis. Three solvent to crude oil ratios of 10:1, 15:1 and 20:1 within 10°C to 50°C range were ultrasonically treated with solvent blends verified experimentally as separated bright spots with black background. The dewaxing process was compared with two different diluents in a common extractant in terms of the efficiency of extraction and microscopic observation for wax appearance in crude oil.



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Computer Science & Information Technology

122 **An Adaptive Tracking for Moving Targets in Shadows and poor Illuminations**

Karthika Pragadeeswari C & Yamuna G

Tracking is an interesting area of research. It has to meet several challenges in real-time. There is a more noteworthy possibility of missing the objective. Again, the target may be single or multiple. Each one is having its speed. The biggest obstacle is when the target meets the shadow of some object or itself, the intensity of the target changes severely. This results in missing the target. In this proposed paper, an adaptive algorithm using the Difference method with normalized values indexed with Vegetation parameters (NDVI) is utilized to differentiate the target from shadows followed by tracking the desired object which may be moving at different speeds by an improved optical flow algorithm. Thus, this proposed method aims to follow the object along with challenging illuminations and in the presence of shadows. This is particularly useful to follow the objects successfully on both internal and out-of-doors scenes in shadows. Examination and comparison of various videos in MAT Lab with standard data set indicate that this method yields a better tracking result with state of art methods.

129 **Non-Dominated Sorting Social Group Optimization Algorithm for Multi-Objective Optimization**

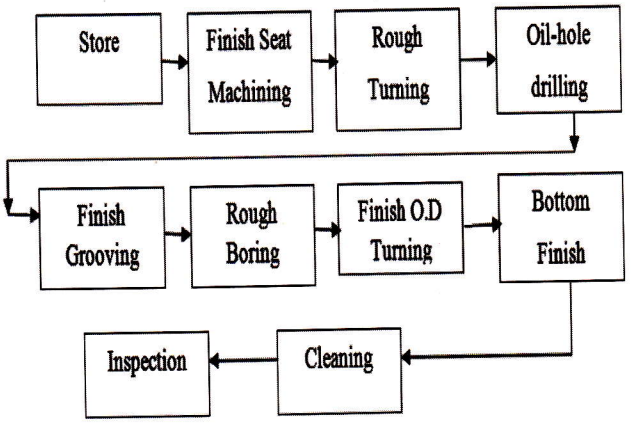
Anima Naik, Junali Jasmine Jena & Suresh Chandra Satapathy

In this paper, authors have proposed a posterior multi-objective optimization algorithm named Non-dominated Sorting Social Group Optimization (NSSGO) for multi-objective optimization. 'Non-dominated Sorting' is the technique of sorting the population into several non-domination levels and 'Crowding Distance' is a concept used for maintaining diversity among the current best solutions. The algorithm acquires the combined concept of both. The proposed algorithm was simulated on a set of multi-objective CEC 2009 functions and competitive results were obtained.

137 **Simulation and Modelling of Hybrid Heuristics Distribution Algorithm on Flow Shop Scheduling Problem to Optimize Makespan in an Indian Manufacturing Industry**

Harpreet Singh, Jaspreet Singh Oberoi & Doordarshi Singh

This study presents a heuristic formulation of the flow shop scheduling problem by the hybrid algorithm fitness function. The genetic algorithm is used to model the time-estimates such as makespan and completion time. This paper aims to optimize the sequence-independent and sequence-dependent time-estimates. The production scheduling parameters such as permutation, non-permutation, no-wait, tardiness, and several workstations are identified from a piston manufacturing industry, in Northern India. Different machine operating parameters were collected from the piston manufacturing industry to work on reducing the makespan. The MATLAB programming in heuristics algorithm distribution function resulted in a reduction of makespan of the product by five times. The reduced completion time is 23 minutes for the piston ring product and 26 minutes in the cumulative validation of the proposed model. The cumulative optimized standard error of 0.26; (n=3) simulateand synthesize the suggested model with its validation. The system efficiency through completion time optimization ranged from 70–82 percent in piston ring, and 63–89 percent in cumulative validation of the model has been worked out for each machine type.



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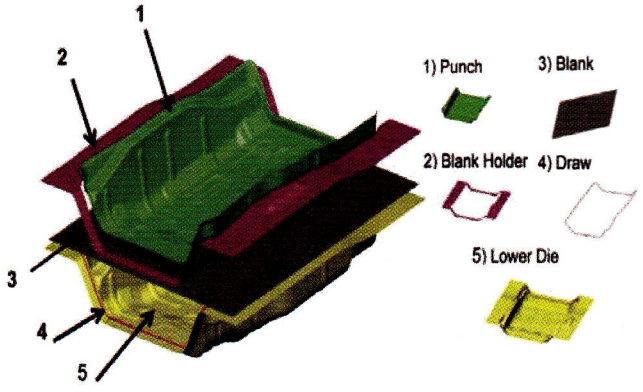
143 **A Blank Optimization by Effective Reverse Engineering and Metal Forming Analysis**

