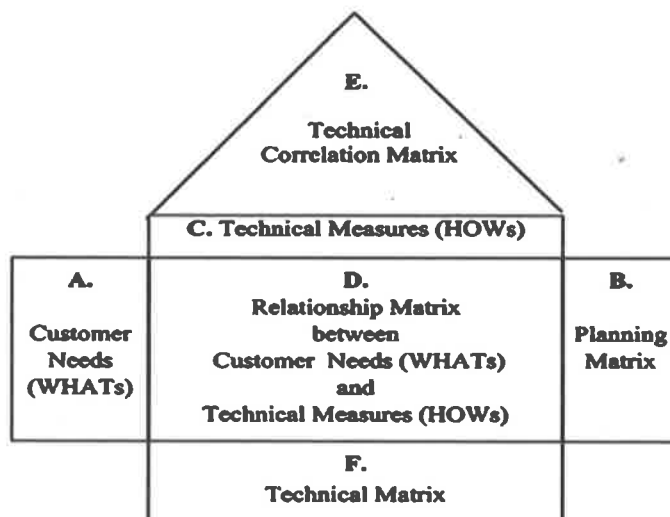


CONTENTS

Management & Information Technology

- 149 **The Application of Quality Function Deployment to Smart Watches – The House of Quality for Improved Product Design** Consumers are confused about the benefits of using smart watches due to the various insignificant functionalities included and the unclear value propositions promoted by smart watch manufacturers. In order to improve the quality of products and to provide features that can satisfy consumers' needs, technicians must understand the expectations of consumers. This paper recommends the use of quality function deployment (QFD), a method that integrates consumers' dynamic requirements with product designs, which can be represented using a House of Quality (HoQ) matrix diagram. Here, the unmet and uncovered needs of consumers relating to the smart watch are analyzed extensively using a questionnaire-based survey. The opinions of consumers and technicians are then examined, and a HoQ diagram is constructed to evaluate the relationship between the design attributes of smart watch and its technical attributes. Finally, the attributes that need to be improved are listed in a suggested order of priority.



W C Ho, A W Lee, S J Lee & Grace TR Lin

- 153 **Research on the Production Efficiency of China Civilian Military Listed Companies** Civilian military enterprises are the driving force to promote the integration of military and civilian. DEA is used to study the product efficiency of China civilian military listed companies during the period of 2005-2014. The result shows that: the comprehensive product efficiency of civilian military listed companies in China is at a low level which is mainly caused by pure technology efficiency; the differences of the product efficiency between companies are becoming larger, and this differences are more obvious between companies of different types.

Weida He , Yao Fu & Rong Hao

156 **Programming of an Industrial Robot Using Demonstrations and Soft Computing Techniques**

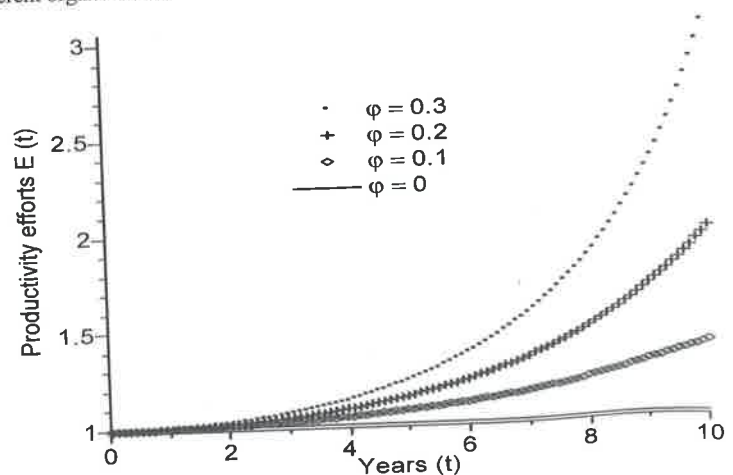
In this work, trajectory planners are developed to program an industrial robot using human demonstrations aided by artificial neural network and human hand synergy approach. These planners are developed to acquire trajectory from human demonstrator and convert it to robot trajectory. The planner based on artificial neural network utilizes kinematic model of human and robot hand for mapping whereas human hand synergy approach is used by second planner for mapping. The proposed approach is implemented to an industrial robot in a designed scenario. The performance of both the planners is compared using an established metric. Experimentations and analysis of results revealed that both the approaches generalize well in the tested scenarios. Moreover, the planner adopting using human hand synergy for mapping shows better performance than kinematics based planner.



