Journal of Scientific & Industrial Research

VOLUME 75 NUMBER 1 JANUARY 2016

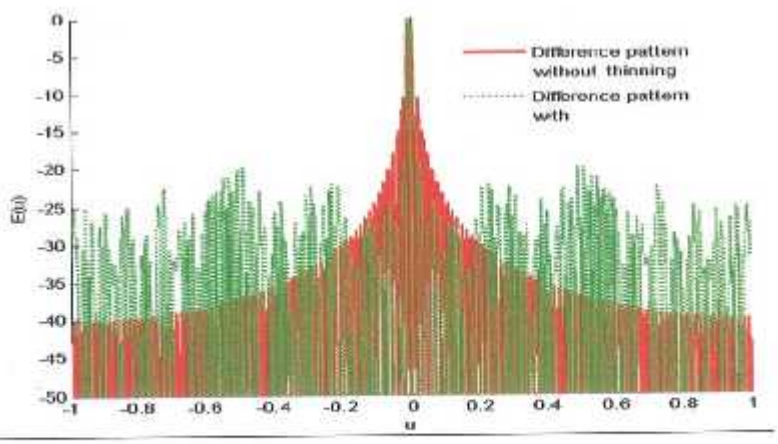
CONTENTS

Management & Information Technology

9 **Generation of Difference Patterns from Thinned Arrays using Genetic Algorithm**

D RamaDevi & G S N Raju

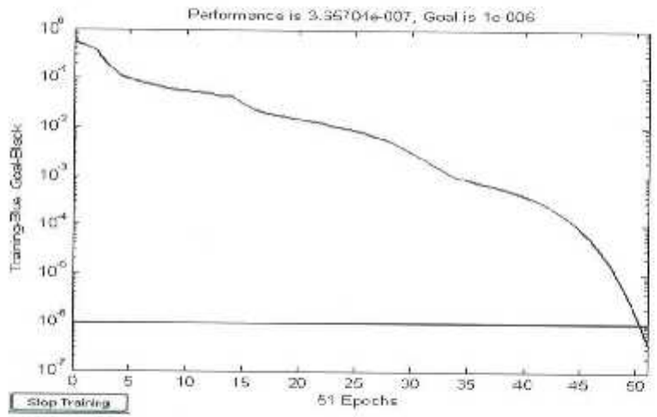
In tracking radar systems, it is essential to locate the target with high accuracy. When the target is placed exactly in the null between the two principal lobes of a difference pattern, its angular location can be determined with high accuracy. The general way of obtaining a difference pattern is to excite the array with a bi phasal distribution where one half of the distribution is in phase while the other half is out of phase. Array thinning can be used to generate low side lobe difference patterns for tracking applications. In the present work thinning of linear arrays for generating low side lobe difference patterns using Genetic algorithm was carried out. From the simulation results we found that optimized patterns are characterized by lowest possible side lobes with a deep null in the bore sight direction. These types of patterns are useful for array designers for angular tracking RADAR and point to point communication applications with reduced EMI.



14 **A Productivity Analysis of the Industrial Security in the Mineral Resources Mining Industry**

Weida He, Zhonglin Sheng & Rong Hao

This study elaborates on the evaluating indicator system of mining industry security, and presents a method of combination between entropy and grey relation and makes an assessment of the security situation in China's mineral mining industry during the period from 2002 to 2009. Then, this study establishes a safety warning model for the mineral resources industry based on BP neural network and simulates the warning of related security conditions. The final analysis finds that warning effect simulation and empirical assessment results of the model are basically the same and this further demonstrate the effectiveness of this study.