Asit Kumar Choudhary, Sharad Verma, Vishal KalubhaiBharodia & Sudhakar S

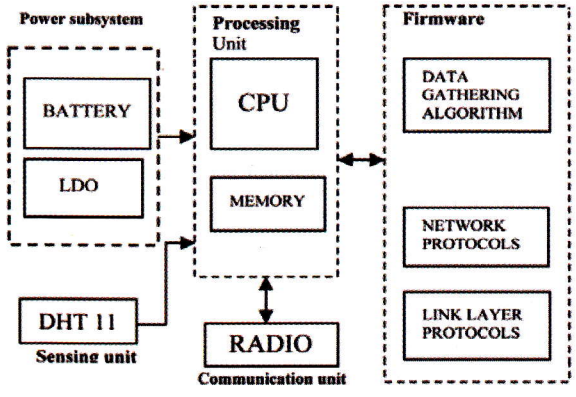
Finite element methods allow us to better understand the complex plastic deformation behaviour of a sheet metal component during forming. The purpose of the present work is to optimise the current 1535 × 1600 × 1.2 mm blank sheet of a commercial vehicle engine tunnel bottom using finite element simulation without violating safety and efficiency. The goal of this communication is to look at methods of finite element simulation that are used to solve the related problem. For generating the CAD data of the forming instruments, a reverse engineering technique has been adopted. The formation simulation is performed using the commercially available PAMSTAMP explicit solver-based program. The blank holder force was increased by around 15 % (from the current force of 350 kN to 400 kN) while measuring the reduced blank width. The optimised blank sheet's simulation results have been compared to the current blank, ensuring that the optimised blank is appropriate for the bottom portion of the engine tunnel without any defects or failures being produced. In the application of sheet metal formation, finite element techniques have always enabled us in weight savings and cost-saving of automotive components.



149 **Realization of Autonomous Sensor Networks with AI based Self-reconfiguration and Optimal Data Transmission Algorithms in Resource Constrained Nodes**

Syed Ameer Abbas & Abirami

Wireless sensor networks (WSN) prove to be an enabling technology for Industry 4.0 for their ability to perform in autonomous manner even in regions of extreme conditions. Autonomy brings in independent decision making and exerting controls without manual intervention and frequent maintenance. This paper aims to inculcate intelligence to the WSN exploiting the merits of Artificial Intelligence (AI) algorithms in cheap and most preferred ESP8266 and ESP32 based nodes. Autonomy is brought in by means of optimal data transmission, compressive sensing fault detection and network reconfiguration and energy efficiency. Optimal data transmission is achieved using Q-learning based exploration exploitation algorithm. Compressive sensing performed using Autoencoders ensure reduction in transmission overhead. Fault detection is done using Binary SVM classifier and the net- work re-configures based on physical redundancy. This paper high- lights the implementation of such autonomous WSN in real time along with their performance statistics.



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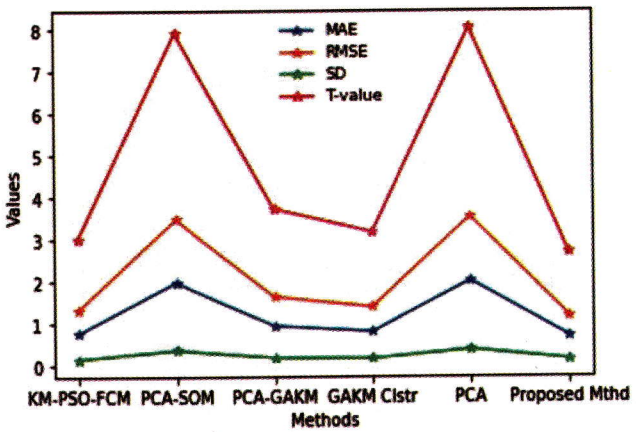
159 **A New Approach for Movie Recommender System using K-means Clustering and PCA**

Vikash Yadav, Rati Shukla, Aprna Tripathi & Anamika Maurya

Recommendation systems are refining mechanism to envisage the ratings for items and users, to recommend likes mainly from the big data. Our proposed recommendation system gives a mechanism to users to classify with the same interest. This recommender system becomes core to recommend the e-commerce and various websites applications based on similar likes. This central idea of our work is to develop movie recommender system with the help of clustering using K-means clustering technique and data pre-processing using Principal Component Analysis (PCA). In this proposed work, new recommendation technique has been presented using K-means clustering, PCA and sampling with the help of MovieLens dataset. Our proposed method and its subsequent results have been discussed and collation with other existing methods using evaluation metrics like Dunn Index, average similarity and computational time has been also explained and prove that our technique is best among other techniques. The results achieve from the MovieLens dataset is able to prove high efficiency and accuracy of our proposed work. Our proposed method is able to achieve the MAE of 0.67, which is better than other methods.