P M Khandekar, S S Chiddarwar & A Jha

164 **Modeling the Effects of Innovative Leadership on Productivity and Profitability**

The purpose of this paper is to analyse the effects of innovative leadership on organisational productivity and profitability. A deterministic mathematical model using Runge-Kutta integration was utilised to analyse the effect of innovative leadership. A numerical simulation of the model differential equations disclosed how innovation leadership enables a company to change and adapt to its external environment and by implication enhance its performance. The study revealed that without innovative leadership, the production efforts remain stagnant with low productivity and profitability. Due to a change in the production efforts introduced by innovative leadership, an increase in the level of productivity and profitability is observed. The findings further emphasise that productivity increases with time under the innovative leadership. The proposed mathematical model can be broadly used to analyse the effect of innovative leadership on profitability and productivity within different organisations.

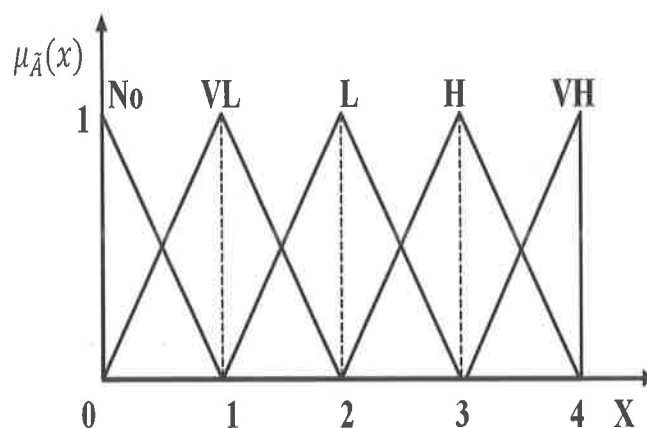


B Yan

CONTENTS

168 **Influence Factor Analysis of MEMS and IC Integration Technologies**

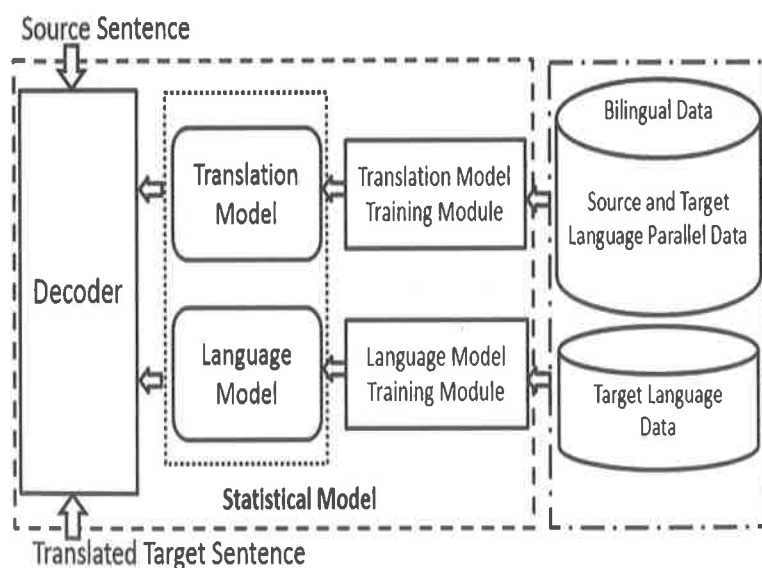
Microelectromechanical system (MEMS) devices are typically combined with integrated circuits (ICs) for operation in electronic systems. A variety of possible factors could affect the decisions of integrating MEMS and IC components. This paper aimed to investigate the critical influence factors of MEMS and IC integration technologies through expert interviews, and to further analyze their causal relationships based on fuzzy decision-making trial and evaluation laboratory (fuzzy DEMATEL) method. We found that product footprints and product costs are the two major influence dispatchers in the cause group, while fabrication complexity is the major influence receiver in the effect group. Moreover, signal path length has very little strength of influence on other factors. The research analysis of fuzzy DEMATEL method could serve as a reference to future development strategies in the field of MEMS and IC integration technologies.



