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Quality assessment of COC (Code of Conduct) by SERVQUAL method and IPA model

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Abstract

Technology and knowledge development in globalization era are influence to all aspect through society life. A technology implementation which been applied in society such as education, government, transportation, communication, and others. On the other side, a modern technology is can not able to improve performance quality in every sector or instantion. The important thing which can influence performance quality is about availability of human resources. Humans have more sophisticated abilities and flexibility to conduct performance evaluations. An example of human resources duties is COC (Code of Conduct) activity in PT. PLN. Its address to job evaluation, work evaluation, and solve the problems in company. SERVQUAL method is conducted in this research ind order to assess the service quality of COC (Code of Conduct). Score of SERVQUAL are combine with importance-performace analysis (IPA) model. On the other side, researcher give suggestion of improvement through the instrument of IPA diagram has lower scale which are not suitable to employees expectation. Researcher distributed thirty questionnaire to all employees. The questionnaire is fulfillment by using likert scale 1 to 5. According to the methods, the results of this research is giving improvement in the first quadrant

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The 5th International Conference on Industrial, Mechanical, Electrical, and Chemical Engineering 2019 (ICIMECE 2019)

Surakarta, Indonesia • 17–18 September 2019

Editors • Wahyudi Sutopo, Miftahul Anwar, Muhammad Hamka Ibrahim, Hari Maghfiroh, Chico Hermanu Brilianto Apribowo, Sutrisno Ibrahim and Muhammad Hisjam

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Preface: The 5th International Conference on Industrial, Mechanical Electrical, and Chemical Engineering 2019 (ICIMECE 2019)

On behalf Organizing Committee, it is my privilege to welcome you to The Fifth International Conference on Industrial, Mechanical, Electrical, and Chemical Engineering (5th ICIMECE 2019). The ICIMECE 2019 is organized by Faculty of Engineering – Universitas Sebelas Maret and supported by Universiti Teknologi Malaysia; Curtin University – Serawak; Indonesian Institute of Sciences (LIPI); National Standardization Agency of Indonesia (BSN); Agency for Cooperation of Higher Education of Industrial Engineering (BKSTI); Agency for Cooperation of Higher Education of Electrical Engineering (FORTE); Industrial Engineering and Operations Management Society International (IEOM Society International); National Centre for Sustainable Transportation Technology (NC STT); and USAID–SHERA (Sustainable Higher Education Research Alliances). The ICIMECE was formerly known as IMECE which was first held in November 2015.

This event will include the participation of renowned keynote speakers, workshop, oral presentations, and technical conferences related to the topics dealt with in the program. This year, the conference theme is "*Development and Commercialization of Green Technology*". The ICIMECE 2019 conference is going to be a broad, widely provided opportunity for the different areas to exchange new ideas and experiences, as well as to establish business or research relations and to find global partners for future collaboration in the fields of engineering.

Speakers from Indonesia, Japan, USA, Malaysia, Myanmar, Brunei Darussalam, Iran, and Singapore submitted the articles to this conference with 214 standard oral presentations presented – which was selected from 306 papers with an acceptance rate of around 70 %. This year's program features 8 keynote speakers including Prof. Ir. Dr.-Ing. Eko Supriyanto, UTM Malaysia; Prof. Dr. Nurul Taufiqu Rochman, M.Eng, Ph.D, LIPI Indonesia; Harry Kasuma (Kiwi) Aliwarga, UMG Myanmar; Prof. Minoru Sasaki, Gifu University Japan; Dr. Robert de Souza Ph.D., MSc, BSc Hons, NUS Singapore; Dr. Eng. Bentang Arief Budiman, Bandung Institut of Technology Indonesia; and Dr. Denni Kurniawan, University Technology Brunei - Brunei Darussalam. We also have 13 invited speakers in 5 parallel sessions for two days on September 17-18, 2019. It is expected to underline the issues on "*Development and Commercialization of Green Technology*". All presenters are also invited to submit a full paper which will published in the American Institute of Physics (AIP) conference proceeding and will be proccessed to be indexed by SCOPUS. All paper publication had already peer-reviewed from independence reviewers and associated editorial team to ensure high quality of contributed material.

We would like to thank all those people who have worked hard in this period for the preparation and the success of this meeting, including all the contributors, the authors, the associate editors, the review committee, the program and steering committees, sponsors and all the members of the organization.

Finally, it is our great honor and pleasure to accept the responsibilities and challenges as a Conference General Chair. We hope that the conference will be a stimulating, informative, enjoyable and fulfilling experience for all who attend it.

Thank you very much.

