

The 2014 International Conference on Green and Human Information Technology



ICGHIT 2014

Posts and Telecommunications Institute of Technology
Ho Chi Minh City, Vietnam
February 12 - 14, 2014



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Program

Time	Hanoi	Lobby	Seoul
Wednesday, February 12			
08:30		Registration	
09:30		Welcoming Address - Congratulatory Address	
10:00		Plenary Talk 1	
10:50		Coffee Break	
11:10		Plenary Talk 2	
12:00		Lunch Break	
13:30	Section I-V1: Communication and Ubiquitous	Section I-P1: Multimedia and Signal Processing	Section I-V2: Control and Intelligent System
15:10		Coffee Break	
15:30	Section II-V1: Communication and Ubiquitous	Section II-P1: Control and Intelligent System	Section II-V2: Green Information Technology
17:10	Student Interview 1		Student Interview 2
Thursday, February 13			
08:00		Registration	
08:20	Section III-V1: Communication and Ubiquitous	Section III-P1: Communication and Ubiquitous	Section III-V2: Multimedia and Signal Processing
10:00		Coffee Break	
10:20	Section IV-V1: Communication and Ubiquitous	Section IV-P1: Multimedia and Signal Processing	Section IV-V2: Control and Intelligent System
12:00		Lunch Break	
13:30	Section V-V1: Communication and Ubiquitous	Section V-P1: Communication and Ubiquitous	Section V-V2: Multimedia and Signal Processing
15:10		Coffee Break	
15:30	Section VI-V1: Communication and Ubiquitous	Section VI-P1: Communication and Ubiquitous	Section VI-V2: Multimedia and Signal Processing
17:10	Research Group Discussion 1		Research Group Discussion 2
18:00		Banquet	
Friday, February 14			
09:00	Organizing Committee Meeting		Participant Panel Discussion
11:30		Lunch Break	
13:30		Campus Visiting Ceremony	

Wednesday, February 12

08:30 - 09:30

Registration 

09:30 - 10:00

Welcoming Address - Congratulatory Address 

10:00 - 10:50

Plenary Talk 1 

A New Trend On Data Compression
Prof. Hyoung-Joong Kim (Korea University, Korea)

Chair: Huu Tue Huynh (International University, HCMC VNU, Vietnam)

10:50 - 11:10

Coffee Break 

11:10 - 12:00

Plenary Talk 2 

Non Gaussian Modeling with applications
Prof. Hữu Tuệ Huỳnh (International University VNU-HCM, Vietnam)

Chair: Kyutae Lee (Kongju National University, Korea)

12:00 - 13:30

Lunch Break 

13:30 - 15:10

Section I-P1: Multimedia and Signal Processing 

Room: Lobby

Chair: DoHyeun Kim (Jeju National University, Korea)

A Modified Hough Scheme Based Automated Cell Counting Method for the Lens-free Shadow Imaging Platform

Mohendra Roy (Korea University, Korea); Geonsoo Jin (Korea University, Korea); Dongmin Seo (Korea University, Korea); Sangwoo Oh (Korea Institute of Ocean Science & Technology, Korea); Sungkyu Seo (Korea University, Korea)

In this paper we demonstrate an automated cell counting method for the lens-free shadow imaging platform. The detection method is based on the identification of the diffraction pattern centers in a lens-free shadow image. For that we developed an algorithm by introducing a modified Hough transform scheme. The algorithm can efficiently detect the centers of the filtered pixel clusters of the diffraction patterns in a lens-free shadow image. Based on this technique we evaluated the concentrations of micro beads, RBC, HeLa and MCF-7 cell lines. These results were compared with the standard optical microscope results. The comparison shows a good correlation index of 0.9936.

Traffic Sign Detection Using Retinex and Various Color Models

Sungje Fom (University of Kwangwoon, Korea); Jeong Yong Jin (Kwangwoon University, Korea)

Traffic sign recognition(TSR) is an important part of the driver assistance system(DAS), and it is mainly composed of three stages: segmentation, detection, and classification. The overall recognition performance of TSR is greatly affected by segmentation and detection, especially in poor driving environment: high contrast backlight, shadow and foggy images, night images, light interference, and video(moving pictures). In this paper, we try to enhance the detection performance by using retinex algorithm and various color models. The current result shows that many of them are improved for day time driving from 95% to 98~99% in detection rate on two different benchmark datasets. But, we still have problems: (1) bad detection rate at night time (2) high computational complexity in embedded processors. We are currently working to solve these problems by introducing machine learning concepts and implementing hardware accelerators.

Hardware structure for BA(Bundle Adjustment) algorithm

Hyun Kim (University of Kwangwoon, Korea); Jeong Yong Jin (Kwangwoon University, Korea)

Three-dimensional (3-D) reconstruction (from a set of 2-D images) is one of very important applications of computer vision. The BA(Bundle Adjustment) algorithm is widely used as a last step of feature-based 3-D reconstruction systems, and it is composed of two main stages: calculating reprojected points and minimizing reprojection error. The reprojected points are calculated using highly complex matrix arithmetic, and the reprojection error is usually minimized using a well-known nonlinear optimization process, Levenberg-Marquardt method. But due to their highly computation-intensive properties, it is hard to implement the BA algorithm in real-time on software platform. In our research, we want to implement the BA algorithm in real-time using FPGA hardware by extracting computational parallelism from the algorithm. Currently we are exploring data dependency of the BA algorithm and trying to evaluate many aspects of hardware costs (e.g., area, power, and speed) for different hardware structures.

Spatiotemporal Reasoning Using Memory DB in a Cognitive Robot

Hyunsik Ahn (Tongmyong University, Korea)

In this paper, a methodology of spatiotemporal reasoning using memory DB of cognitive system is presented. A cognitive system embodied in a cognitive robot consists of multiple modules for perceptive and behavior of the robot. All the events are interpreted to sentences which are parsed syntactically and semantically. The arguments of the sentences are stored at a sentential memory DB with modular and time tags. For spatiotemporal reasoning and sentence synthesizing, the cognitive system extracts proper arguments from the memory DB using query rules. The methodology is can be used for cognitive robots interacting with humans.

Analysis on the retro-reflection effective area of the truncated corner cubes

Eunkyong Moon (KOREA University, Korea); Seung-Hwan Kim (KOREA University, Korea); Ji-Woon Yang (Korea, Korea); Hwi Kim (Korea University, Korea)

It is well known that the conventional retro-reflection corner cube has the maximum retro-reflection efficiency of 67%. The truncated corner cube structures which have the incidence facet covered in the effective retro-reflection area of the conventional corner cube can have the effective retro-reflection efficiency up to 100%. In this paper, the effective retro-reflection area of the truncated corner cube is analyzed with the Zemax software and, as a result, the optimal design of the truncated corner cube is proposed.

A Design of a Memory Interface for Texturing in a Programmable Stream Processing GPU

Kwangyeob Lee (Seokyeong University, Korea); Taeryong Park (Seokyeong University, Korea); Jae-Chang Kwak (Seokyeong University, Korea); Yongseo Koo (University of Dankook, Korea)

In this paper, a texturing instruction and interface structure is proposed to support OpenGL ES 2.0 for a Programmable Stream Processing GPU. The designed stream graphics processor has variable length instructions which consist of maximum four of the 32bit unit-instruction for maximum utilization of ALUs and minimum length of instruction fields. To reduce the complexity of the interface between the programmable registers and the texture controller, internal register groups are designed to be interleaved. As a result, a smaller memory is required for stream buffers. Also a simplification of hardware interface is proposed to improve the pipeline delay that can be occurred between a programmable shader and a fixed texturing hardware. The designed instruction and interface reduces the instruction cycles for texturing, and improves 75% of performance compared to the conventional architecture.

A Smart Vision Sensor based Disaster Events Monitoring System

Won-Ho Kim (Kongju National University & College of Engineering, Korea)

In this paper, a smart video surveillance system that consisted of small-size wireless smart vision sensor and geographic information system (GIS) is described. The events of a disaster such as fire, smoke, object movement are detected automatically and false alarms are minimized by using intelligent and high-reliable video event analysis algorithms. Embedded video analysis algorithms, real-time digital signal processor (DSP), camera module, wireless transceiver, and GIS & video monitor are integrated as a smart disaster video surveillance system.

Improved Target Detection for Moving Object in IR-UWB Radar

Van Han Nguyen (Chosun University, Korea); Jae-Young Pyun (Chosun University & Dept. of Information and Communication Engineering, Korea)

This paper presents an efficient method using Impulse Radio Ultra Wideband (IR-UWB) Radar for detection of multiple moving targets. In the multiple targets scenario, conventional detection algorithm may miss the targets which are far away from the radar and produce high false alarms. Therefore, we propose additional processes to improve the performance of conventional detection algorithm. At first, the reflected signal from target is compensated according to the distance between target and radar, and then the false alarm is reduced based on 2-D jumping window. Through the experiments with IR-UWB radar, our proposed target detection is shown to be improving the detection probability better than the conventional CLEAN method.

Section I-V1: Communication and Ubiquitous

Room: Hanoi

Chair: Vo Nguyen Quoc Bao (Posts and Telecommunications Institute of Technology, Vietnam)

13:30 Physical Layer Security in UWB Communication Systems

Dac-Binh Ha (Duy Tan University, Vietnam); Vu Tran-Ha (Research and Development Center, Duy Tan University, Danang, Vietnam); Dung Tran (Duy Tan University, Vietnam)

In this paper, we focus on analysis the physical layer (PHY) secrecy of Ultra Wide Band (UWB) system consisting of a couple of single antenna devices, in the presence of a single antenna passive eavesdropper over Rayleigh fading channel. Specifically, the exact closed form expressions of probability of existence of secrecy capacity and the secrecy outage probability are derived by using statistical characteristics of the signal-to-noise ratio (SNR). The analytical results are verified by Monte-Carlo simulation.

13:50 Jamming Detection and Classification in 802.11

Ahmad Yusri Dak (Universiti Teknologi MARA, Malaysia); Noor Elaiza Abd Khalid (UiTM, Malaysia); Saadiyah Yahya (Universiti Teknologi MARA, Malaysia)

Recent years witnessed a surge in numerous security vulnerabilities and attacks due to the popularity of wireless network. The nature of wireless network such as open medium, dynamic mobility and lack of security renders these networks susceptible to range of attacks. Adopted from wired networks which are of different architecture, protocol, reliability and topology makes security of wireless networks a lot weaker. One of the simplest easier to launch attacks is jamming which often occurs at lower layer in the protocol stack. Nevertheless it can severely affect the performance of networks. Any person who owns a transceiver can launch jamming attacks on wireless transmissions by sending interference signal, injecting spurious messages, or jammed legitimate ones. Most jamming attacks usually occurs at physical and MAC layers due to weaknesses of the 802.11 protocols. In this work, novel algorithms for Jamming Detection and Classification that enable the detection and classification of jamming at physical and MAC layers in wireless networks is proposed. This process begins with investigating problems that arises due to jamming at both layers. To address these problems, lists of parameters associated with jamming are identified and algorithms are designed to detect and classify attacks based on jammer model proposed by Xu et al. Finally, algorithms for detecting and classifying jamming attacks is formulated and presented

14:10 Secrecy Outage Probability of Dual-hop Network in Presence of Co-channel Interference

Tran Trung Duy (Posts and Telecommunications Institute of Technology, Vietnam); Tu Lam Thanh (Posts and Telecommunications Institute of Technology, Vietnam); Vo Nguyen Quoc Bao (Posts and Telecommunications Institute of Technology, Vietnam)

In this paper, we study the security issue on physical layer in dual-hop networks under the impact of co-channel interference. In particular, we derive the closed-form expressions of the secrecy outage probability and zero secrecy capacity probability over Rayleigh fading channel. Various Monte Carlo simulations are presented to verify our derivations.