Yen-Chun Lee

172 **Comparative Analysis of Phrase Based, Hierarchical and Syntax Based Statistical Machine Translation**

Languages have inherent property of tree-based recursive arrangement of phrases and follow a syntactic grammar. Phrase Based Translation is considered state-of-the-art in the field of statistical machine translation, but does not take into account the above mentioned properties of languages. Hierarchical and Syntax based machine translations are aimed to model these properties of languages. English-Hindi language pair, belonging to two different language families needs conversion of Subject-Verb-Object (SVO) structure of English to Subject-Object-Verb (SOV) structure of Hindi. This paper is aimed to perform comparative analysis of these models for this language pair which demands long distance movement of words or phrases.



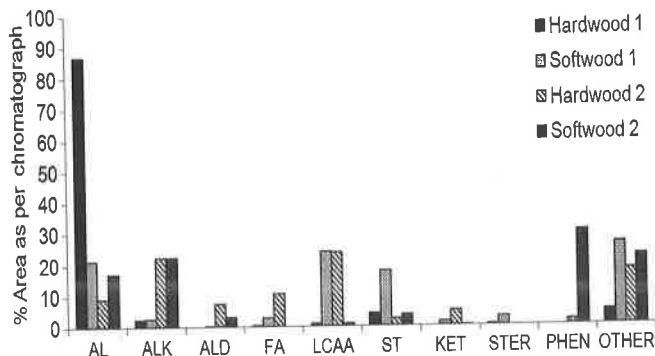
K K Arora & S S Agrawal

S & T and Industrial Research

176 **Beneficiation Opportunities for Bark from South African Grown Eucalyptus grandis and Pinus patula**

Bark, a major waste residue in the forestry, timber, pulp and paper industry has been shown to be a potential source of valuable chemicals. The chemical composition of bark extracted from South African plantation grown *E. grandis* and *P. patula* trees was studied with the objective of identifying components that could potentially be beneficiated into valuable chemical compounds. The lipophilic extracts were rich in hydrocarbons, followed by long chain aliphatic alcohols, fatty acids, sterols and terpenic compounds. Phenolic compounds were found in high quantities in softwood bark, with guaiacol and o-acetyl-p-cresol being the main components.

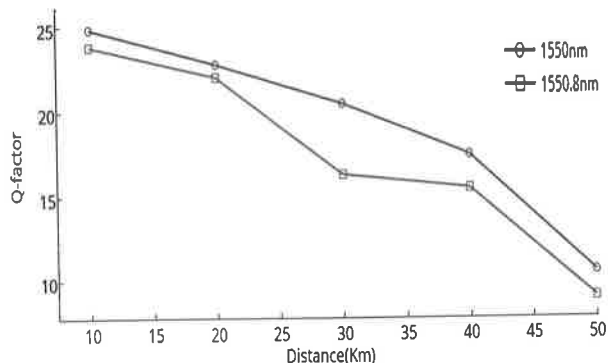
R S Moodley, J E Andrew & B Bruce Sithole



181 **Implementation of Highly Loss Budget NG-PON Incorporating the Direct Modulation and Advance Pulse Formats**