Organizing Committee of ICIMECE 2019
Dr. Wahyudi Sutopo, ST, M.Si
Dr. Miftahul Anwar, S.Si., M.Eng.

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Quality Assessment of COC (Code of Conduct) by SERVQUAL Method and IPA Model

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Abstract. Technology and knowledge development in globalization era are influence to all aspect through society life. A technology implementation which been applied in society such as education, government, transportation, communication, and others. On the other side, a modern technology is can not able to improve performance quality in every sector or instantion. The important thing which can influence performance quality is about availability of human resources. Humans have more sophisticated abilities and flexibility to conduct performance evaluations. An example of human resources duties is COC (Code of Conduct) activity in PT. PLN. Its address to job evaluation, work evaluation, and solve the problems in company. SERVQUAL method is conducted in this research ind order to assess the service quality of COC (*Code of* Conduct). Score of SERVQUAL are combine with importance-performace analysis (IPA) model. On the other side, researcher give suggestion of improvement through the instrument of IPA diagram has lower scale which are not suitable to employees expectation. Researcher distributed thirty questionnaire to all employees. The questionnaire is fulfillment by using likert scale 1 to 5. According to the methods, the results of this research is giving improvement in the first quadrant of IPA diagram then analyze by using 5 whys analysis to know about cause and effect through the factors of COC (*Code of Conduct*). This study is expected to provide all employees by valuable insights through COC (*Code of Conduct*) activity thath reflect the employees' perceptions in order to make continous improvement.

INTRODUCTION

Technology and knowledge development can change the activities of human life. Both of company progress and challenge for company are important thing in the corporate world to face competition in globalization era. To face competition with others, a company is not enough to be merely depending on technology. There is another important element which is esential to compete in global era that is human resource. Human resource is needed by the company to be able to adapt with competitive situation. It is related to reason, feelings, desires, skills, and creation. Therefore, human contribution is strongly needed to determine the company's progress strategy [1]. The report in this paper discusses PT. PLN (Persero) one of a state-owned company in Indonesia. It is engaged in electricity such as operating the power plants and distributing the power by transmission to society all over Indonesia [2]. The researcher is going to discuss about the quality of human resource departement activity in PT. PLN Central Java and Special Region of Yogyakarta Distribution namely COC (*Code of Conduct*). COC (*Code of Conduct*) is a means to improve employees's performance in PT. PLN. This activity is a means of communication manager and staff. It generaly discussess about company management, company problem, job evalution, and employees's performance evaluation [3].

COC (*Code of Conduct*) activity is usually held minimun one time in one week, it is discuss about regional and national problems, and evaluate last week employees' work performance. The activity is held maximum thirty minutes by standing discussion. All employees in every scope should involved in COC (*Code of Conduct*) activity. By those activity, employee are expected to be an active person when deliver opinion. Therefore, COC (*Code of Conduct*) activity able to realize two-way communication between principal and staf. However, there is a passive person when involve in COC (*Code of Conduct*) activity. The reason of this research is about COC (*Code of Conduct*) activity that sometimes not routine schedulled, therefore researcher wants to know quality of COC (Code of Conduct) activity

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Risk Estimation of Construction Activities of Buildings

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Abstract. Building construction work is one of the most dangerous activities among all industries. These works are often associated with different types of risks, which if not eliminated or minimized during design stages would cause fatal accidents and severe injuries during the construction stages. Risk elimination or reduction cannot be achieved without recognizing hazards and assessing risk through evaluation techniques. Risk may not be directly quantifiable, and the presence of confounding variables, ongoing interventions and uncertainty makes generalization of findings to the overall population a suspect. It is difficult to measure risk because it often assumes ordinal scales and data related to it is scarce. This paper presents a risk estimation technique that evaluates risk and produce data that can be used in response decisions to aid risk elimination or reduction in building construction processes. The technique to be presented in this paper will be based on experts' opinion and will depend on experts' knowledge and working experience in the construction industry. The study will conduct a risk assessment survey where experts will be asked to assign risk values to 25 construction activities of five structural elements (footing and foundation, column, wall, beam and roof). The objective is to estimate unit safety risk for each activity and determine the overall risk of the project. A questionnaire with all five components and their corresponding construction activities was used to evaluate risk severity levels and time of exposure for each activity. Data collected was analysed with SPSS descriptive statistics and one-way ANOVA. The findings show that construction field personnel perceive roof, beam and foundation as the most risky design elements to construct. Also excavation, shuttering and anchoring/welding are the most risky activities in the construction process. No significant differences were found between the perceptions of the three groups of construction field personnel (engineers, superintendents and HSEs) regarding risk perception.

