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		Room M101	Room M102	Room M103
13th November (Sun.)	Oral Sessions IV 08:00~10:00	A4. Materials Engineering <i>Chi-Ting Ho, National Formosa University, Session Chair</i> <i>I-Chyn Wey, Chang-Gung University, Co-Chair</i>	B4. Mechatronic Engineering <i>Dein Shaw, National Tsing Hua University, Session Chair</i> <i>Hsing-Cheng Chang, Feng Chia University, Co-Chair</i>	C4. Computer & Information Engineering <i>Chi-Lun Liu, Kainan University, Session Chair</i> <i>Wei-Chih Hsu, National Kaohsiung First University of Science and Technology, Co-Chair</i>
		A4-1. 08:00	B4-1. 08:00	C4-1. 08:00
		Controller Design and Realization for a Novel Inverted Pendulum <i>Yu-Sheng Lu, Hua-Hsu Chiu, and Shu-Fen Lien</i>	Multimode-Interference-Based Polarization Splitter in Two-Dimensional Honeycomb Photonic Crystal <i>Rei-Shin Chen, Yih-Bin Lin</i>	Developments in Nano Unmanned Aerial Systems <i>(invited) Stephen D. Prior, Middlesex University</i>
		A4-2. 08:15	B4-2. 08:15	C4-2. 08:30
		Particle Dynamics Integration to Multibody Dynamics Using GPU <i>Joon Shik Yoon, Jin Hwan Choi, Sungsoo Rhim, Ja Choon Koo</i>	Inspection for Nano-Scale Line-Width by Image Deconvolution Method <i>Ming Chang, Wun-Mao Luo, Po-Cheng Chen</i>	Techniques for Building a Read/Write/Execute-able Web <i>Chun-Hsiung Tseng</i>
		A4-3. 08:30	B4-3. 08:30	C4-3. 08:45
		Geometrical Scaling For The Measurement of In-Vivo Human Inner Ear <i>Jen-Fang Yu, Kun-Che Lee, Wei-Chung Chin</i>	Efficient Weighted Voting Random Subspace SVM for High-dimensional Classification <i>H. Y. Huang, Y. W. Cheng</i>	Prosody Prediction for English Spelling Mixed with Chinese Speech <i>Wen-Hsing Lai, Yi-Jun Su</i>
		A4-4. 08:45	B4-4. 08:45	C4-4. 09:00
		Effect of Canal Depth on Sound Pressure Level Distribution in Human Bilateral Ears <i>Jen-Fang Yu, Wei-De Cheng</i>	Dorsal Hand Vein Recognition Using Gabor Feature-Based (2D)2PCA <i>Chih-Bin Hsu, Jen-Chun Lee, Shu-Sheng Hao, Ping-Yu Kuei</i>	A case study on a real-time quality control system using data mining <i>Bo Eun Park, Jaekyung Yang</i>
		A4-5. 09:00	B4-5. 09:00	C4-5. 09:15
		The vibration analysis of bone conduction for bone anchored hearing aids: In-vivo human temporal bone <i>Jen-Fang Yu, Zi-Xiang Wei, Chin-Kuo Chen, Ching-I Chen</i>	Design and Analysis for Optical System of LED surgical Operating Lamp with Adjustable Focus <i>Dein Shaw, Fan-Yi Liu</i>	Particle Filter Approach for Tracking Indoor User Location Using IEEE 802.11 Signals <i>Teddy Mantoro, Media A. Ayu, Shakiratul Husna Raman, Nurul Hidayati Md Latiff</i>
		A4-6. 09:15	B4-6. 09:15	C4-6. 09:30
		Enhanced Coupled Field Modeling of PZT Cantilever Bimorph Energy Harvester <i>Long Zhang, Keith A. Williams, Zhengchao Xie</i>	A Study of Controlling Color Mixing of Red, Green, and Blue LEDs Based on Photometry Theory <i>Shinn-Fwu Wang, Hung-Chen Chung, Tsung-Hsun Yang, An-Li Liu, Yuan-Fong Chau, Jeng-Hua Wei, Chiung-Chou Liao</i>	A Vectorized Data Communication System for Localization in ZigBee Sensor Networks <i>Yu-Hung Hsueh, Jin-Shyan Lee, Lun-Chia Kuo, Sheng-An Chang, Jen-Chieh Chiang, Chia-Ling Huang, Yi-Hsiung Huang, Chun-Ta Chen</i>
		A4-7. 09:30	B4-7. 09:30	C4-7. 09:45
		Experimental Inspection of Cutting Blades Clearance of Only Cut One layer of Multi-layer Thin Film <i>Dein Shaw, Bo-Han Zeng, Chuan-Yi Kuo</i>	Footprint Recognition using Footprint Energy Image <i>J.-W. Jung, Y.-O. Cho, and B.-C. So</i>	A Privacy-Preserving Biometric Authentication Protocol <i>Kok-Seng Wong, Myung Ho Kim</i>
		A4-8. 09:45	B4-8. 09:45	
		A Modified Heat Pump Air-Conditioning System for Electric Vehicle <i>Po-Hsu Lin, Kuang-Ting Cheng</i>	Real-Time Face Detection Method Using Discrete Wavelet Transform For Vision Care System <i>Chih-Hsien Hsia, Cheng-Kai Liu, Chia-Hui Lin, and Jen-Shiun Chiang</i>	

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Particle Filter Approach for Tracking Indoor User Location Using IEEE 802.11 Signals

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Abstract

To increase the accuracy of Location-aware personal computing application, multi-observers of IEEE 802.11 (Wi-Fi) signals can be used to track indoor user location. Even-though Wi-Fi is more and more widely available on most mobile devices, unfortunately, because of the reflection, refraction, temperature, humidity and the dynamic changing in the environment, the reading of Wi-Fi's signal fluctuates greatly; the deviation can reach up to 33% from single Wi-Fi's access point. This creates problem in tracking user location indoor. Moreover, the use of light estimation algorithms such as fingerprinting, ranking algorithm, Weighted Centroid method, k-Nearest Neighbour, did not give a good tracking result. This paper proposes the use of Particle Filter in improving user location estimation which involves the modeling of non-linear and non-Gaussian systems. The aim is to increase the accuracy of tracking user location indoor. In our experiments, the real time data of multi-observer Wi-Fi signals have been used and the loss of diversity and parameter chosen in order to reduce the ambiguity has also been observed. We improve the algorithm in reducing the computational complexity by giving target/reference points. The paper discussed the comparison between the true location and the estimated location based on two types of signals data: normal data and noise data. The location estimation is predicted based on real-time signal and then compare it to the training data set. This approach shows a promising result in tracking user location indoor using particle filter algorithm.

Keywords: Particle filter, IEEE 802.11 Signals, Indoor user location, Mobile user, Location-Aware Computing.

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Model-based design of EDFA gain control algorithm for fast gain-transient recovery in WDM networks

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Abstract

Based on a theoretical erbium-doped fiber amplifier (EDFA) model, we have proposed an application of disturbance observer (DOB) with proportional/integral/differential (PID) controller to EDFA for minimizing gain-transient time of wavelength-division-multiplexing (WDM) multi channels in optical amplifier in channel add/drop networks. We have dramatically reduced the gain-transient time to less than 10 μ sec by applying DOB with PID controller to the control of amplifier gain. The proposed DOB-based gain control algorithm for EDFA was implemented as a digital control system using TI's DSP (TMS320C28346) chip and experimental results of the system verify the excellent performance of the proposed gain control methodology.

Keywords: EDFA, Disturbance observer, gain control, WDM