19 **Energy Efficient Coverage Using Artificial Bee Colony Optimization in Wireless Sensor Networks**

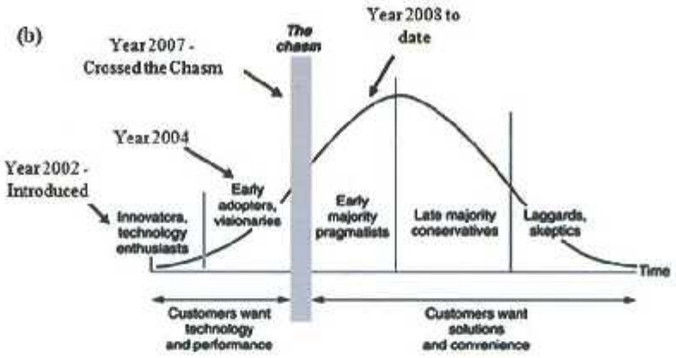
J Roselin & P Latha

In mission critical applications, all critical points (CPs) are to be monitored effectively. Even a single node failure in the Wireless Sensor Network (WSN) may cause coverage hole, reducing the lifetime of the network. The sensor has non-rechargeable battery which makes energy supervision inevitable. The proposed Energy Efficient Coverage based Artificial Bee Colony Optimization (EEC-ABC) approach exploits intelligent foraging behaviour of honeybee swarm to solve Energy Efficient Coverage (EEC) problem, and thereby maximizes the network's life time. It adheres to Quality of Service (QoS) metrics such as coverage, residual energy and life time. The simulation results demonstrated effectiveness of the residual energy and coverage in enhancing network lifetime.

28 **Management of Smart-Technology Market by Diffusion of Front Loading Innovation**

S J Halder, F Rasheed, B J Jeong & W Kim

Smart technology markets are making best of their efforts for delivering products with high quality, competitive prices and within prescribed time bounds to their geographically scattered customers. In order to achieve their strategic and tactical goals with a positive return on investment, companies are using a blend of various well known industrial solutions. A new innovative and a little drifting concept is in practice now-a-days termed as 'Front Loading Innovation (FLI)' which basically encompasses the product complete during its whole life cycle. This paper discusses the diffusion status of FLI in the Smart-technology market, its benefits and future prospects, predicting and forecasting its future marketing potential using appropriate tools and methodologies and to report AS-WAS and AS-IS situation of the main stakeholders after diffusion of this innovation.



S & T and Industrial Research

35 **Development of antioxidant rich beverage from Mahua (*Madhuca indica*) and Amla (*Emblica officinalis*)**

M Patel, S Jaiswal, B Naik, M Naik, D Saxena & S N Naik

An antioxidant rich, sugar free (no added sugar) beverage was developed using a novel source of natural sugar i.e. mahua (*Madhuca indica*) flower juice concentrate and amla (*Emblica officinalis*) juice. Three different concentrations of mahua (20, 40 and 60 °Brix) were blended with amla in six different proportions (90%, 75%, 50%, 40%, 25% and 10%) and were analyzed for total phenol content, DPPH radical scavenging activity, sugar profile and organoleptic property. The blend prepared from 40°Brix mahua having 50% amla was found to be the blend of choice.

40 **An efficient method for detection of inspiration phase of respiration in thermal imaging**

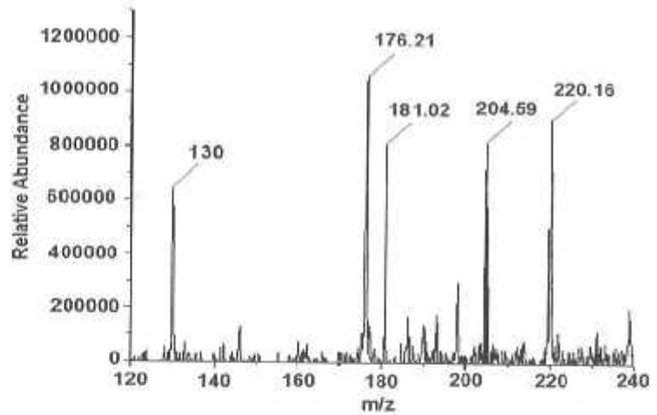
C L Deepika, A Kandaswamy & G Pradeepa

Respiration rate and the time duration between successive respiration cycles are two important parameters required for detection of apnea disorders during a polysomnograph test. Conventional methods use thermistors and respiration belts to measure these parameters. These however cause patient discomfort and also tether the patient to the bed. Thermal imaging is proposed in literature for non-contact measurement of respiration rate, wherein the inspiration and expiration of the patient can be visually monitored as temperature variations from his thermal images. In this paper, a segmentation approach is proposed to accurately localize the low temperature region that occurs near the nostrils during inhalation.