14:30 An Efficient Identity-Based Broadcast Encryption for Large-Scale Wireless Sensor Networks

In Tae Kim (Hongik University, Korea); Seong Oun Hwang (Hongik University, Korea)

Previous identity-based broadcast encryption schemes have mainly focused on reducing the ciphertext and key size. These efforts have resulted in computation and/or storage overhead on a user's side. Therefore, they are not suitable for wireless sensor networks which are very limited in computation capability, storage, and energy resources. In this paper, we propose an efficient, scalable identity-based broadcast encryption scheme suitable for sensor networks by significantly reducing both computation and storage overhead compared to previous schemes. In the proposed scheme, all of the public key, private keys, and ciphertexts are of constant size.

14:50 *SeDIC - Securing on Demand IP based Connection*

Ahmad Yusri Dak (Universiti Teknologi MARA, Malaysia); Saadiah Yahya (Universiti Teknologi MARA, Malaysia)

Diverse security measures are used to improve security entropy including the introduction of secure port services, better tunneling protocols and complex encryptions cryptography. Most of these do not address the fundamental of the security risk which is to avoid newly discovered exploits and protect credential from man-in-middle attack. In this study, experiments involving three types of existing environment, which include insecure connection as a basis, working against pre-shared key and public-key infrastructure (PKI), are being modeled. The selected computers and PKI. A new framework named SeDIC has been introduced to overcome the limitations and address the current security weakness. In this new implementation, forward secrecy is maintained since the key for authentication is only valid once and this will deny replay attack. This study proves that secure internet application is possible and the user can have the freedom to use the lowest cryptographic entropy to perform their on-line transactions. Having complex mathematical algorithms such as Elliptic Curve Cryptography (ECC) for tunneling, or even multilayer authentication system alone will not address the potential risk, besides prolonging the time for intruder in gaining unauthorized access. These instructions give you basic guidelines for preparing camera-ready papers for ETP's journals.

Section I-V2: Control and Intelligent System

Room: Seoul

Chair: Huu Tue Huynh (International University, HCMC VNU, Vietnam)

13:30 *A Network Model for Taxi Pooling*

Shangyao Yan (National Central University, Taiwan); Chia-Hung Chen (Shu-Te University, Taiwan); Hsin-Yein Chen (National Central University, Taiwan)

In this study, we employ network flow techniques to develop an integrated model focusing on advanced-ordered passenger trips for taxi pooling from the planner's perspective. The model is formulated as an integer multiple commodity network flow problem. Since real problem sizes are normally large, which makes them difficult to optimally solve within a reasonable time, we also develop a solution algorithm. The performance of the solution algorithm in practice is evaluated by carrying out a case study using real data and suitable assumptions. The test results show the model and the solution algorithm to be good and could be useful in practice.

13:50 *Mobile Robot Trajectory Tracking Using Model Predictive Control of Laguerre Functions*

Mapopa Chipofya (Chonbuk National University, Korea); Deok-Jin Lee (Kunsan National University, Korea); Kil To Chong (Jeonbuk National University, Korea)

This paper presents a method of solving the problem of mobile robot trajectory tracking. A model predictive controller designed using Laguerre functions is used. A linear model of the two-wheeled nonholonomic robot is obtained by converting the more natural cartesian system to a polar one. This change is preferred because the mobile robot model which is nonlinear in cartesian form becomes linear in the polar form. The advantages of using model predictive control of Laguerre functions (LMPC) are also highlighted in this paper.

14:10 *Robust Adaptive Control of Wheeled Mobile Robot via Backstepping and Neural Networks*

Hoang Ngoc Bach (University of Ulsan, Korea); Tien Dung Le (Danang University of Science and Technology, Vietnam); Hee-Jun Kang (University of Ulsan, Korea)

In this paper, a novel robust adaptive control based on backstepping and neural networks is presented. First, desired velocities are designed with the aim to make the tracking error between the real mobile robot and the virtual vehicle converge to zero (kinematic controller). Then, a robust adaptive controller is proposed by using backstepping method so that the velocities of the mobile robot converge to the desired velocities. In order to compensate these uncertainties, three-layer neural networks with online weight tuning algorithm are used. The effectiveness of our proposed approach is demonstrated through a simulation example.

14:30 *High-Gain Observer- Based Adaptive Sliding Mode Control for Robot Manipulators*

Toa Tran (University of Ulsan, Korea); Tien Dung Le (Danang University of Science and Technology, Vietnam); Hee-Jun Kang (University of Ulsan, Korea)

This paper proposes a high gain observer-based adaptive sliding mode control (HGO-ASMC) approach for robot manipulators. The adaptive sliding mode control (ASMC) addresses the problem of robot manipulator with model parameter uncertainty and external disturbance, while the high gain observer is used to estimate joint velocities. The proposed approach is established in the sense of Lyapunov stability analyses to ensure the stable control performance. The simulation results on a two link robot manipulator are presented to show the effectiveness of the proposed method.

14:50 *Safety system in Five Wheels Electric Wheelchair with Ultrasonic*

Theerawat Chongcharoen (King Mongkut's Institute of Technology Ladkrabang, Thailand); Noppadol Maneerat (King Mongkut's Institute of Technology Ladkrabang, Thailand); Don Isarakorn (King Mongkut's Institute of Technology Ladkrabang, Thailand); Songmoung Nundrakwang (King Mongkut's Institute of Technology Ladkrabang, Thailand); Kasemsuk Sepsirisuk (King Mongkut's Institute of Technology Ladkrabang, Thailand)

This paper presents the ultrasonic system in five wheels Electric stand-up Wheelchair with ultrasonic sensor. Electric wheel chair with electric motors is expected for elderly people, patients and disable, general, most of Electric wheelchair often determines obstruction or human to avoid the accident from crashing. The safety system avoids accident from falling was scarcely founded, However, the safety performance must be further improved because accident from falling is often severe and dangerous for user that have narrow sight. This paper proposes a new safety system in five wheel electric wheelchair that controls the operation of joystick to avoid the severe accident from falling. The proposed safety system detects the risk from hole or stair by Arduino microcontroller based on the information of distance from eleven ultrasonic sensors around electric wheelchair. Programs to determine the distance and control the operation of joystick are designed surely to operation. Some experiments show the effectiveness of the proposed safety system.

15:10 - 15:30**Coffee Break** **15:30 - 17:10****Section II-P1: Control and Intelligent System** **Room:** Lobby**Chair:** Hyunsik Ahn (Tongmyong University, Korea)***Vision-Based Formation Control of Multiple Mobile Robot System***

Amir Reyaz Khan (Chonbuk National University, Korea); Deok-Jin Lee (Kunsan National University, Korea); Bayanjargal Baasandorj (Chonbuk National University, Korea); Kil To Chong (Jeonbuk National University, Korea)

Multi-robots system is getting more importance day by day and has grown enormously with a large variety of topics being addressed. It is an important research area within the robotics and artificial intelligence. By using the vision based approach this paper deals with the formation of multiple-robots. Three NXT robots were used in the experiment and all the three robots work together as one virtual mobile robot. In addition to these things we also used TCP/IP socket, ArToolKit, NXT robot, Bluetooth communication device. And for programming C++ was used. Results achieved from the experiment were highly successful.

An Simple and High-Efficiency High-Brightness LED Driver with Flicker Reduction

Van Ha Nguyen (Inje University, Korea); Hyunsik Son (Inje University, Korea); Minji Lee (Inje University, Korea); Hanjung Song (Inje University, Korea)

In this paper, a novel off-line converter-less with flicker reduction for light-emitting diode (LED) driver IC is presented. Proposed circuit is compounded by simple elements so that the chip cost is reduced significantly. The proposed LED driver also reduces the flicker characteristic (which is important for human health) by using two current controllers which controls and limits the LED current as a constant in each period time of conduction. The proposed LED driver IC is simulated using a 1-um 650V-BCDMOS process technology that provides lateral double-diffused MOS transistors with 350 V breakdown voltages. Simulation results show that power factor (PF) is 0.97, 24.62% of total harmonic distortion (THD) and efficiency of 87.1% at 220 V AC supply. This confirms the high efficiency of the proposed LED driver to comply with international standard for lighting systems.

Distributed Power Control Scheme for MIMO Cognitive Industrial Sensor Networks

Minh-Phuong Tran (Kumoh National Institute of Technology, Korea); Dong Seong Kim (Kumoh National Institute of Technology, Korea)

Cognitive radio sensor networks (CRSNs) have emerged as a promising solution to address the spectrum-related challenges of wireless sensor networks (WSN). Moreover, cognitive radio (CR) gives us a possibility to maximize the utilization efficiency of limited spectrum resources. However, because the wireless devices coexist in the same radio environment, there are harmful channel conflicts among users. In this work, power control is designed for MIMO underlay cognitive radio-based industrial wireless sensor networks in which single primary users (PUs) coexists with multiple secondary users (SUs). With perfect knowledge of local channel information, the optimization problem is solved iteratively. We propose an algorithm for controlling power in cognitive radio sensor networks.

A Study of Vessel Collision Risk Calculation Method Using Fuzzy Algorithm in a Seaway

Do-Hyeun Kim (Jeju National University, Korea)

Recently, despite of modern navigation devices, there are still problems in navigation of vessels in waterways due to the geographical structures, disturbances in water, dynamic nature of the sea traffic and heavily influenced environmental traffic. Even though all vessels are equipped with modern navigation devices, the accidents reported are caused by various reasons but mainly by human factor according to investigations. To decrease the accidents and increase the safety of sea traffic, researchers have proposed an automatic vessel maneuvering system to overcome the human's shortcomings and increase work efficiency. This paper survey an effective and practical collision risk calculation method using fuzzy algorithm for finding the collision probability and avoiding the collision for ships in possible collision situations. In this paper, we present the new collision risk calculation which calculates the collision risk between ships at current time using fuzzy algorithm.

Automatic Translation System for Web Accessibility

Seungcheon Kim (Hansung University, Korea); Kim Jinhong (HanSung University, Korea); Hoon Jin (Sungkyunkwan University, Korea)

This paper introduces an automatic translation system that can examine the legacy web pages and produce new mobile web pages in accord to the web accessibility. For this purpose, the regulation for the web accessibility should be built first and the recommendation for a new web page would be performed based on the regulation by the system.