INTRODUCTION

Construction works are inherently risky and have potential hazards to people, assets, environment and reputation to companies. Based on incident and fatality rate, the sector is classified as one of the most dangerous industries for industrial workers. A large number of incidents of fatalities and permanent injuries to workers and damages to the industry occur every year. According to the global statistics of the International Labor Organization (ILO, 2018) [1], the accident rate in the construction industry was three times higher than that of other industries and the fatality rate of construction workers was five times that of all industries. Construction fatality rate in Malaysia rose from 7.26 deaths per 100,000 workers in 2014 to 14.57 in 2017, and recorded 118 fatalities in 2018 (DOSH, 2018) [2]. Occupational incidents are predictable and preventable with the process of hazard identification as well as risk assessment and control [3] . Therefore, in order to prevent or minimize occupational accidents, the top-most priority for the construction industry is evaluating and identifying hazards, assessing risks associated with such hazards and attempting to control them during design phases of projects. Risk assessment and quantification is an appropriate method of identifying risks associated with constructing structural elements and activities [4]. This can be achieved by the ability of field personnel to perceive risk and implement effective risk assessment and management practices [5], through their knowledge of construction design processes and safety. Formal identification of hazards and

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Robot Control Systems Using Bio-Potential Signals

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Abstract. Robot control systems via human bio-potentials, such as electroencephalography (EEG), electrooculography (EOG), and electromyography (EMG) signals offers unlimited opportunities to stakeholders. Research and development of the technology essential for estimating and identifying the usable biological signals through sensors and signal processing techniques, as well as their conversion into control scheme has been carried out in the recent past. The need for bio-signal control is heightened by elderly and disabled people who through myriad of happenstances have lost control of the environment. To promote quality of life and self-reliance, biotechnology joined with Man-Machine interfaces are a promising undertaking. In this research, we utilize EOG, EMG and eye related information to control a robot in 3D environment. By mapping gaze motions to corresponding inverse kinematics, the operator can control a robot arm through his eye movements and facial muscles. The results prove the workability of the concept which on further improvement, would avail a dynamic 3D bio-signal control system.

INTRODUCTION

In modern Japan, as the population is aging, dysfunctions related with senility and the like are on the rise. On the other hand, disabilities stemming from traffic and occupational accidents have a potential to change the lives of individuals from self-reliance to dependents. The reality is that, the numbers of such people who need constant nursing care are increasing. To this end, support for restoration of control to individuals, restoration of independence in career, reduction of the caregivers' burden, etc. are issues that cannot be wished away. In the recent past, research in human-machine interface using biomedical signals that are extended to people with disabilities have gained traction for enhancing self-reliance of the elderly and persons with disabilities and towards reducing burden on the nursing persons.

As mentioned above, bio-signal technology paired with a support equipment and or communication schemes can handle or lessen the severity of the challenges experienced by the elderly and disabled. Bio-signals are present in any human being in varying forms e.g. electromyography (EMG) [1], electroencephalography (EEG) [2], and electrooculography (EOG) [3] to list but a few. EOG focuses on the potential resulting from the movement of the eyes. In this technique, EOG signal waveform that is generated when the subject is looking upwards, downwards, left or right is interfaced with a computer system which associates the eye potential with the viewing angle. EMG on the other hand deals with the signal generated by contraction of muscles.

EOG signals have been implemented in various research areas. In [4], EOG was applied to control mouse functions. Gadget control by classifying EOG with Deterministic Finite Automata was introduced by [4]. EOG signal was used in wheelchair control to help disable people [5]. The authors reported an accuracy of approximately ±2°. In [6], an improvement system of automatic wheelchair with EOG signal was developed with PIC microcontroller.

In [7], research to combine EOG and two degrees of freedom robot manipulator was introduced. EOG signal was grouped by four positive thresholds and four negative thresholds for both vertical and horizontal gaze motions. The

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Synthesis Of Hydroxyapatite From Seashells Via Calcination at Various Temperature Using Microwave and Furnace