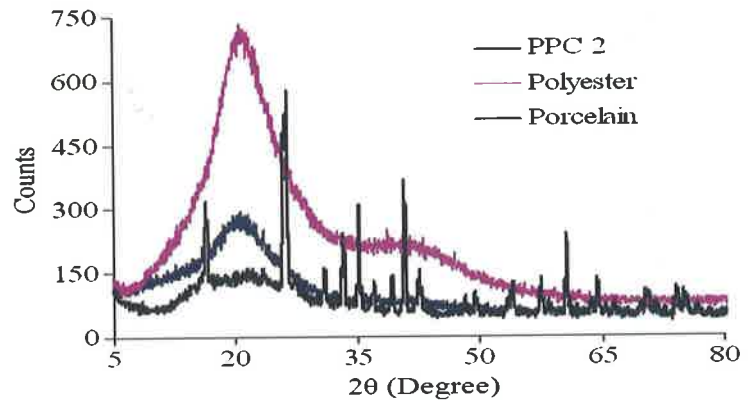
This paper presents the different modulation formats Return to zero (RZ), Non-return to zero (NRZ) and differential phase shift key (DPSK) and these formats have been investigated in wavelength division multiplexing passive optical network (WDM-PON) at 40Km. It has been observed that DPSK performs better at long range than return to zero (RZ) and non-return to zero (NRZ) techniques. It is further investigated that with increase of link length, value of quality (Q) -factor decreases and there is increase in the bit error rate (BER). System performance studied at different input powers and it is observed that system performance increase with increase in power but after some value results tend to decrease due to nonlinearities Self phase modulation (SPM), Four wave mixing (FWM), Cross phase modulation (XPM) comes into play.

A Gupta, R Bhardwaj & S Bakshi



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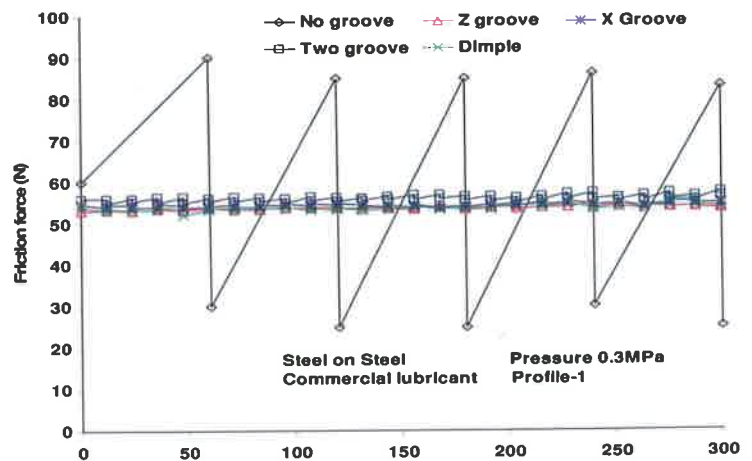
- 184 **Porcelain Reinforced Polyester Resin Composites: Preparation and Characterization** Porcelain reinforced polyester resin composites containing 10-60% porcelain with respect to the weight of unsaturated polyester resin were prepared by compression molding. Synergistic improvements in the composite properties were achieved and are superior to those of the individual components. The effects of porcelain content on some important physical and mechanical properties such as water absorption, compressive strength and hardness of the composites were investigated in detail. It is evident from the XRD spectra of the composites that porcelain has been incorporated into polyester resin of the composites resulting in better mechanical properties.



R Sultana, R Akter, M R Qadir, M A Gafura & M Z Alam

Short Communication

- 188 **Influence of Oil Groove Shapes on Frictional Properties of Slide Ways** The requirements of linear guide ways are rising, especially for machine tools which have to meet the demands of high positioning exactness and stick-slip free behavior with low coefficient of friction over a wide range of speed. These requirements can be met by employing different slide way materials, developing new lubricant additives and through improved oil groove design. Unsteady or variation in frictional force leads to jerky motion or stick-slip in machine tool slide ways. In the present investigation an attempt is made to study the efficiency of different oil groove shapes with reference to the stick-slip behavior and frictional properties over a wide range of speed and load (pressure). The results on variation of the coefficient of friction and stick-slip amplitude for groove profiles ogee, rectangular and different groove shapes (Two, X, Z and Dimple) as functions of sliding velocity and load (pressure) on commercial lubricant are presented in this paper.



M Kemal, S A Jabasingh, A Yimam & J A Kumar

Author-Reader Platform

- 191 **Instructions to contributors (Extended)**