Design of a Model for a Machine Learning Technique Based Late Blight Forecasting System

Yun Hwan Kim (Sejong University, Korea); Seong Joon Yoo (Sejong University, Korea); Yeong Hyeon Gu (Sejong University, Korea); Na Ra Lee (Sejong University, Korea); Dongil Han (Sejong University, Korea); Jin Hee Lim (Sejong University, Korea); Sung Baik (Sejong University, Korea)

This paper describes design of a model for a machine learning based late blight forecasting system. The proposed system consists of a late blight prediction module and a notification module. With which users can reduce damages on potatoes and tomatoes by notifying a blight occurrence in a personalized style. This is a system model which is a work in progress and we will have a first prototype by the end of February next year

Section II-V1: Communication and Ubiquitous **Room:** Hanoi**Chair:** Kyutae Lee (Kongju National University, Korea)**15:30 *A Compact High-Q Resonator Using Interdigital Hair-pin Resonator and Meander-line with μ -Near Zero Metamaterial***

Ki-Cheol Yoon (Kwangwoon University, Korea)

In this paper, a new high quality factor (QL) resonator using combination of SIR (Stepped Impedance Resonator) shaped hair-pin (SHP) resonator, interdigital capacitor, and meander line with μ -near zero metamaterial is suggested. Interdigital capacitor

is applied to the hair-pin resonator to get high-QL performance and μ -near zero characteristic for size reduction. The resonator is designed to operate at 10 GHz and the experimental result shows the QL value of 244.

15:50 **Analysis of Crossed Planar Monopole SPA**

Taek Kyun Oh (Dept. of Electronics Engineering University of Dankook San29 Anseo-dong Dongnam-gu Cheonan-si, Korea); Hak Keun Choi (Dept. of Electronics Engineering University of Dankook in Korea, Korea); Kyutae Lee (Kongju National University, Korea); Jae Hyung Kim (Dept. of Control and Measurement Engineering Changwon National University, Korea); Dong Cheol Son (Dept. of Electronics Engineering, University of Dankook, Korea)

In this paper, SPA (Switched Parasitic Antenna) using Crossed Planar Monopole (CPM) for mobile communication is proposed. Crossed Planar Monopole with wideband characteristics is used as the active element of the proposed antenna. The proposed antenna has four parasitic elements around the active element. It is confirmed that the beam direction is changed by the reactance values of the parasitic elements. This paper compared antenna characteristics between wire monopole and crossed planar monopole. The proposed antenna shows less than 15dB for return loss ($VSWR < 1.45$) and over 4.3dBi for gain.

16:10 **Design of ESPAR Antenna Using Square Cylindrical Monopole**

Kwang-Woo Park (University of Dankook, Korea); Hak Keun Choi (Dept. of Electronics Engineering University of Dankook in Korea, Korea); Kyutae Lee (Kongju National University, Korea); Jae-Sung Park (Dankook University, Korea); Kyu-Bo Kim (Dankook University, Korea)

In this paper, ESPAR (Electrically Steerable Passive Array Radiator) antenna with wideband characteristics is proposed. To obtain the wideband characteristics, square cylindrical monopole is used as the active element of the proposed antenna. The reactance values of the parasitic element of the proposed antenna is changed, so 1.5:1 for VSWR and 4.41dBi for gain (at maximum beam direction) is obtained at 1.8GHz to 2.3GHz.

16:30 **Asym-AWPC Antenna and Compressive Sensing for DOA estimation in Correlated Environment**

Tran Thi Thuy Quynh (VNU University of Engineering and Technology, Vietnam); Nguyen Linh-Trung (Vietnam National University, Hanoi, Vietnam); Tran Duc Tan (University of Engineering and Technology (UET), VNUH, Vietnam); Phan Anh (REV, Vietnam)

Direction Finding (DF) systems with high resolution which using subspace methods such as Multiple Signal Classification (MUSIC) or Estimation of Signal Parameters via Rotation Invariance Techniques (ESPRIT), has attracted a lot of attention in the last decades. However, in correlated environment, their performance degrades or even do not work. Several techniques such as Forward-Backward Averaging or Spatial Smoothing can mitigate the problem if antenna array geometry is Uniform Linear Array (ULA) or few special Uniform Circular Arrays (UCA). Recently, effectiveness of Compressive Sensing (CS) based on l_1 minimization is demonstrated for recovering sparse signals from a limited number of measurements. In order to apply for Direction of Arrival (DOA) estimation, in fully incoherence condition, CS needs at least $D \cdot \log n$ samples to recover n -length signal with D sparsity ($D < n$) in spatial domain whether sources are correlated or not. That means the DF system based on CS can operate well in correlated environment but the number of sensor is really large. To reduce this parameter, in this paper, Asymmetric Antenna without Phase Center (Asym-AWPC) is proposed to the DF system based on CS. Simulated results indicate the effectiveness of the proposed system.

16:50 **Point-to-point H.264 Video Streaming over IEEE 802.15.4 with Reed-Solomon Error Correction**

Wei chun Tung (The University of Electro-communications, Japan); Pham Cong-Kha (The University of Electro-Communication, Japan); Huynh Huu Thuan (Ho Chi Minh University of Science, Vietnam); Nhat-Tan Mai (Ho Chi Minh University of Science, Vietnam); Duy-Tung Dao (Ho Chi Minh University of Science, Vietnam)

IEEE 802.15.4 standard is designed for low data rate and low power consumption wireless personal area network (WPAN). It is widely used for sensor network such as Zigbee which can transmit small size sensor data with multi-hop routing service. According to the rapid development of wireless technology, low power consumption wireless communication module is also expected to transmit pictures or videos in real-time. Video transmission over such networks is considered an issue since video traffic demands high data rates. In this paper, we applied GStreamer as media framework. To achieve making point-to-point real-time video stream over IEEE 802.15.4, we encode/decode video by H.264 codec which is best known as being one of the video encoding standards for streaming internet source. Also, this work applies Reed-Solomon theorem as error correction solution with optimized parameters $RS(127,105,11)$. For applying $RS(127,105,11)$ which is based on 7 degree Galois Finite field ($GF(2^7)$) over IEEE 802.15.4 PSDU, this work will introduce an efficient method to repack video data. The final experiment result shows that the real-time video is streamed with more reliable quality. And the quality of video can be guaranteed with resolution 320x240 pixel and frame rate 15 fps until 20 meters.

Section II-V2: Green Information Technology

Room: Seoul

Chair: Kim Jinhong (HanSung University, Korea)

15:30 **Effect of Device Performance on Signal Transmission Characteristics of SATA Cable Assembly**

Moonjung Kim (Kongju National University, Korea)

Signal transmission characteristics of the Serial Advanced Technology Attachment (SATA) cable assembly is study in this work. Using 3-dimensional electromagnetic field simulation, the S-parameters of the SATA cable assembly are calculated to compare high-speed performance of each component and then obtain a better signaling. Each component has different frequency characteristics due to the difference of their structures. While the connector and cable present the excellent the insertion loss and reflection loss, the printed circuit board degrades substantially the signal fidelity of the SATA cable assembly. Therefore, the calculation results verify that the signal transmission properties of the SATA cable assembly can be determined mainly by the lowest performance of its components.

15:50 **A Supercharged Policy-based Dynamic Power Management Architecture for Cluster System**

Hyungjik Lee (ETRI, Korea)

This paper presents policy-based dynamic power management software architecture for reconfigurable cluster systems including virtual servers. The existing static time-based or threshold based power management technologies are not very effective, because, even at night, there are large amount of service request. Therefore, another method or policy to back up the time-series based policy or threshold based is needed. We suggest supercharged time-based dynamic power management software architecture for cluster system. Experimental results using our approach for dynamic power management policy show that the total power consumption increased by 5% compare to static time-based method but total response time of service request is decreased by 12% compared to existing methods.

16:10 **Link Based Energy Saving Method for OpenFlow Based Networks**

Bhed Bahadur Bista (Iwate Prefectural University, Japan); Toyoo Takata (Iwate Prefectural University, Japan); Danda B. Rawat (Georgia Southern University, USA)

Until recently the main focus of researchers in energy efficient networks was how to extend the life time of battery operated networks such as wireless sensor networks and mobile wireless networks by reducing the consumption of energy by nodes. But as Internet traffic has increased, the power consumed by Internet nodes has also increased. Researchers now focus on energy efficient wired networks also. Here, we propose a link based approach to put underutilized links of nodes to sleep in OpenFlow based networks. If all links of a node are put to sleep, the node itself will be put to sleep. By putting underutilized links/nodes to sleep, power consumed by networks can be reduced. We focus in OpenFlow based networks because they are flexible to manage and easy to deploy new protocols in them. OpenFlow is being standardized by big enterprises such as NEC, Google, Cisco, Microsoft etc.

16:30 *The Non-Parametrics Approches For Time-Varying Delay Estimation With Application To The Electromyographics Signals*

Luu Gia Thien (Posts and Telecommunications Institute of Technology, Vietnam); Philippe Ravier (Université d'Orléans, France); Olivier Butteli (Université d'Orléans, France)

Muscle fiber conduction velocity (MFCV) is based on the time delay estimation between electromyography recording channels. In order to take into account the variability of the MFCV, we assume that the time delay between the channels varies over time. In this paper, the generalized correlation windowed methods were used in order to estimate the time varying delay for two channels of EMG signals that follow a inverse sinusoidal model. Monte Carlo simulations are performed at different noise levels in order to evaluate the noise impact of the estimator. This approach gives the best results by comparison with the other ones.

16:50 *Design and Implementation of Multi-standard Digital Radio Chipset with Shared Logic and Memory*

Se-Ho Park (Korea Electronics Technology Institute, Korea); Yong-Suk Park (Korea Electronics Technology Institute & Yonsei University, Korea); Min-goo Kang (Hanshin University, Korea); Jun-rim Choi (Kyungpook University, Korea)

The digital transition of analog TV is rapidly taking place throughout the world. However, the digital transition of radio is progressing at a slower rate. Diverse standards are being considered for adoption and different countries have different frequencies allocated for digital radio. As a consequence, the progress in the development of digital radio receiver chipsets has been rather stagnant. In this paper, the design and implementation of a receiver chipset with integrated baseband and RF tuner block is presented for DAB/DAB+, DRM30/DRM+, and HD Radio digital radio standards. The developed chipset can receive broadcast from all standards and frequencies considered through simple software change

17:10 - 18:00

Student Interview 1

Room: Hanoi

Student Interview 2

Room: Seoul

Thursday, February 13

08:00 - 08:20

Registration

08:20 - 10:00

Section III-P1: Communication and Ubiquitous

Room: Lobby

Chair: Luu Gia Thien (Posts and Telecommunications Institute of Technology, Vietnam)

On the Analysis of Network Coding Gain in Mobile Ad-hoc Wireless Networks

Beongku An (Hongik University, Korea); Dung Le The (Hongik University, Korea)

In this paper, we present an analysis of network coding gain in mobile ad-hoc wireless networks. The main goal of the presented analysis is to show how the probability of receiving / sending data packets affects the coding gain in mobile ad-hoc wireless networks. Our analysis can be extended further to express the impact of network parameter such as node density, node mobility, data distribution, etc. on network coding gain.

Control on MAC Layer for Cluster-based WBAN of IEEE802.15.6

Pham Thanh Hiep (Yokohama National University, Japan); Nguyen Huy Hoang (Le Quy Don Technical University, Vietnam); Nguyen Nhu Thang (University of Communication, Vietnam)

Since the elderly population is increasing all over the world, health care market keeps growing and there is a need for monitoring of health issues. Body Area Network (BAN) consists of wireless sensors attached on or inside human body for monitoring vital health related problems, i.e, Electro Cardiogram (ECG), ElectroEncephalogram (EEG), Electronystagmogram (ENG) etc. Vital data is recorded by each sensor and sent toward the coordinator. In order to improve the performance of WBAN, the cluster-based topology is considered. Moreover, the control on MAC layer is proposed, all sensors and cluster-headers are allocated to transmit in Contention Access Phase (CAP) and Exclusive Access Phase (EAP), respectively. The calculation result shows that the cluster-based topology system, especially with control on MAC layer, has the higher performance than one-hop star topology does.