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Abstract. The wastage of cockle shells in Malaysia kept increasing from the year of 1948. At the same time, the demand for synthetic grafting also urges new source of synthetic hydroxyapatite to be used as an alternative material. Therefore, cockle shells are suitable source for the alternative source of synthetic grafting material. However, a systematic study on the behaviour of hydroxyapatite in microwave heating versus conventional heating is still lacking. This research study focuses on the effect of microwave heating and conventional heating on the formation of hydroxyapatite. The shells were collected from local restaurants in Melaka. Sample preparation was done by rinsing the shells in acetone and cleaning by using tap water before drying. Shells were crushed into powders by ball mill and the powders were sieved into size of $x \leq 45\mu m$ and $45 \leq x \leq 63\mu m$. The powders were calcined by furnace (FS) and microwave (MS) respectively. The temperature settings of FS were 600°C, 800°C and 1000°C for three and four hours respectively while the settings for MS were 60P, 80P and 100P with duration of one hour respectively. Characterization of calcined shell powders were performed by using FTIR and XRD. Results showed that no HA was formed, instead, calcite was formed in FS at 600°C while CaO and $Ca(OH)_2$ were formed in others temperature in FS and MS. Moreover, it was also found that CaO can be synthesized rapidly by using MS.

INTRODUCTION

In Malaysia, aquaculture sector has been identified as one of the major sectors in recent years. The amount of cockle farmers in Malaysia keeps increasing every year since the year of 1948. The total production of cockle had reached 9596.76 tonnes in the year 2016[18]. The untreated shells that are disposed will create odour and pollute the environment. Action such as recycling should be taken to reduce the negative impacts on the environment. At the same time, the rise in demand synthetic grafting also urges new source of synthetic hydroxyapatite to be used as an alternative material. These problems can be solved if cockle shells are chosen for the alternate materials for synthetic bone grafting.

Hydroxyapatite (HA) has the formula of $Ca5(PO4)_3(OH)$ and molecular weight of 502.306g/mol. It is an inorganic component in the bones that provides rigidity and an important element in an artificial bone. There are variety of ways to synthesize HA powders such as wet chemical precipitation [16], hydrothermal [17], sol-gel [3], solid state reaction [12] [13], Self-propagating combustion synthesis (SPCS) [1], emulsion and microemulsion [10]. Furthermore, HA was proved to be successfully synthesized from bovine bones by heat treatment process using furnace [9].

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Preliminary Research of Surface Electromyogram (sEMG) Signal Analysis for Robotic Arm Control

Pringgo Widyo Laksono[1,2,a)], Minoru Sasaki[2,b)], Kojiro Matsushita[2,c)], Muhammad Syaiful Amri bin Suhaimi[2,d)], and Joseph Muguro[2,3,e)]

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Abstract. Human-robot interactions have gained popularity in the recent past, particularly in the advent and revolution of industry 4.0 era. There are still open research issues to be addressed, e.g., human-machine interaction, especially in robotic operation using bio-signal. This paper presents surface electromyography (sEMG) signal analysis of the motion of upper limb muscles to control the robotic arm. The objective is to use as few EMG channels to estimate joint angles for application in a robotic arm. The overall target is how this information can be applied to a robot control scheme. Three motions are proposed based on the 2 degrees of freedom (DOF) between joint elbow and shoulder. Three sEMG channel signal is captured using a DAQ unit comprising of pre-amplifier and NI USB 6008 and a laptop running LabVIEW software. The analysis is conducted using Matlab software. The result indicates that the sEMG from three muscles of the upper limb gives useful information and the performance of the sEMG synergy-based model has a good prospect for the controlling robot arm.

INTRODUCTION

In the recent past, robots have played an important role in manufacturing industries and other fields like human support robots. From 2012 up to 2017, robot sales have increased by an average of 19% annually with a reported peak in 2017 of 381,335 units, which is a 30% increment [1]. The human-robot interfaces are attracting more attention particularly since the introduction of robots for daily life tasks, e.g., self-care services [2][3][4]. One of the most important aspects in robotics is control system. Conventional control schemes entail complicated systems with many sensors, and buttons preprogrammed logic. Commonly, the action/motion relation have been mapped by training process (i.e., haptic devices or 3-D motion of a joystick)[4]. The challenge with the system is its reduced adaptability to the user's needs. This necessities a review of the existing control interface. Myoelectric controlled interface is one of the promising substitutes that have been widely applied by researchers in areas like robotic teleoperations, prostheses, and exoskeletons[2]. Electromyography (EMG) is a promising candidate due to its ease of acquisition as well as rich in contextual information like force, torque and, position content that can be derived with minimal signal processing operations.

In a previous study, EMG signal using multiple target muscles was used to estimate joint angles of upper limbs[4][5][6]. The authors in [7] applied Kalman filtering techniques to translate from raw/processed EMG signal to an equivalent angle position[7]. Others researchers investigated the activation patterns, electrode positioning, and other relevant factors for high-density surface EMG (SEMG) mapping from upper-arm and forearm muscle[6]. Another author used biceps muscle only to estimate angle of elbow in flexion-extension motion[7]. Increasing the

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