IJCAET ISAMPE 2017

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PROGRAM BOOK

Advanced Engineering and Innovation for Green Technology and Sustainable Development

SANUR PARADISE PLAZA HOTEL
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Organized by:
Diponegoro University, Pukyong National University and Udayana University

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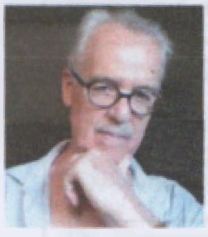
KEYNOTE SPEAKER

1. Dr. Arcandra Tahar
Vice Minister of Energy and Mineral Resources, the Republic of Indonesia



2. Prof. Alexander Cuthbert
Emeritus Professor of Planning and Urban Development, The University of New South Wales, Sydney, Australia

"Robots, Wind farms, and the internet : The ethics of technology in a changing world"

3. Prof. Andrew Price
Loughborough University, UK
Civil and Building Engineering Department

"Improving critical infrastructure performance through advanced engineering and innovation"

4. Assoc. Prof. Tomomi Honda

University of Fukui, Japan
Department of Mechanical Engineering, Faculty of Engineering
Gradurate School of Engineering

"New diagnosis methods of the lubrication oils for the proactive maintenance"

INVITED SPEAKER

Prof. Buntara Sthenly Gan
Architecture Department Nihon University, Koriyama Japan

"Isogeometric Analysis for Beam Element"

Assoc. Prof. Tegoeh Tjahjowidodo
School of Mechanical and Aerospace Engineering, Nanyang Technological University (NTU), Singapore

"An Integrated-Intelligent Re-manufacturing Process"

Prof. Niro Nagai
Mechanical Engineering Department, University of Fukui, Japan

"Boiling research in Japan, cooling technology of high-temperature material"

Assoc. Prof. Rosdiazli Ibrahim
Electrical and Electronics Engineering Department, Universiti Teknologi Petronas (UTP), Malaysia
Dean of Centre for Graduate Studies (UTP)
"The journey towards industrial monitoring and control application of wirelessHART technology"

Prof. Junghwan Oh
Biomedical Engineering Department, Pukyong National University (PKNU), Korea

Prof. Prabir Basu
Mechanical Enginering Department, Dalhousie University, Nova Scotia, Canada
"Torrefaction – an easier, simpler, inexpensive immediately implementable option of reduction in greenhouse gas emission"

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A Review on Sensors for Real-time Monitoring and Control Systems on Machining and Surface Finishing Processes

Tomi Wijaya[1], *Wahyu* Caesarendra[1], *Tegoeh* Tjahjowidodo[2,*], *Bobby K* Pappachan[1], *Arthur* Wee[3], *Muhammad Izzat* Roslan[3]

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Abstract. One of the key components in real-time monitoring and control on machining and surface finishing processes are sensors. The advances of such system have triggered interesting questions on sensor selection that act as the fundamental before starting a project. This paper is made to review and answer the questions surrounding sensor selection. The paper first explains on the type of sensors commonly used in practice for real-time monitoring and control systems. After which, the paper discusses on how often the sensors are used on several machining and surface finishing processes and what are the reasons for the sensor selection. Thereafter, a review on the type features commonly analysed through these sensors is discussed. The paper expects reader would decide better upon selecting sensors and has a better direction in their project. Thus the paper works to guide reader to improve based on what has been completed before.

1 Introduction

The development of manufacturing industry nowadays is pushed to its limit to fulfil the demand of market. The market requires better quality products, more variability, shorter product life cycle, reduced product cost, and globally competitive products [1].

Machining and surface finishing processes develops in the direction of immediate integration with real-time monitoring and control systems to allow users to monitor and control the events happening during machining and surface finishing.

The selection of sensors is one of the fundamental building block for real-time monitoring. This paper will discuss on the sensors used in other real-time monitoring and control projects to better inform reader on suitable sensor application for their project.

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Measurement of injury rate on fish skin and performance comparison based on L*A*B* and HSV color spaces

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Abstract. This paper analyses and compares the performance of L*A*B* and HSV color spaces and applies them to calculate the injury rate on fish. To do these issues, the following steps are done. An original image is transformed into L*A*B and HSV color spaces. A channel "a" is separated from L*A*B* color space. In channel a, a formula to adjust "channel a value" is proposed to realize the shapes of injury on fish clearly and a new channel a is obtained by adjusting the channel a. The new channel "a" is converted into injury binary image by manual threshold. Otsu's method is applied converted the original channel a image of fish shape into binary image. Finally, by calculating the number of pixels of areas of shape and total injury of fish, the injury rate is calculated. The steps of image processing of HSV color space is similar to L*A*B* color space. The proposed process are tested on fish.