Underlay Approach based Soft Combination Schemes for Cooperative Spectrum Sensing in Cognitive Radio Networks

Beongku An (Hongik University, Korea); Tri-Nhu Do (Hongik University, Korea)

In this paper, the problem of soft decision cooperative spectrum sensing scheme is investigated in cognitive radio networks over Rayleigh fading channels. We propose the underlay approach based cooperative spectrums sensing schemes to increase

bandwidth efficiency in cognitive radio networks. We further consider how the transmit power of relaying user impacts the sensing performance of the proposed schemes. The simulation results demonstrate that the sensing performance can be improved by increasing the transmit power of the secondary relay.

Optimizing Access Probability for WBAN with Cluster-based CSMA/CA of IEEE802.15.6

Pham Thanh Hiep (Yokohama National University, Japan); Nguyen Huy Hoang (Le Quy Don Technical University, Vietnam); Nguyen Nhu Thang (University of Communication, Vietnam)

Since the elderly population is increasing all over the world, health care market keeps growing and there is a need for monitoring of health issues. Body Area Network (BAN) consists of wireless sensors attached on or inside human body for monitoring vital health related problems, i.e., Electro Cardiogram (ECG), ElectroEncephalogram (EEG), Electronystagmogram (ENG) etc. Vital data is recorded by each sensor and sent toward the coordinator. However, due to the obstacle of human body, sensors not always can send the data to the coordinator. In addition, the life time of sensors meaning the reduction of transmit power of sensors should be considered. In standard IEEE802.15.6, the transmission topology is indicated as 1 hop star plus one. In order to obtain the high throughput, reduce the transmit power of sensors, clustering method is used. The sensor nodes are allocated to clusters and the performance of WBAN is analyzed based on CSMA/CA protocol of IEEE802.15.6. We show that the cluster-based topology can reach the higher throughput and reduce consumption transmit power.

Total-Phosphorus Analysis Lab-on-a-chip for monitoring water quality

Dong Geon Jung (School of Electronics Engineering, Kyungpook National University, Korea); Seong Ho Han (Kyungpook National University, Korea); Geunbae Lim (Pohang University of Science and Technology(POSTECH), Korea); Seong Ho Kong (Kyungpook National University, Korea)

A LOC (Lab-on-a-chip)-based Total-Phosphorus (TP) analysis chip for monitoring water quality is proposed and fabricated. The fabricated LOC-based TP analysis chip is characterized by measuring TP concentration of unknown samples, and then compared to the measured results with conventional TP analysis system. The experimental results show that the performance of the proposed TP analysis chip and that of the conventional TP analysis equipment have similar characteristics. Based on the experimental results, the designed LOC-based TP analysis chip can be used in water quality monitoring instead of conventional TP analysis system.

Matrix Based Decoding Algorithm to Avoid Decoding Failure of LT Code

GoangSeog Choi (Chosun University, Korea); Md. Tariq Hasan (Chosun University, Korea)

LT code is the first true rateless fountain code that can recover the whole transmitted message from the erasure channel as in its encoding, message information is distributed among a number of output symbols. Although this code has many important characteristics, and its performance determining one of the important factors is degree distribution as decoding is initiated from the check nodes having degree 1, yet it demands more works for its universal and efficient characteristics. In this short work in progress paper, a matrix based decoding algorithm is proposed, which can avoid decoding failure problem as a result of not having a check node with degree one. The algorithm works perfectly as expected and it is found that the generator matrix was needed to be updated only 9.09% of time for the proposed algorithm whereas without advance process- a process that was used in the proposed algorithm, it updated its generator matrix 90.90% of time for successful decoding. Sometimes the proposed one did not take any extra symbols for decoding. Again the algorithm has no complex mathematical operation which makes it suitable for hardware implementation with high accuracy.

Section III-V1: Communication and Ubiquitous

Room: Hanoi

Chair: Soo-Hyun Park (Kookmin University, Korea)

08:20 Outage Performance with Selection Decode and Forward in Cognitive Radio with Imperfect CSI

Tu Lam Thanh (Posts and Telecommunications Institute of Technology, Vietnam); Tran Trung Duy (Posts and Telecommunications Institute of Technology, Vietnam); Vo Bao (PTIT, Vietnam); Nguyen Luong Nhat (Posts and Telecommunications Institute of Technology, Vietnam)

In underlay cognitive radio (CR) scheme, the primary users (PUs) will not be protected completely when the channel state information (CSI) of interference links between two networks is imperfect. In this paper, we derive the exact closed-form expression of interference probability (IP) at primary networks owing to imperfect CSI between two systems by adopting the Selection Decode and Forward (SDF) at relay node. It is shown that IP depends not only on the maximal tolerance level but also on the outage threshold of secondary networks. Moreover, a back-off power control scheme is applied in order to ensure that IP at primary user belows an acceptable level. The outage probability of secondary networks is also derived with two different techniques at destination, i.e., selection combining (SC) and maximal ratio combining (MRC). Some numerical results are provided to verify our analysis results

08:40 An Improved Error Resilient Scheme for Wireless Video Applications

Yu-ning Dong (Nanjing University of Posts and Telecommunications, P.R. China); Haibo Chen (Nanjing University of Posts and Telecom, P.R. China); Hai-xian Shi (Nanjing Agricultural University, P.R. China)

A forward error correction (FEC)-UEP based error resilience approach for real-time video transmission over lossy wireless networks is proposed in this paper. In the proposed approach, multiple video frames in a sub-GOP are protected by the LDGM (Low-Density Generator Matrix) Unequal Error Protection algorithm according to the importance level of video packets, which can enhance the performance of LDGM codes and does not introduce any display delay at the decoder. Experiment results show that the proposed approach can achieve better objective and subjective quality than existing real time video transmission schemes.

09:00 Distributed Scheduling for Secondary Users in Multi-hop Cognitive Radio Ad Hoc Networks

Mui Van Nguyen (Posts and Telecom Insitute of Technology (PTIT), Vietnam); Tan Hanh (Posts and Telecommunications Institute of Technology, Vietnam); Nguyen Khac Chien (The People's Police University, Vietnam)

In this paper, we take into account the possible spatial reuse of licensed channels in order to enhance the overall network throughput in multi-hop cognitive radio ad hoc network (CRAHN). We propose an optimization framework of joint link scheduling and congestion control under spectrum underlay as an mix-integer nonlinear non-convex programming problem. The optimal solution is known to be NP-hard. To solve the problem, we develop a distributed algorithm, which has been proved to closely converge to the Nash Equilibrium point with a low complexity.

09:20 Measurement and Interpretation of Brain Reaction during Mental Calculation

Jungeun Lim (Kyungpook National University, Korea); Bohyeok Seo (Kyungpook National University, Korea); Soonyong Chun (Dongyang University, Korea)

Measurement of brain reaction during mental calculation is essential to assess the performance of those whose career involves severe mental activity. The Electroencephalogram(EEG) is one of the useful biosignals detect the Brain function. This paper discusses on a research conducted to determine the changes in the brain waves related to distinct mental calculation. As

subjects, 10 men and women over 20 years were selected. The segments Fp1, Fp2 were applied as a measuring point. To find correlation between brain activities and mental calculation, subjects solved mathematical questions. Skewness, kurtosis and power spectrum was applied to the signals in order to extract the EEG parameters. Experimental results indicated that this feature can represent mental calculation.

09:40 **Sequential Multidimensional Scaling For Realtime Sensor Network Localization**

Trinh Lan Anh (Posts and Telecommunications Institute of Technology, Vietnam); Nguyen Duc Thang (HCMIU, Vietnam); Nguyen Luong Nhat (Posts and Telecommunications Institute of Technology, Vietnam); Cong Hung Tran (Posts and Telecoms Institute of Technology, Vietnam); Tran Hoang Hai (Hanoi University of Science and Technology, Vietnam)

We investigate on addressing the localization problems of nodes in a sensor network based on multidimensional scaling (MDS). The distances of node pairs are given and conventional MDS attempts to locate the position of nodes given the distance matrix. However, conventional MDS addresses the mapping problem using eigenvector decomposition which is complicated in computation, mitigating the efficiency of this approach for real-time applications. In this paper, we introduce a sequential MDS for the fast implementations of MDS for a changing sensor network. The fast-fixed point algorithm is used to initialize the locations of nodes. When the distance matrix is varied due to the movements of nodes, sequential MDS aims at reallocating the nodes with a fast and effective update process. We validated sequential MDS with a number of experiments and shown the proposed approach is superior to conventional MDS when it deals with the location problems of moving nodes of the sensor network.

Section III-V2: Multimedia and Signal Processing

Room: Seoul

08:20 **Fast Motion Estimation with Considering Motion of Moving Objects Using Histogram Preprocessing**

YongRak Jo (SungKyunKwan University, Korea); Jong Hak Kim (Sungkyunkwan University, Korea); Sang-hyeob Song (SungKyunKwan University, Korea); Seong-Muk Kang (Sungkyunkwan University, Korea); Jun Dong Cho (Sungkyunkwan University, Korea)

This paper presents digital image stabilization for the case especially where sudden and unexpected moving objects appear on the screen during the video recording. Our proposed method based on histogram preprocessing excludes motion of the moving objects during image stabilization, while conventional method does not consider this motion of objects. Our experimental result showed that performance of our method is better than conventional method while moving objects appear in the video with about 92% reduction in computing time. In this manner, our method is suitable for real-time processing on hardware.

08:40 **Smart Active Multi-pad Acupuncture Systems using Fuzzy Inference Rules**

Kyutae Lee (Kongju National University, Korea); You-Sik Hong (SangJI University, Korea); Duck Je Park (Korea Airport Corporation, Korea); Sangsuk Lee (Sangji University, Korea); Eun-Jun Yoon (Kyungil University, Korea); HanGyu Kim (Anyang University, Korea)

The pulse rate in the human species is a significant factor in oriental medicine. Pulse waves is potential energy which has been generated by main artery expansion from the left ventricle, transforms into kinetic energy and passes through the vessel wall to the peripheral nervous system. In this paper, it aims to solve this problem by using fuzzy inference rules in judging patients' health status and to develop a software kit of intelligent electronic acupuncture system.

09:00 **The effect of MFCC extraction methods on speech recognition embedded system**

Hoang Trang (University of Technology, HoChiMinh City, Vietnam)

Speech recognition system has been studied by many works. Mel Frequency Cepstrum Coefficients (MFCC) is an important process in speech recognition system and has been widely used. This paper presents the conventional MFCC method, proposes two modifications in MFCC. These three different MFCC methods will be evaluated in recognition accuracy and execution clock number of the whole system. From these evaluations, the designer could choose the appropriate MFCC method in a given application. The embedded system in this paper is built with Nios II of Altera Corporation.