45 **Biosynthesis, Characterization, Optimization of Auxins by *Piriformospora indica:* It's Impact on Growth of *Solanum melongena* L. Cultivars**

S Swetha & T Padmavathi

The Presen: study summarizes the biosynthesis, characterization and optimization of auxins by *Piriformospora indica* and its effect on the growth of *Solanum melongena* L. cultivars. The biosynthesis of auxins was greatly influenced by the addition of tryptophan. Based on the data obtained from traditional one factor at a time method, optimization was carried out using the response surface methodology taking into account three significant variables viz. tryptophan concentration, pH and trace element solution. The optimized value of Indole 3 acetic acid and related indolic metabolites was observed to be 7.39 mg mL^{-1} with 0.2 g of tryptophan, pH 8.5 and 200 µl trace element solution. The Presence of auxins was, confirmed by UV visible spectroscopy, Fourier transform infrared spectroscopy and mass spectroscopy.

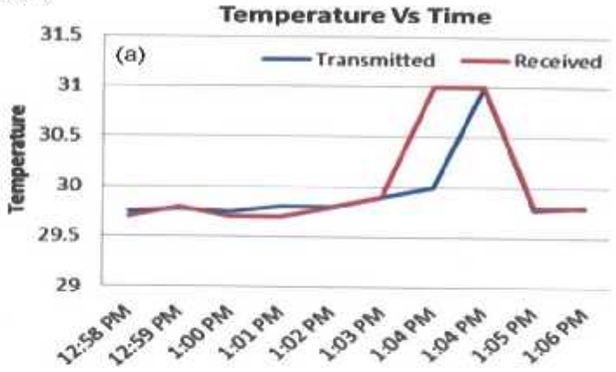


Energy and Environment

51 **Fault-Tolerant Wireless Communication System for Process Control in Wind Power Stations**

R Nagarajan & R Dhanasekaran

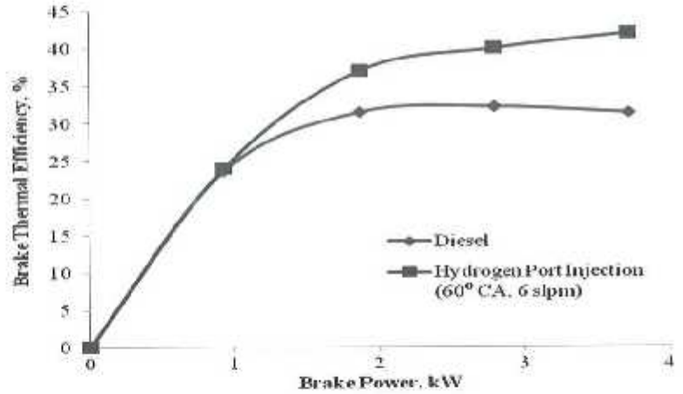
Industrial automation networks (IANs) involve the control system that communicates with the sensors to collect process-related data. To ensure proper control, the control system acts on the physical variables measured by issuing the commands or signals that activate relays, solenoids, motors, and actuators. The implementation of the control system for a wind power station is a time-consuming process. Hence, to speed up the project implementation with reduced cost and maintenance, a fault-tolerant wireless system for wind power stations that employs a wireless protocol, ZigBee is proposed. This wireless protocol can establish a two-way communication between the field devices and the base station.



56 **Port Fuel Injected Hydrogen in Dual Fuel Mode in Direct Injection Diesel Engine**

G Mohankumar & C Dhanasekaran

Hydrogen is expected to be one of the most important fuel in the near future for solving the problem caused by the greenhouse gases, for protecting environment and saving conventional fuels. In this study, a dual fuel engine of hydrogen and diesel was investigated. Hydrogen was conceded through the intake port, and simultaneously air and diesel was pervaded into the cylinder. Using Electronic Gas Injector and Electronic Control Unit (ECU), the injection timing and duration are varied. In this investigation, a single cylinder, KIRLOSKAR AV1, DI Diesel engine was used. Hydrogen injection timing was fixed at TDC and injection duration was timed for 30°, 60°, and 90° crank angles. The injection timing of diesel was fixed at 23° BTDC.



Author-Reader Platform

61 **Instructions to contributors**