

Editorial Notes

In this issue, variety of topics is presented as part of the rich world of Robotics and Mechatronics. We present to readers five papers, which are related to image compression technique, product development model, heaving wave energy control, human emotion detection, and computer controlled polishing for modern free-form lenses.

The first paper, authored by Falila et al., presents a comparative study on traditional techniques of multi-spectral image compression, such as JPEG, JPEG2000, set partitioning in hierarchical trees (SPIHT), and their proposed modified SPIHT algorithm. The proposed technique is a hybrid compression technique which depends on interband JPEG prediction and the SPIHT algorithm which is extended for multi-spectral case. The experimental results presented indicate that the proposed technique outperformed the other three techniques in term of peak-signal-to noise ratio (PSNR) for multi-spectral image compression and transmission over OFDM communication system.

The second paper, authored by Tseng Hsu et al., discusses the implementation of user-oriented model for collaborative product development, illustrated on medical-equipment industry. This type of industry has the characteristics of generating products with short life cycle, high technical complexity and a low chance of success. Therefore, it requires an intelligent system for its collaborative product development. The model contains a knowledge-based operation and maintenance system, a clinical test system, a file management system, an accessibility system, a calendar function and an announcement module. The system proposed by the authors can simplify the originally complex and dispersed process of product development.

The third paper, authored by Wahyudie et al. is on optimal control strategy for heaving wave energy converters. The authors proposed a robust hierarchical control strategy which can provide optimal reference signal for various combinations of wave specific heights and frequencies under elevation's constraints. The controller consists of two parts, higher hierarchical controller (HHC) and lower hierarchical controller (LHC). The optimal reference signal is provided by the HHC, and the robust tracking action is performed by the LHC, which is based on a proportional-integral-derivative (PID) controller with sliding mode control (SMC). The proposed controller provides better results in terms of captured mechanical power, converted electrical power and efficiency in comparison to other existing control strategies, such as resistive loading control and conventional hierarchical control system.

The fourth paper, authored by Md. Yusoff, et al., proposes human emotion detection system based on thermal imaging. The method uses the Gray Level Co-occurrence Matrix (GLCM) to analyze the heat pattern on the facial skin corresponds to particular affective states, and the k-Nearest Neighbor classifier to classify three human basic emotions (fear, happy and sad). Human-robot interaction has become one of very important topics in Robotics. In order to develop an emotionally intelligent robot with social and interactive skills, it is essential to understand human affective states. The proposed system has successfully detected the three states of emotions with an overall accuracy of approximately 90.3%.

Last but not least, the fifth paper, authored by Mosaddegh et al., presents an open-loop fuzzy optimizer for computer controlled polishing (CCP) for optical lens manufacturing. CCP is an alternative approach for manufacturing process of optical lenses. The proposed open-loop fuzzy controller for CCP is designed to optimize the tool feed rate distribution over the toolpath to reduce the surface error in minimum time. Simulation and experimental results indicated that the proposed method has reduced the surface error over 85%.

We hope readers find those valuable contributions beneficial and reflect the richness of research and development in the fields of Robotics and Mechatronics. We are looking forward to more high quality contributions in IJRM from all of you!

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