09:20 **AVA Model: Adaptive Vehicular Agents Model**

Kim Jinhong (HanSung University, Korea); Seungcheon Kim (Hansung University, Korea); Hoon Jin (Sungkyunkwan University, Korea)

Traffic system, in general, like ruralized/urbanized area expansion traffic or pedestrian signals, and footslogging crowds consist of many autonomous, intelligent entities, which are distributed over a large area and interact with each other to achieve certain goals. However, these entities may represent completely different things, like traffic lights, trucks or even road users. According to these entities, we aim at giving insight into the concept of adaptive vehicular agents. Additionally, different applications of multi-agent systems to the traffic domain are presented. Furthermore, we propose to traffic flow models which describe drivers' behavior not only on a reactive but also on a cognitive level.

09:40 **Cryptanalysis of a Novel Biometric-Based Remote User Authentication Scheme Using Quadratic Residues**

Eun-Jun Yoon (Kyungil University, Korea); Kee-Young Yoo (Kyungpook National University, Korea)

In 2013, Cheng-Liu-Chang-Liu proposed a novel biometric-based remote user authentication scheme using quadratic residues. They claimed that their proposed scheme is secure, practical, and trustworthy remote authentication, which can be implemented on different real network environments. However, this paper points out that Cheng et al.'s scheme not only suffers from stolen-verifier attack and impersonation attacks, but also does not provide forward secrecy.

10:00 - 10:20

Coffee Break 

10:20 - 12:00

Section IV-P1: Multimedia and Signal Processing

Room: Lobby

Chair: YongSoo Choi (Sungkyul, Korea)

Saliency-directed Multi-dimensional Dictionary Learning for MR Image Denoising

Irfan Mehmood (Sejong University, Korea); Muhammad Sajjad (Sejong University, Korea); Seong Joon Yoo (Sejong University, Korea); Dongil Han (Sejong University, Korea); Sung Baik (Sejong University, Korea)

In medical field, magnetic resonance imaging (MRI) is considered to be the most versatile and highly accurate imaging modality. However, due to trade-off between acquisition time and image quality, acquired MRI results in noisy images. To improve the reliability of MRI analysis, image denoising is often a necessary pre-processing step, which is the focus of current work. Most existing denoising schemes learn dictionaries on sequence of 2D MRI scans which cannot preserve objects structure because understanding the structure of brain tissues from simple 2D images is substantially more challenging. The proposed method replicates the properties of spatiotemporal saliency and V3-layer of human visual cortex to efficiently learn the dictionary. V3 layer detects 3D object structures effectively using 2D projections from all possible views. The experimental results show that the proposed modification in dictionary-learning procedure leads to substantial increase in denoising performance.

A modified block matching 3D filtering by using variable block sizes

Cheonghee Kang (Hanyang University, Korea); Dokyung Lee (Hanyang University, Korea); Changryoul Choi (Hanyang University, Korea); Jechang Jeong (Hanyang University, Korea)

We propose an improved image denoising method based on the block matching 3D filtering (BM3D) by using variable block sizes. The previous BM3D mainly consists of two steps: a basic estimate by hard thresholding and a final estimate by Wiener filtering. In order to exploit the spatial correlation among adjacent pixels in an image, we specifically employed the concept of the variable block sizes in the block matching process. The block division simply depends on the variance and the mean, which are key parameters to describe the histogram of the image. Therefore, the proposed algorithm efficiently reduced the noise in the large and plain areas and preserved the fine details at the same time.

A New Visual Secret Image Sharing based on Random Grids and Steganography

Gil-Je Lee (Kyungpook National University, Korea); Eun-Jun Yoon (Kyungil University, Korea); Kee-Young Yoo (Kyungpook National University, Korea)

Random grid (RG) is a methodology to construct visual secret sharing (VSS) scheme without pixel expansion. In some reported RG-based VSS schemes, a secret image can be visually reconstructed only by stacking operation, even though some light-weight computational devices are available. In this paper, a new RG-based VSS is proposed using steganography, where the secret image can recover to reversible. It is computed that some light-weight computational devices are available, the secret image can be extracted by LSB-1 and can be decrypted by XOR operation.

Phase regularization in polygon computer generated hologram synthesis

DaJeong Im (Korea University, Korea); Eunkyong Moon (KOREA University, Korea); Hwi Kim (Korea University, Korea)

The phase mismatch problem in the conventional polygon computer generated hologram synthesis algorithm is addressed. To resolve the phase mismatch problem, the concept of the phase regularization in polygon computer generated hologram is devised and a novel synthesis algorithm of polygon computer generated hologram with phase regularization is proposed.

Real-time video-based displacement measurement system for monitoring the vibrational motion of Goega bridge

Yohan Park (KOREA University, Korea); Jinyoung Roh (Korea, Korea); Jin-Hwan Oh (Korea, Korea); Ji-Woon Yang (Korea, Korea); Hwi Kim (Korea University, Korea)

The real-time video-based remote displacement measurement system for monitoring vibrational motion of Goega Bridge is developed. The data logged during a few days is analyzed and the vibrational motion of the Goega Bridge is discussed.

Color Image Quantization with Virtual 2 Dimensional Color Map Extension

YongSoo Choi (Sungkyul University & IEEK, Korea); Cheong Kim (Namseoul University, Korea)

There are color displays restrictions to 8 bit graphic memory. So, only 256 colors are available to represent the gamut of colors of raw format images. In this paper, we present a method to display greater number of colors by 8 bit memory only that will provide good quality of images(about 9 bit depth per pixel).

Emotion Appraisal in a Sentence Based Cognitive System

Hyunsik Ahn (Tongmyong University, Korea)

Emotional response of robots is an important factor for robot companion. In this paper, an emotion appraisal system based on a sentence based cognitive system is presented. Firstly, OCC model is simplified to model a contextual emotion appraisal which defines the types of emotion appraisal, the target of the emotion induced from analyzing emotional verbs, and the transition of emotions in the context. We employ a sentence based cognitive system and its sentential memory and object descriptor to define the type and target of emotion and to evaluate the emotion varying with the process of time with the a priori emotional evaluation of targets. In an experiment, we simulate the proposed emotion appraisal system with a scenario and show the feasibility of the system to HRI.

An Effective Ship Recognition and Classification Scheme through the Image from UAV

Yong-Ho Kim (Chung-Ang University, Korea); Soowoong Jeong (ChungAng University, Korea); Sangkeun Lee (Chung-Ang University, Korea)

UAV (Unmanned Aerial Vehicle) has been developed and used for prompt response to many kinds of accidents. A binary decision tree-based effective ship recognition and classification scheme is presented for images from UAV. Specifically, the object, ship, is first extracted using a Grab Cut algorithm. Next, recognition candidates by multiple thresholds are assigned to the nodes in multiple binary decision trees. Finally, well rectified candidates are compared with the models predefined in database. Experimental results show that the proposed scheme can classify the given objects in a query image into one of the correct models with less being affected by model shapes and view point changes.

Section IV-V1: Communication and Ubiquitous

Room: Hanoi

10:20 *Multipath FAST TCP for Large Bandwidth-Delay Product Networks*

Bich Phuong Ha (Posts and Telecoms Institute of Technology, HCM Campus & HCM University of Transport, Vietnam); Bao-Yen Tran (Posts and Telecommunications Institute of Technology, Vietnam); Tuan-Anh Le (Posts and Telecommunications Institute of Technology, Vietnam); Cong Hung Tran (Posts and Telecoms Institute of Technology, Vietnam)

In such a rapid growing computer age, there are more and more applications that require to transmit data over large bandwidth-delay product (BDP) networks. Besides, with the increment of producing smart portable devices equipped multiple interfaces, several schemes, e.g., MPTCP, wVegas, have been proposed to exploit multi-home at two end-to-end hosts. These algorithms improve the performance and resilience via transport protocol, yet they cope with under-utilization available bandwidth in large BDP networks. In this paper, we propose MPFAST, which is an extension of FAST TCP for multiple paths.

Based on FAST TCP, which uses queuing delay as a measure of congestion, it has the ability to fully utilize the resources in large BDP networks. The results of our simulation show that MPFAST can outperform these protocols with regard to throughput and fairness to regular FAST TCP flows.

10:40 A distributed architecture and Non-adaptive Group Testing approach to fast detect Hot-IPs in ISP Networks

Chinh Huynh (University of Technical Education, Ho Chi Minh City, Vietnam); Thuc Nguyen (University of Science, HCM, Vietnam); Tan Hanh (Posts and Telecommunications Institute of Technology, Vietnam)

Hot-IPs, hosts appear with high frequency in network, cause many malicious for systems such as denial of service attacks or Internet worms. One of the main characteristic of them is a very fast propagating in networks with a large number of packets sent to victims in a very short amount of time. In this paper, we propose a solution to fast detect Hot-IPs based on distributed architecture and non-adaptive group testing approach. Our solution can be applied to improve efficiency for fast detecting Hot-IPs in ISP networks.

11:00 On the AP Virtualization of IEEE 802.11 WLANs

Jaebeom Kim (Ajou University, Korea); Young-Bae Ko (Ajou University, Korea)

Large-scale Access Point (AP) environment is getting more complex due to popularization of the mobile wireless devices and various internet applications. However, traditional WLAN architecture cannot dynamically correspond to these environments due to hardware dependability to fixed configuration and channel restrictions. Therefore, AP virtualization is becoming one of the key technology for future wireless internet paradigm. In virtual AP network environment, several APs can be operated in a single physical machine and network policy as quality of service control, channel switching. Also, differentiated user policy as QoS level, handover, and association of the WLAN client can be dynamically controlled by service providers. In this survey, the characteristics, advantages, and examples of the existing AP virtualization techniques are thoroughly investigated, and the main issues for future designs of WLAN AP virtualization techniques are presented.

11:20 A High Efficiency Blood Warmer System

Park Suksantisakul (King Mongkut's Institute of Technology Ladkrabang, Thailand); Noppadol Maneerat (King Mongkut's Institute of Technology Ladkrabang, Thailand); Ruttikorn Varakulsiripunth (Thai-Nichi Institute of Technology, Thailand)

This paper introduces a blood warmer system to prepare the blood for infusion and facilitate the work of anesthesiologists. The system is contained in a rectangular box, inside of which consists of two separate chambers: one housing the electronics and the other the blood warming components. Two peltiers and EPDM cushion sheets are employed in the proposed system to quicken the warming of blood bags. Nonetheless, three experiments were conducted with three different blood warming configurations: using one peltier without the EPDM cushion sheets, two peltiers without the EPDM cushion sheets, and two peltiers with the EPDM cushion sheets. The finding indicates that the use of two peltiers together with the plates produces the best results.

11:40 Determination of Automobile Sound Towards Sound Maps

Itaru Usami (Aoyama Gakuin University, Japan); Niwat Thepvilojanapong (Mie University, Japan); Naofumi Kitsunezaki (Aoyama Gakuin University, Japan); Yoshito Tobe (Aoyama Gakuin University, Japan)

Crowdsourcing enables us to collect information by a large group of people. We can make a map of environmental sound by using crowdsourcing or crowdsensing. In fact, many sound maps are already available, but we cannot query those sound maps based on particular features, e.g., crowds of people, traffic volume of automobiles. Therefore, we aim to make feature vectors of each item available on the sound map. For the first step of this work, we propose a method to extract traffic of automobiles. In this paper, we describe an algorithm of our system and a preliminary experimental result.