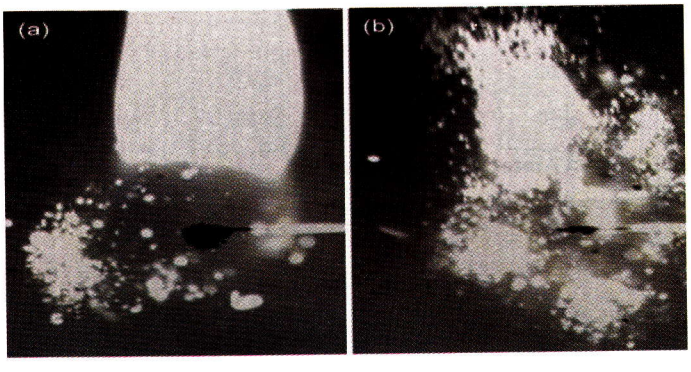


Energy Technology & Management

166 **Impact of Alumina Nanoadditives on Operation and Emission Attributes of Diesel Engine**

P Sharma, N R Chauhan & M Saraswat

This paper collectively report work of many researchers on engine operation and emissions of diesel engine with alumina nanoadditive in diesel blends. Fuel blending is a very common and popular practice as compared to making changes in engine design or treating the exhaust gases for hazardous emissions. Alumina nanoadditive related findings are encapsulated here to review the pros and cons of various alternative fuels for better performance and reduced harmful emissions. Many recent researches are now focussed on nanoadditive over microadditives for their high specific surface area, much better combustion characteristics than micron sized additives and shorter ignition delays. Easy dispersion and suspension in liquid fuels can be obtained by Nanoparticles. This review focus on the effect of alumina nanoadditives on the fuel efficiency, brake thermal efficiency, emissions and a summary of the observation from literature is presented here.



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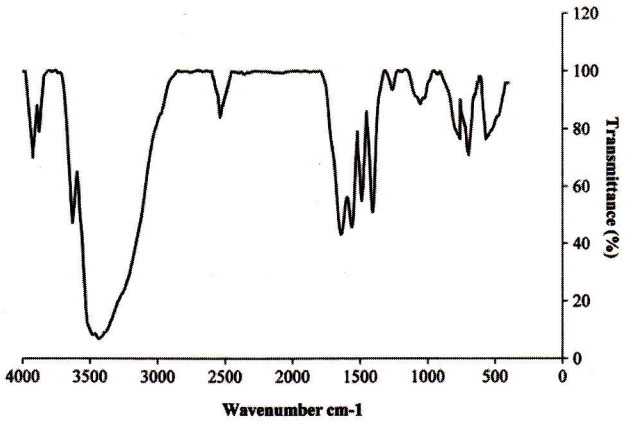
172 **Combination of Woody and Grass type Biomass: Waste Management, Influence of Process Parameters, Yield of Bio-oil by Pyrolysis and its Chromatographic Characterization**

C Sowmya Dhanalakshmi, P Madhu, A Karthick & R Vignesh Kumar

Due to looming demand for fossil fuels and environmental concerns over global warming, extensive attention has been given on the development of renewable energy. Biomass materials are used since millennia for meeting myriad human needs including energy and chemicals. In this study, co-pyrolysis characteristics of woody and grass type agricultural wastes, namely *Borassus flabellifer* and *Cymbopogon flexuosus* were studied in a fixed bed reactor to evaluate their potential use as source of bio-oil. The effects of operating parameters such as temperature, particle size and heating rate were investigated. In this co-pyrolysis process, the maximum yield of pyrolysis bio-oil 47.10 wt% can been obtained under the pyrolysis temperature of 500 °C, 1.0 mm particle size and at the heating rate of 30 °C/min. The bio-oil product was analyzed for physical, elemental and chemical composition using Fourier transform infra-red (FTIR) spectroscopy and gas chromatography (GC).



Waste Utilization & Management

181 **Utilization of Eureka Lemon Peel for Development of Value Added Product**

Pawandeep Kour, Neeraj Gupta & Jagmohan Singh

The main purpose of this study was to prepare a delicious value added product from the osmo-dried eureka lemon peel flakes which otherwise is a wastage material. The peels of eureka lemon were used to prepare flakes. Plain water was used for washing of flakes, thereafter after washing these were blanched for five minutes and dipped in sugar and jaggery syrup concentrations as per the treatment combinations for 24 hours. In another 24 hours, the peel flakes were dried in cabinet tray drier (60°C) for 4–5 hours after draining out the water. Thereafter, the peel flakes were packed in LDPE bags and then stored at room temperature for 3 months. At the interval of 1 month, the various chemical and sensory characters were investigated. Osmo-dried eureka lemon peel flakes showed a decreasing trend in L* value, b* value, ascorbic acid and β-Carotene whereas an increasing trend was observed in reducing sugar, total sugar and a* value during storage period of three months. On the basis of overall acceptability, treatment T_7 (75°Brix sugar syrup) was found to be the most preferred osmo-dried eureka lemon peel flakes. It could be concluded that osmo-dried eureka lemon peel flakes can be preserved safely for three months.

Author-Reader Platform

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