



Intelligent Manufacturing & Mechatronics

Proceedings of Symposium, 29 January 2018, Pekan, Pahang, Malaysia

Editors: **Hassan**, Mohd Hasnun Arif (Ed.)

Mohd Hasnun Arif Hassan
Editor

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Preface

The Symposium on Intelligent Manufacturing and Mechatronics (SymposIMM) 2018 was held at Universiti Malaysia Pahang in Pekan, Pahang, Malaysia, on 29 January 2018. It was organized by the Faculty of Manufacturing Engineering, Universiti Malaysia Pahang (UMP), in collaboration with the Faculty of Manufacturing Engineering of Universiti Teknikal Malaysia Melaka (UTeM), Melaka. Both parties aimed to provide a platform for deliberating empirical and theoretical research that are foreseen in the context of Industry 4.0. With the theme of “Strengthening Innovations Towards Industry 4.0”, it is the first dedicated symposium to Industry 4.0 hosted by the organizers. The symposium was graced by a vivacious keynote speech entitled “The Ideas of Mechatronics” by Prof. Ir. Dr. Wan Azhar Wan Yusoff.

This symposium enticed 120 submissions from authors nationwide. All submissions underwent a strenuous peer review process from members of the Peer-Reviewing Technical Committee. The reviews were based on the manuscript’s relevance to the tracks, novelty of the findings, the importance and presentation of the studies towards the particularity of Industry 4.0’s current trends. Following the review process, only 65 submissions made it into the symposium, 15 submissions were withdrawn, and 40 submissions were rejected due to various reasons. The accepted submissions were divided into five tracks covering various scopes of manufacturing engineering and mechatronics stream, namely Intelligent Manufacturing, Robotics, Artificial Intelligence, Instrumentation, and Modelling and Simulation. This book was divided into five parts based on the aforementioned tracks.

We would like to express our gratitude to all members of the Organizing Committee, without which the organization of this symposium would never be possible. Special thank goes to the management of the Faculty of Manufacturing Engineering, Universiti Malaysia Pahang, for the support towards the successful organization of the symposium. Further, we would like to extend our thanks to all authors for their participation in the symposium and their valuable contribution to this book. Last but not least, we would like to appreciate the help from the

publisher, especially to Dr. Christoph Baumann and Mr. Arumugam Deivasigamani. We hope that the contents of this book will benefit the readers in embracing the new era of industrial revolution 4.0.

Pekan, Pahang, Malaysia
January 2018

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SKF-Based Image Template Matching for Distance Measurement by Using Stereo Vision



Nurnajmin Qasrina Ann, Dwi Pebrianti, Luhur Bayuaji,
Mohd Razali Daud, Rosdiyana Samad, Zuwairie Ibrahim,
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Abstract In this paper, a novel image template matching approach to tackle distance measurement problem has been proposed. There are many conventional algorithms to increase the accuracy of distance measurement as reported in the literature such as Semi-global algorithm to produce the disparity map. Meanwhile, in this paper, the reverse engineering technique had been implemented to get the correct depth value by applying the image template matching method as reference for the distance measurement. The traditional algorithm to solve image matching problem take a lot of memory and computational time. Therefore, image matching problem can be considered to optimization problem and can be solved precisely. The search of the image template has been performed exhaustively by using Simulated Kalman Filter (SKF) algorithm. The experiment is conducted with a set of images taken by using stereo vision system. Experimental results show the accuracy of the distance measurement by using stereo camera, after applying (1) the estimate error model, (2) SKF and (3) PSO algorithm are 89.95%, 96.09%, 95.29% and 58.51% respectively. The limitation of estimate error model that it can only be applied into the same setup of the experiment, environment, parameters of the camera and acquired images. Instead, the proposed algorithm which is SKF can be applied to original image and image under the vision problems like illumination and partially occluded. The SKF algorithm shows more robust, more efficient and more accurate to solve the distance measurement problem.

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