Section IV-V2: Control and Intelligent System

Room: Seoul

Chair: Seungcheon Kim (Hansung University, Korea)

10:20 Adaptability Improvement of Learning from Demonstration by Stochastic Trajectory Optimization

Jeong-Jung Kim (KAIST, Korea); Ju-Jang Lee (KAIST, Korea)

One of the approach for motion planning in a high-dimensional space is a Learning from Demonstration (LfD) strategy. Trajectories that a robot should follow are extracted from human demonstrations and those are used as data for encoding motions and encoded motions are used for a motion planning. The advantage of the LfD method is that it can find a motion planning solution that is suitable to a task in a short time. Although the method successfully generates a motion when a query point is similar to a learned trajectories, it has a limitation when additional constraints such as obstacles, short distance are added. To overcome the limitation of LfD, we combine LfD and stochastic trajectory optimization for improving an adaptability of LfD. Although those methods can be used independently, we can utilize their advantages when we combine those methods. A trajectory generated from an LfD is modified by stochastic trajectory optimization. The final trajectory is suitable for task and adapted for constraints. The effectiveness of the method was shown with three-dimensional simulations having constraints. The proposed algorithm successfully modified a trajectory to adapt for constraints.

10:40 Application of Robust Multi-parametric MPC to Low Dimensional Systems

H. Chang (Kookmin University, Korea); Kyung-Jung Lee (Kookmin University, Korea); Gu-Min Jeong (Kookmin University, Korea); Chanwoo Moon (Kookmin University, Korea)

Multi-parametric model predictive control (mpMPC) problem for discrete-time linear parameter-varying (LPV) systems has been investigated based on the solution of the mpMPC problem for discrete-time linear time-invariant (LTI) systems by Chang et al., 2013. This robust controller design method provides a controller adapted to parameter changes of an LPV system and it could improve the performance of an LPV system in terms of robustness particularly for slowly varying parameters. In this paper we apply this design method to low dimensional systems which suffer from slow variation of system parameters, due to aging or degradation. Simulation examples, such as a reference tracking control problem and a slowly varying disturbance offset, are illustrated. The robust mpMPC technique shows an improvement of the reference tracking error compared to the nominal mpMPC and could render a system stable while the nominal mpMPC could not.

11:00 Efficient Similarity Search for Static Queries in Streaming Time Series

Giao Cong Bui (Posts and Telecommunications Institute of Technology, Vietnam); Tuan Anh Duong (Ho Chi Minh City University of Technology, Vietnam)

Streaming time series causes a big challenge in data mining because the processing methods of static time series almost are not suitable for the streaming environment. Furthermore, the previous works on similarity search in streaming time series data is comparatively insufficient. In the paper, we introduce an efficient implementation approach for similarity search for static queries in streaming time series by using a multi-resolution index structure and a multi-scale filtering method. In order to make the implementation more efficient, we have to deal with data normalization and have proposed an incremental

normalization that is adaptive to multi-resolution match. Another advantage of the implementation approach is that it could be used with any dimension reduction method which satisfies the lower bounding condition and has multi-resolution property. Experiments show that our approach performs very well in terms of runtime and preciseness.

11:20 *PID Control Speed of DC Motor Using Parallel Particle Swarm Optimization*

Hilal Tayara (Chonbuk National University, Korea); Kil To Chong (Chonbuk National University, Korea); Deok-Jin Lee (Kunsan National University, Korea)

This paper proposes the tuning of proportional-integral-derivative (PID) controllers of DC motor using parallel particle swarm optimization (PPSO) method. The DC motor was modeled in Simulink and Parallel PSO was implemented in Matlab. The results were more efficient in reducing the steady-states error; rise time, settling time and maximum overshoot in speed control of a DC motor.

11:40 *PDSP-based architecture for speech recognition system*

Hoang Trang (University of Technology, HoChiMinh City, Vietnam)

This paper presents implementing speech recognition system with Programmable Digital Signal Processors (PDSP). The system is then evaluated in recognition accuracy and system speed. Six different configurations for speech recognition systems are built and evaluated. From these evaluation results, system designer could choose the appropriate model based on priority in system speed or in accuracy. Recognition system is built with TMS320C6713 processor of Texas Instruments on TMS320C6713 DSP kit. Assessment results are made over 40 Vietnamese words, 100 utterances per one word.

12:00 - 13:30

Lunch Break 

13:30 - 15:10

Section V-P1: Communication and Ubiquitous 

Room: Lobby

On the false positive probability of the Bloom filter

Ji Hong Kim, Professor (Semyung University, Korea)

A Bloom filter is a simple space-efficient randomized data structure used to represent set in order to support membership queries. So it is useful to search the wanted data from the database. In this paper, we analyze the problems of the false positive probability of the bloom filter being used up to now and present the revised false positive probability formula.

Location-based User Selection Scheme for Cooperative Spectrum Sensing in Cognitive Radio Networks

Beongku An (Hongik University, Korea); Tri-Nhu Do (Hongik University, Korea)

In this paper, we consider how to choose the cooperative secondary users (SUs) to maximize the spectrum sensing reliability in cognitive radio networks. We propose a user selection scheme for cooperative spectrum sensing that takes into account the location information of secondary users and the effect of path-loss. Moreover, the performance of the proposed scheme is evaluated by simulation.

Performance Analysis of Synchronization Signals for Efficient D2D Communications in Unlicensed Band

Hyungjin Kim (ETRI, Korea); Sung Cheol Chang (ETRI, Korea); Jaemin Ahn (Chungnam National University, Korea)

This paper considers operation with fixed and sectionized frame structure to support a large number of devices and power saving. Supporting a large number of devices is achieved by high spectral efficiency and low signaling overhead and power saving is achieved by sleep and wake up at the predefined time. Fixed frame structure requires synchronization function. Synchronization signals must be sent at predefined time. Centralized synchronization scheme and fully distributed scheme are two synchronization methods in D2D communication without operator control. In this paper, we considered fully distributed synchronization scheme. All devices operating in unlicensed band must consider coexistence. To send synchronization signal at predefined time without collision avoidance with heterogeneous network devices such as Wi-Fi, synchronization signals must be sent by low power to minimize interference. In this paper, we describe the synchronization signals used for fixed frame structure and analysis the performance of synchronization signals for the unlicensed band D2D communication with interference of heterogeneous networks.

Performance analysis of STBC-OFDM transmit diversity for mobile internet access networks

Seong Chul Cho (ETRI, Korea); Seung Hwan Lee (ETRI, Korea)

In this paper, we propose a novel mobile Internet access system based on orthogonal frequency division multiplexing (OFDM) time division duplex (TDD) and analyzes the performance of quadrature amplitude modulation for the proposed OFDM systems employing space-time block codes in Rayleigh fading channel. The performance of the proposed system employing the pilot tones assisted channel estimation is compared to the ideal case with perfect channel estimation.

Calculation of the traffic safety speed using Fuzzy Reasoning Rules

Byung Soon Cho (Green Building, BEMS System, Micro Hydropower Generator & C&C Instruments, Korea); You-Sik Hong (SangJI University, Korea); Chun Kwan Park (Mokpo Maritime National University, Korea); JaeMin Lee (Kwandong University, Korea); ByungMin Lim (XML Company, Korea)

These days the many researchers of traffic accidents using IT technology have been done to reduce the traffic accidents. This paper has simulated the automatic warning broadcasting system for the freezing and fog areas through Web. Also, we have performed the simulation which informs the drivers of the optimum traffic safety speed in real time to protect the traffic accidents in even the worst weather conditions. We use Fuzzy Reasoning Rules for this simulation.

Modeling and Evaluation of Network-based Partial Distributed Mobility Management

Jang-Geun Ki (Kongju National University, Korea); Kyutae Lee (Kongju National University, Korea); Dohyeon Kim (CheJu National University, Korea)

DMM(Distributed Mobility Management) mechanisms have been actively studied in and around the IETF to solve several limitations of centralized mobility management schemes. In DMM, data traffic is distributed in an efficient way and does not rely on a central anchor node to manage IP mobility sessions. In this paper, the network-based partial distributed mobility management scheme is suggested and the simulation models and programs are developed and verified by simulations under various traffic environments. The simulation results for performance comparison of DMM, PMIPv6 and MIPv6 protocols include

UDP traffic sent/received, end-to-end packet transfer delay, binding delay, CPU utilization, WLAN load and throughput, etc. and show that the developed models for DMM are useful for mobility management studies in wireless network environment.

Section V-V1: Communication and Ubiquitous

Room: Hanoi

Chair: Cong Hung Tran (Posts and Telecoms Institute of Technology, Vietnam)

13:30 *Analyses of Attacks and Vulnerability on the U-healthcare System*

Kim Jung Tae (Republic of Korea, Korea)

Today's society is rapidly moving toward to the elder people's society. The rapid changes of modern styles give a new chance to build new market and industry. Ubiquitous technologies based on mobile devices and sensor nodes are able to manage healthcare information. As information technologies are developed rapidly, E-healthcare system has been realized. Recently the trend of healthcare system has moved to U-healthcare system because of smart equipment and devices with low computing power. Radio frequency identification (RFID) is an automated data-capture technology that uses low-power radio waves to communicate between readers and tags. RFID technology is also adapted to U-healthcare system to reduce manual handling error, monitor patient's medical information, process efficiency and track patient's location. To apply this system, new issues are also induced such as security, authentication and safety. The use of a mobile device such as NFC, RFID tag and small sensor nodes in hospital environment offers an opportunity to deliver better services for patients and staffs. Furthermore, medical errors will be reduced because M-health system helps to verify the medical procedure. Optimized security protocols and mechanisms are employed for the high performance and security in U-healthcare system. A challenge in the near future will be the integration of Ubiquitous Sensor Network (USN) with security protocols to the hospital environment. Developing a security protocol in u-healthcare environment is analyzed in this paper.

13:50 *Fast Location-based Association of Wi-Fi Direct for Distributed Wireless Docking Services*

Jina Han (Ajou University, Korea); Keun-Woo Lim (Ajou University, Korea); Young-Bae Ko (Ajou University, Korea)

This paper proposes a novel method of faster association in the Wi-Fi Direct specification to support various wireless docking services in future wireless networking. Wireless docking can be one of the most prominent services in the future because various real-time multimedia streaming applications will be based on this service. Even though the Wi-Fi Direct specifies a neat architecture to support these environments, the delay from the association process may severely deteriorate the network performance. To solve this problem, we propose a faster method of Wi-Fi Direct association by allowing mobile clients to share information of their Group Owner (GO) with each other. Location and channel information is also utilized to locate and quickly associate with GOs. The performance of the proposed scheme is evaluated using the NS-3 simulator, showing that the association delay can be reduced as much as 75%.

14:10 *Designing Information Architecture for Directing Activities*

Szumiao Chen (National Cheng Kung University, Taiwan)

This paper mainly examine the directing in navigation activities in a city with the assistance of information provided by people who are familiar with the environment to foreigners. Through the discussion of spatial cognition and mental model, we can understand how spatial information is generally processed and what kind of information is critical in order to provide useful directing instructions. In this paper, few case studies are conducted by contextual inquiry to examine how people give spatial instructions, and to find out the critical points in directing with the purpose of collecting enough resources for the future studies.