1 Introduction

"Machine vision", as a crucial part of sorting systems, enables automatic and non-destructive selecting of products that satisfy certain requirements. There are many different methodologies for image processing in recent years. Therefore, choosing a right color space in processing algorithms is crucial. Eyarkai et al. described that mangoes were measured during ripening in 24 hours and evaluated using L*A*B* and RGB color coordinates [1]. Using exactly color space is important for controlling of food quality. Ivana et al. measured color of food products by using L*A*B* and RGB color space[2]. In this paper, fruit quality based on L*A*B* color space is more accurate than RGB color space. On the other hand, Hitesh et al. used image processing technique to detect fish disease [3]. This issue is done by using image processing algorithms based on L*A*B* and HSV color spaces. A method to measure injury rate of fish surface based on K-means clustering image segmentation was represented by Sheng el at.[4]. This method calculated injury rate based on S channel of HSV color space. After that, Otsu's threshold was applied to converted S channel into binary image, and calculate injury rate by counting area pixels of injuries and total shape on fish. The results

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Design studies of inner and outer embedded Permanent Magnet for hybrid electric vehicles

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Abstract. Hybrid vehicles require high torque for propel, hence permanent Magnet machines are highly suiting for the improvement in the torque density. The paper focus on designing built-in interior permanent magnet (IPM) synchronous machine for hybrid electric drive. With the permanent magnet switched from rotor to stator and the characteristics over a wide range of speed operation is studied. The results obtained though performance analysis shows that at 130 rpm high torque with power peaking at around 900 rpm. Both the inner and outer machine are studied using numerical study tool for performance analysis for the application mentioned above. The inner magnet rotor design has provide a better magnetic flux flow due to the larger flux linkage between the permanent magnet and stator pole. Both type of machines are evaluated for torque where the machine with inner magnet provide a higher torque density of 4.94% as compared to the outer magnet machines.

1 Introduction

Unlike internal combustion engine (ICE) vehicles, the mechanical losses are converted into heat and dissipate to surrounding which does not practice the concept of energy efficiency [1-2]. Hybrid vehicles operate based on permanent magnet machine where magnetic flux linkage generated from the overlapping of magnetic field between permanent magnet and electromagnet [3]. The brushless permanent magnet DC machines have advantages over other machines such as simpler to maintain, more durable, and compact, less likely to suffer reduction in torque performance. The issues occurred where the fixed magnetic field in the stator could not increase the torque density due to difficulty in controlling the magnetic flux. [4-5]. A new type of design that includes two rotors one inside the machine and the other outer rotor enable applications in future wherein the operating mode is feasible in either simultaneous or independent operations using control techniques. A comparative design analysis using torque density value as evaluation parameter is presented to suiting to a hybrid electric vehicle.

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Fatigue Testing and Evaluation of Fatigue Strength under Multiaxial Stress State; Why do we need fatigue testing?

Takamoto Itoh*, *Fumio* Ogawa and *Takahiro* Morishita

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Abstract. Types of multiaxial fatigue tests and their experimental results are presented in this paper. There are typical three types in multiaxial fatigue tests: the combining push-pull and reversed torsion loading test using hollow cylinder specimen, the biaxial tension-compression test using cruciform specimen and the inner pressure applied the push-pull loading test using the hollow cylinder specimen. In the combining a push-pull loading and a reversed torsion loading test, failure life under non-proportional loading in which principal directions of stress and strain were changed in a cycle was shortened compared to proportional loading in which those are fixed. Fatigue lives were well-correlated using a non-proportional strain range considering the effect of strain path and material dependence. In the biaxial tension-compression test, the failure life decreased with increase of the principal strain ratio. In the inner pressure applied the push-pull loading test, cyclic deformation behaviour due to complex loading paths of multiaxial fatigue tests with the inner pressure associated with push-pull and rev. torsion acted to reduce the failure lives. Experimental investigation of multiaxial failure life and elucidation of their governing mechanism is essential and it can broaden the applicability of structural components.

1 Introduction

Investigation of fatigue properties is essential for design of structural components. In practical application, structures are subjected to complex multiaxial load. Therefore, the understanding of multiaxial fatigue properties of materials is important. Indeed, failure lives are overestimated when the effect of multiaxiality is neglected. Multiaxial fatigue testing usually has been carried out using a hollow cylinder specimen by applying push-pull loading and a reversed torsion loading and the applicability of multiaxial stress and strain parameters has been discussed [1-5]. However, a principal strain ratio (ϕ) and a principal stress ratio (λ) ranges performable by the testing method are $-1 \leq \phi \leq -\nu$ and $-1 \leq \lambda \leq 0$, where ν is the Poisson's ratio. Structural components sometimes undergo fatigue damage at principal strain/stress ratios in excess of the above range under service loading. In

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