14:30 *Load-Aware Rebroadcasting Algorithm in MANET*

Sweungwon Cheung (Samsung Techwin, Korea); DaeIn Choi (Korea University, Korea); Chang Min Lee (Korea University, Korea); Woo Suk Choi (Korea University, Korea); Hyun-Kook Kahng (Korea University, Korea)

In that any additional infrastructure is not required for communication Ad-hoc networks have been got a lot of attention. However collisions due to the excessive competition among (re)broadcast packets for routing establishment deteriorate the network performance such as packet delivery ratio as the number of nodes increased. In this paper, collision-avoidance broadcasting algorithm is proposed by limiting the number of neighbor nodes, not to exceed a predefined number (threshold) value. We also show the significance of appropriate predefined number heuristically under the normal environment. The performance of the proposed algorithm was compared with GPSR using QualNet network simulator.

14:50 *Design of Underwater Things and IoUT Architecture using Delay Tolerant Network*

Kalyani Muppalla (Kookmin University, Korea); Chang Hwa Kim (Gangneung-Wonju National University, Korea); Soo-Hyun Park (Kookmin University, Korea); NamYeol Yun (Kookmin University, Korea)

In the earth more than half of the space filled with water. In that water most of the part is in the form of oceans. The ocean atmosphere determines climate on the land. Underwater things can collect the underwater data. Using Internet of Underwater Things (IoUT) we can find the changes in the ocean environment. Underwater things are constructive in offshore investigation, disaster anticipation, data gathering, assisted navigation, pollution checking and strategic inspection. The concept of Delay Tolerant Networking (DTN) is used for communicate heterogeneous networks. So DTN is used to communicate between the underwater acoustic sensor network and internet with help of DTN gateway. By using internet, ocean data can be broadcasted in different applications like scientific applications, military applications and industrial applications. This paper introduces internet of underwater things architecture using delay tolerant network.

Section V-V2: Multimedia and Signal Processing

Room: Seoul

13:30 *Human Motion Tracking using the Image Subtraction and SVM with the Physical Characteristics*

Min Jae Kim (Dong-A University, Korea); Hye-Youn Lim (University of Dong-A, Korea); Dae-Seong Kang (University of Dong-A, Korea)

In this paper, when blob is not detected in the video, background image is saved in the ".jpg". And the background is removed by image subtraction (IS) between background image and original video image. To make a real time tracking system, silhouette of pedestrian is extracted by techniques of IS and filtered out using support vector machine (SVM) algorithm with the physical characteristics. In this experiment, the proposed method can be efficiently removed the noise like lighting noise and other noise. Tracking rate is improved about 5% than conventional methods. And frame per second (FPS) is 21.8. The experimental results show that this approach is robust tracking the pedestrian in real time.

13:50 *Simplified System for the Forest Fire Detection in the Moving Camera*

Seung-Hwan Yeom (Dong-A University, Korea); Hye-Youn Lim (University of Dong-A, Korea); Dae-Seong Kang (University of Dong-A, Korea)

The purpose of this paper is implementation of a simple forest fire detection system using moving camera. This study was aimed compatibility and scalability both software and hardware, especially software part. To make a simple system with less-throughput, main theories used basic form. First, preprocessing method was used by Gaussian blurring. Second, this study used HSV color space that has more superior performance to lighting changes than basic RGB color space. Third, adaptive threshold was used more intuitive representation of fire area. Finally, labeling was used to find wanted area. Based on images of a moving camera experiments, the proposed method was proved that operated stably.

14:10 **Comparative Study for Classification Algorithms adaptable for Liver Patients Prediction**

Hoon Jin (Sungkyunkwan University, Korea); Kim Jinhong (HanSung University, Korea); Seungcheon Kim (Hansung University, Korea)

Due to inhalation of alcohol and ongoing toxic gas, ingestion of contaminated food, excessive consumption of pickled food and drug intake, liver disease patients are growing up increasingly. To this end, variety of automatic classification algorithms can help medical doctors in diagnostics of patients at the hospital. This paper treats evaluation of the performance of classification algorithms selected for better performance based on the features of data from the mixed patients' data set with liver disease and normal. In this paper, we investigated and analyzed the classification algorithms such as Naïve Bayes, Decision Tree, Multi-Layer Perceptron and k-NN used in [1], which developed our data set, and additionally Random forest, Logistic which proposed by us. Those algorithms were compared in several kinds of evaluating criteria like precision, recall, sensitivity, specificity, and so on. Through the experiments, we can know that in view of precision, NB is preferable than others but in other criteria, Logistic and Random forest take precedence over other algorithms.

15:10 - 15:30

Coffee Break 

15:30 - 17:10

Section VI-P1: Communication and Ubiquitous 

Room: Lobby

Chair: Tuan-Anh Le (Posts and Telecommunications Institute of Technology, Vietnam)

A Low-power CNT based Chaotic Generator for Chaos based Secure Communication and Neural Network Applications

Van Ha Nguyen (Inje University, Korea); Sangguk Nam (University of INJE, Korea); Bookang Kim (Inje University, Korea); Hanjung Song (Inje University, Korea)

This paper presents a compact and low-power-based discrete-time chaotic generator based on a carbon nanotube field-effect transistor implemented using Wong and Deng's well-known model for chaotic communication. The chaotic circuit is composed of a nonlinear circuit that creates an adjustable chaos map, two sample and hold cells for capture and delay functions, and a voltage shifter that works as a buffer and adjusts the output voltage for feedback. The operation of the chaotic circuit was verified with the SPICE software package, which used a supply voltage of 0.9 V at a frequency of 20 kHz. The time series, frequency spectra are presented.

Termite-Inspired Optimization Unbalanced Radius Scheme for Zone Routing Protocol in Mobile Ad-Hoc Networks

Thu Pham (Kumoh National Institute of Technology, Korea); Dong Seong Kim (Kumoh National Institute of Technology, Korea)

This paper proposes an optimization unbalanced radius scheme inspired from building hill behavior of termites. In typical termites building hill strategy, after a termite walks through a path, it will leave pheromone, therefore the amount of pheromone of a path displays how much this path is used by termites. By apply this characteristic into construct zone of each node in Zone Routing Protocol (ZRP) the balanced radii in all directions will be replaced by unbalanced one. With more nodes in the direction has higher probability to become destination are stored in intrazone routing table, our proposed scheme allows to enhance data packet delivery ratio, mitigate delay (discovery route delay) and reduce control overhead.

Performance Comparisons of Concatenated Codes with Different Inner Coding Scheme

Ye Hoon Lee (Seoul National University of Technology, Korea); Nam-Soo Kim (Cheongju University, Korea)

We analyze the performance of a concatenated code with two different inner decoding schemes. One is the error-detecting inner decoding, and the other is the error-detecting-and-correcting inner decoding scheme. We compare the performances of the two decoding schemes for finite and infinite block length cases when the concatenated code is applied to slow frequency-hopping spread-spectrum multiple access (FH-SSMA) communication systems.

Virtualization Technologies in Cloud Computing: Its Security Issues and Countermeasures

Young Jin Kang (Dongseo University, Korea); Hyun Ho Kim (Dongseo University, Korea); Su Hyun Park (Dongseo University, Korea); HoonJae Lee (Dongseo University, Korea)

As Cloud computing technology is emerging nowadays, it has raised the security issue in the field of IT. Most of researches have been done in the cloud storage domain supporting customers and providers in their usage of cloud services. Due to the multiple elements which support the cloud environment, cloud computing technologies still have the security vulnerability that cause security breaches problem. Moreover, cloud computing evolved and currently, virtualization concept using a hypervisor as part of the environment is integrated into cloud technology. In this paper, we focus on two main parts, first we present a study on existing machine virtualization such as SANS, Gartner, IBM, second we analyze the security vulnerabilities of the virtualization technologies and finally we formulate recommendations in regards with this study.

Research on EV Charging Process using V2G Communication

Hyang Won Lee (Hanyang University, Korea); Sung-kwon Park (Hanyang University, Korea); Eunjo Lee (Hanyang University, Korea); Chul-sun Park (Hanyang University, Korea)

The V2G Communication Interface in International Standard ISO/IEC 15118-2 Communication can support bi-directional power transfer and exchange of information between Smart Grid and EV (Electric Vehicles). Latest standard ISO / IEC 15118 (2012) added V2G Message Session Timing. If the timer exceeds the defined timing value when the EV and EVSE (Electric Vehicle Service Equipment) exchange of V2G Messages, the communication session is stopped. Time-out condition is Request/Response Message transfer delay, Software defects, Request/Response Message recognition error in EVCC/SECC, unexpected Message and Response Message Processing delay in SECC, etc. This stoppage causes the charging to restart from the beginning, which brings a great amount of inconvenience to the driver. In this paper, we propose Retry Method which

allows us to maintain the session when the time-out occurs during a session. With this method, we can receive the session's information and send the message instantaneously through EVCC memory. We compared proposed Method with the original one, and calculated the total V2G Message charging time in the worst case. As a result, the Retry Method reduces charging time by 11-50% depending on the type of the message.

A Simulation Tool Based on Run-Time Log for a Separated Software Execution Environment

Yeoneo Kim (Pusan National University, Korea); Pilsu Lee (Pusan National University, Korea); YunJung Lee (Pusan National University, Korea); Won Young Kim (ETRI, Korea); Gyun Woo (Pusan National University, Korea)

Providing 3D application is not easy especially in a virtualization environment. To solve this problem many companies have proposed various solutions and one of them is a separated software execution environment. Because the separated software execution environment provides display virtualization in an application level, it is important to evaluate the number of providable services per server and balancing the load among servers. However it is hard to evaluation the real performance of this environment in a large-scale. In this paper proposes a simulation tool for evaluating the performance of a separated software execution environment. To promote the accuracy of this simulation tool, the runtime log containing information of the resources is utilized. On the other hand, the CPU benchmark is also utilized to normalize the CPU load of the runtime profile. From experimental result, it is found that the simulation tool based on the runtime log can model much accurately the separated execution environment. The difference between the estimated and the actual CPU usages was measured about in 1% error bound.

A Study of Hierarchical Data Model for Sensor Web in Pig Farm

Do-Hyeun Kim (Jeju National University, Korea)

Pig keeping has become an increasing concern for ecological preservation and growth. This paper proposes hierarchy architecture of data modeling for information representation in pig ecological environment. This architecture provides various real-time sensing data such as pigs environment of piggery using temperature sensor, humidity sensor, wind speed sensor, etc. Information of this architecture supports to develop Sensor web for effective pig keeping in ecological pig farm environment.

Design of a helix antenna for GPS receivers

Gangil Byun (Hanyang University, Korea); Byung Jun Jang (Kookmin Univ, Korea); SangKyu Han (Kookmin University, Korea); Hosung Choo (Hongik University, Korea)

This paper proposes a novel design approach of a dual-band helix antenna for GPS receivers. The proposed antenna is composed of four identical radiators and a feeding network. Different line widths are applied for radiating lines to reduce the antenna size and adjust the interval between two resonance frequency points for dual band operations. The feeding network contains a hybrid chip coupler whose output ports are connected to the first and the second radiators, and then meander lines are applied to link the first and the third, the second and the fourth radiators. The simulated performances of the broad matching characteristics and high radiation gains demonstrate the antenna's suitability for the GPS receivers.

Section VI-V1: Communication and Ubiquitous

Room: Hanoi

Chair: Mui Van Nguyen (Posts and Telecom Insitute of Technology (PTIT), Vietnam)

15:30 Robust Carrier Phase Estimation in MIMO Systems for Smart Grid Environment

Jin-Woong Cho (Korea Electronics Technology Institute, Korea); Yong-Seong Kim (Korea Electronics Technology Institute, Korea); Hong Dae-Ki (University of SangMyung, Korea)

In this paper, the robust carrier phase estimation is proposed for pilot symbol assisted (PSA) packet downlink code-division multiple access (CDMA) with multiple-input and multiple-output (MIMO) antenna systems. To obtain the diversity gain provided by the frequency offset estimation, the combined frequency offset estimate is used for the performance improvement of the carrier phase estimation. Simulation results shows that the improved frequency offset estimation performance by combining techniques can aid the estimation performance improvement of carrier phase.

15:50 Gesture-Based Session Establishment for Multi-User Data Exchange

Ryo Kanaoka (Aoyama Gakuin University, Japan); Niwat Thepvilojanapong (Mie University, Japan); Ryosuke Ozaki (Aoyama Gakuin University, Japan); Naofumi Kitsunezaki (Aoyama Gakuin University, Japan); Yoshikatsu Ohta (Mie University, Japan); Yoshito Tobe (Aoyama Gakuin University, Japan)

The number of mobile devices equipped with short- range wireless communication modules such as Bluetooth, infrared and near field communication (NFC) is increasing rapidly. People always carry the devices and use them for various purposes in their daily lives. For example, mobile users may exchange electronic business card or contact address through infrared or Bluetooth. To establish a connection between two devices, the users have to specify the communicating party by using some kinds of identifiers, e.g., device's ID, name or MAC address. Since communicating parties are in a nearby area, it would be convenient if we can exploit such physical adjacency to establish the communication instead of using conventional addressing scheme or complicated setup. Thus this paper proposes EriCC, a gesture-based session establishment for multi-user data exchange. EriCC uses gesture to identify and verify a communicating party. In particular, the users do the same gesture in order to establish a connection without knowing the other party's address. EriCC then transforms acceleration signal of the gestures into frequency domain by applying Discrete Fourier Transform (DFT). If frequency components of acceleration signal stay below a threshold, data exchange is allowed. We implemented EriCC on Android smartphones and conducted experiments to study its performance. The experimental results show that EriCC is able to remove undesirable receivers from actual receivers with high recall and reasonably high precision.

16:10 Evaluating Perception Value of Contextual Network Information in Data Visualization towards Dynamic Proficiency Levels

Aun Yichiet (National Advance IPv6 Centre, NAv6 & Universiti Sains Malaysia, Malaysia); Sureswaran Ramadass (National Advanced IPv6 Centre, Malaysia)

Network monitoring is becoming more demanding due to the growing complexity in network communication patterns induced by proliferation of Internet services. Network monitoring tools must evolve coherently with this development pace to remain relevant in facilitating network analysis going forward. However the direction of growth often revolves around curating detection intelligence that deals with dedicated analysis domain and has inevitably neglected the visualization department to convey network information effectively. In general, while network monitors are advertised to assist in network analysis, the coverage of supported audience base is questionable. Conventionally network monitors are benchmarked by detection and filtering prowess from the eyes of network specialist; however this metrics do not translate into true contribution in terms of perception impact, in addition to failing to consider the perception value of conveyed information on mainstream network community with diverse networking proficiency. This paper attempts to review efficacy of existing data visualization mechanics on samples of networking tools from dimension of dynamic IT literacy levels, by classifying network information into various contexts and examines their perception value of these information in respect to general internet population; and promotes initiatives to personalize conveying of information based on networking proficiency levels to address and bridge the gap between public perceivable ability on visualization mechanics in network monitoring.

16:30 A Low Power Node for A Wireless Body Sensor Network

Thang Tran (Pukyong National University, Korea); Wan Young Chung (Pukyong National University, Korea)

This paper proposes the design and implementation of a low power Wireless Body Sensor Node (WBSN) for monitoring the Electrocardiography (ECG) and Photoplethysmography (PPG) signals. To achieve compact size and low power consumption for comfortable WBSN, a simple PPG sensor interface and an ECG front-end circuit which is small size and ultra-low current consumption are integrated into the design. The proposed node can be powered by a very low and wide voltage range, from 0.6V to 6.5V, that makes it can use an AAA battery or button cell and even energy harvesting. The software is supported by the NesC language under TinyOS environment so that the proposed node is easy to configure for working as an individual health monitoring node or a node in the wireless body sensor network. The proposed node is also used to set up a wireless body sensor network for gathering health signals and the results are monitored on the personal computer by user interface program using C-Shape language.

16:50 Cloud computing-based malicious code countermeasures

Hyun Ho Kim (Dongseo University, Korea); Young Jin Kang (Dongseo University, Korea); Su Hyun Park (Dongseo University, Korea); HoonJae Lee (Dongseo University, Korea)

There is a lot of development and research in ubiquitous computing such as smart homes, smart cars, smart devices, etc. However, there are several vulnerabilities. With the extension of ubiquitous computing, new attack methods spring up creating a need for immediate countermeasures. There are many smart device users that use cloud services through wireless internet. Malicious code can easily be injected into the smart devices and once the smart devices are connected to the cloud services, the malicious code will be injected to the cloud service's system. In this paper, malicious code on mobile and cloud services, and the countermeasures, are discussed.

Section VI-V2: Multimedia and Signal Processing

Room: Seoul

Chair: YongSoo Choi (Sungkyul, Korea)

15:30 Analysis of Corner and Blob Feature Detection for Image Processing

Byung-Jae Choi (5407B, College of Information and Communication, Korea)

The feature detection is very important to image processing area. In this paper we analyze some characteristics of major robust image processing algorithms for corner and blob feature detection. We also compare the simulation results through image matching process. We show that how these algorithms work and how fast they execute. Some simulation results are shown for helping us to select an algorithm or several algorithms extracting corner and blob feature in faster efficiency and better results.

15:50 MRI System Evaluation Using Cubic / Triangular / Vessel and Low-Contrast Tissue Phantoms

Jong-Min Kim (Korea University, Korea); Cha Jang-Gyu (Soonchunhyang University Bucheon Hospital, Korea); Hwang Ji-Young (Ewha Women's University Mokdong Hospital, Korea); Jung Seung-Eun (The Catholic University of Korea Seoul St. Mary's Hospital, Korea); Hyun Kyoan Lim (Korea Research Institute of Standards and Science & University of Science and Technology (UST), Korea); Kim Do-Wan (Korean Institute for Accreditation of Medical Imaging, Korea); Kim Kwang-Su (Korean Institute for Accreditation of Medical Imaging, Korea); Lee Hyun Goo (Korean Institute for Accreditation of Medical Imaging, Korea); Kang Sung-Jin (Soonchunhyang University Bucheon Hospital, Korea); Young-Seng Jo (Korea University, Korea); Sang-Doc Han (Korea University, Korea); Suchit Kumar (Korea University, Korea); Jong-Hoon Han (Korea University, Korea); Han-Joong Kim (Korea University, Korea); Park Junyong (Korea Basic Science Institute, Korea); Lee Chulhyun (Korea Basic Science Institute, Korea); Oh Chang-Hyun (Korea University, Korea)

As the MRI system evaluation method using the ACR phantom has several limitations in evaluating the MR images, especially those from high-field (HF) and ultra-high field (UHF) systems, there is growing need of quantitative evaluation of MR images with various evaluation options. This study proposes a new phantom, called KMRP-4 with added evaluation inserts, and methods for quantitative evaluation of MR images. MR images of the proposed KMRP-4 phantom obtained on more than 10 MR systems are evaluated and the utility of the phantom is shown by evaluating the images.

16:10 'A Pipeline Schedule and Data Reuse Scheme for Merge Mode Operations in a Hardware-based HEVC Encoder

Thang Nguyen (Seoul National University, Korea); Truong Nguyen (Seoul National University, Korea); Thanh Nguyen (Seoul National University, Korea); Hyuk-Jae Lee (Seoul National University, Korea); Chae Eun Rhee (Inha University, Korea)

The merge mode is a new compression tool in High Efficiency Video Coding (HEVC) proposed to reduce a bitrate significantly by sharing motion information between neighboring blocks. However, for hardware implementation, the merge mode causes a significant bottleneck in encoding operations. For fast processing of the merge mode, parallelism should be exploited in terms of computation and memory access. This paper proposes a pipeline schedule and a data-reuse scheme to speed up merge mode operations given the limited memory bandwidth. Experimental results show that the proposed merge mode design with 210 K logic gates processes 32x32 coding tree units within 980 cycles at the operating frequency of 150 MHz.

16:30 Advance Machine Learning Methods for Evaluation of Human Mental Workloads Using Functional Near-Infrared Spectroscopy

Thao Pham Thanh (International University, Vietnam); Nguyen Duc Thang (HCMIU, Vietnam); Vo Toi (HCMIU, Vietnam); Huy Cu Gia (International University, Vietnam)

Functional Near-Infrared Spectroscopy (fNIRS) is becoming an effective technique for noninvasive studies of Human Computer Interface (HCI) by measuring temporal hemodynamics of cerebral cortices. One aspect of a HCI system is to evaluate brain functions of users during a mental task. Previously, there have been experiments conducted by researchers from Tufts University to differentiate mental workload levels during a task that involved working memories. The machine learning method with k-nearest neighbor algorithm (k-NN) was implemented to distinguish different workload levels. In this work, based on the obtained data of oxy-hemoglobin and using Support-Vector Machine (SVM) for classification, our experimental results suggested that we can separate two workload difficulties with about 70.4 % success that is superior to conventional classification methods with k-NN. In addition, by applying Principle Component Analysis (PCA) for data dimensional reduction, we showed a promising method to measure real-time mental workloads. This is the preliminary step for future development of an online system which is able to cover more cerebral cortices and to utilize noise removal methods, aiming at a better method to distinguish different mental workload levels.

16:50 Illumination Removal by Using Low-pass Filter and Trimmed Normalization

Sang-hyeob Song (SungKyunKwan University, Korea); Jong Hak Kim (Sungkyunkwan University, Korea); YongRak Jo (SungKyunKwan University, Korea); Seong-Muk Kang (Sungkyunkwan University, Korea); Jun Dong Cho (Sungkyunkwan University, Korea)

This paper presents digital image enhancement for the recognition of character and other information. The proposed method is based on Retinex algorithm and histogram preprocessing. Compare with the conventional method for digital image enhancement, our approach focuses on the backlit scene application. The experimental validation indicate that our proposed method can be used as a reliable method for hardly backlit photograph recognizing.

17:10 - 18:00

Research Group Discussion 1 

Room: Hanoi

Research Group Discussion 2 

Room: Seoul

18:00 - 20:59

Banquet 

Friday, February 14

09:00 - 11:30

Organizing Committee Meeting 

Room: Hanoi

Participant Panel Discussion 

Room: Seoul

11:30 - 13:30

Lunch Break 

13:30 - 16:30

Campus Visiting Ceremony 

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