GHTCE 2013

2013 IEEE GLOBAL HIGH TECH CONGRESS

ON ELECTRONICS

November 17-19, 2013

Shenzhen Convention & Exhibition Center, Shenzhen, China

Program Booklet

GHTCE 2013
2013 IEEE Global High Tech Congress on Electronics
17-19 November 2013, Shenzhen, China

Program at a glance

Time	Rose-3 Hall At 5/F	Rose-2 Hall At 5/F	Rose-1 Hall At 5/F
Sunday, November 17			
09:00		*Registration*	
09:30	*Opening Ceremony*		
10:30	*Group Photo*		
11:00	*Keynote Speeches*		
12:00		*Luncheon*	
13:30	*Industry Forum I: Electronics Industry and Green Earth*		
15:30		*Tea Break*	
15:45	*Industry Forum II: Consumer Experience and Enabling Technologies in the Big Data Era*		
19:00	*Awards Ceremony and Reception Dinner*		
Monday, November 18			
09:30	*Keynote Speech: Storing Your Life*		
10:00	S14: *Enabling Technology*	S2: *Smart Grid, Power Systems and Renewable Energy*	S1-1: *Internet of Things*
11:00	S6: *Big Data, Analytics and Optimization*		
11:40	S13: *Automotive Entertainment, Safety & Information*		
12:00		*Luncheon*	
13:30	S3-1: *Mobile Internet and Social Computing*	S5: *ICT and Electronics for Healthcare*	S1-2: *Internet of Things*
15:30		*Tea Break*	
15:45	S3-2: *Mobile Internet and Social Computing*	S8: *Entertainment & Services*	
16:45		S4: *Cloud Computing and Consumer Services*	
Tuesday, November 19			
09:30	S12: *Network Technology & Energy Management*	S11-1: *RF & Wireless*	S9-1: *Image & Video Processing*
12:00		*Luncheon*	
13:30	S7: *Human-Device Interaction*	S11-2: *RF & Wireless*	S9-2: *Image & Video Processing*

Sunday, November 17

09:00 - 09:30

Registration

09:30 - 10:30

Opening Ceremony

Room: Rose-3 Hall at 5/F

10:30 - 11:00

Group Photo

Room: Rose-3 Hall at 5/F

11:00 - 12:00

Keynote Speeches

Room: Rose-3 Hall at 5/F

12:00 - 13:00

Luncheon

13:30 - 15:30

Industry Forum I: Electronics Industry and Green Earth

Room: Rose-3 Hall at 5/F

15:30 - 15:45

Tea Break

15:45 - 17:45

Industry Forum II: Consumer Experience and Enabling Technologies in the Big Data Era

Room: Rose-3 Hall at 5/F

19:00 - 21:00

Awards Ceremony and Reception Dinner

Room: Rose-3 Hall at 5/F

Monday, November 19

09:30 - 10:00

Keynote Speech: Storing Your Life

Thomas Coughlin, VP of Future Directions, IEEE CE Society

Room: Rose-3 Hall at 5/F

This presentation discusses the drivers for consumer digital storage, the different mobile and static usage models for digital storage in consumer devices and the resulting consumer storage hierarchy. Important characteristics of consumer storage devices are shown and guidelines are given for how digital storage should be designed in consumer devices. Demand for higher resolution content and for capturing ever greater details of the life of family members will drive increases in commercial as well as personal content storage demand. Sharing of content within a home or over the Internet creates much greater demand for storage since a shared file can be multiplied many times through network sharing. Implementation of a virtualized integrated storage utility into most homes with appropriate ease of use, suitable for consumers, will benefit customers by providing greater access to data as well as enhanced content protection using local as well as remote storage.

10:00 - 12:00

S1-1: Internet of Things

Room: Rose-1 Hall at 5/F

10:00 *Path Following Phase Unwrapping Using Wrapped Filtering Method for Interferometric Phase Denoising*

Zeng Fan Guang (Physics, Kunming University of Sciences and Technology, P.R. China)

Filtering of interferogram with noise and phase unwrapping are critical steps of InSAR (interferometric SAR) applications. Path following integral of Goldstein is used to build branch-cut to avoid radar noise in the data points and discontinuities and to satisfy the condition of zero integral path. We take into account phase noise impact on unwrapping process. In this paper, we introduce an effectiveness filtering method of wrapped average and median phase noise filtering technology. We combine phase residues as a measure standard. Compared with traditional mean and median filtering, it can reserve strips perfectly. It improve unwrap speed and remove phase residues at mostly. Experimental results show that the strips of phase data are reserved completely after filtering. Path integral method based phase unwrapping results show effectiveness of our proposed method. This method can supply important references for real InSAR data phase unwrapping and DEM generation, also for other applications.

10:24 *Weighted Centroid Localization Algorithm Based on Normal Distribution in Wireless Sensor Networks*

Shaoguo Xie (Key Laboratory of Intelligent Computing & Signal Processing, Ministry of Education, AnHui University, P.R. China); Yanjun Hu (Anhui University, P.R. China); Jingjing Liu (Anhui University, P.R. China); Yi Wang (Anhui University, P.R. China)

Localization algorithm continues to be an important and challenging topic in today's wireless sensor networks (WSNs). To efficiently exploit the normal distribution for range-free localization, we propose two weighted centroid localization algorithms, called Positioning Based on Normal Distribution and Positioning Based on the Network Size. The former uses the normal distribution to reduce weights error. The latter takes a further step to control the variance in normal distribution to estimate the location. The simulation results show that the proposed weighted centroid algorithms are better than WCL and AMWCL-RSSI in terms of the localization accuracy for WSNs with planned deployment of anchor nodes. Our experimental results demonstrate that the proposed two weighted centroid localization algorithms have a small localization error.

10:48 *Semidistributed Virtual Network Mapping Algorithms Based On Minimum Node Stress Priority*

Yi Tong (Beijing University of Posts and Telecommunications, P.R. China); Zhenmin Zhao (Beijing University of Posts and Telecommunications, P.R. China); Zhaoming Lu (BUPT, P.R. China); Haijun Zhang (Beijing University of Chemical Technology, P.R. China); Gang Wang (Beijing University of Posts and Telecommunications, P.R. China); Xiangming Wen (Beijing University of Posts and Telecommunications, P.R. China)

Network virtualization has been regarded as a fundamental paradigm that extenuates the ossification of current network. In a virtualization-enabled networking infrastructure,numbers of diverse virtual networks (VNs) can coexist on a shared physical substrate. In this consideration, an important challenge is the allocation of substrate network resources to instantiate multiple VNs. To address this challenge, we propose a semidistributed approach which is different from the traditional centralized and fully distributed approaches in this paper. Moreover, another major contribution is that we develop a balanced VN assigning procedure focusing on balancing the substrate node stress, which is composed of Node-Stress-Sorting Algorithm, Improved Shortest Path Tree Algorithm and Center-Root Communicating Protocol. Besides, numerical experiment results show that the proposed approach has a better performance in terms of node stress and message exchange.

11:12 *Research on the evaluation of traffic condition using mobile phones*

Li Hao (Beijing University of Posts and Telecommunications, P.R. China); Yichen Sun (Beijing University of Posts and Telecommunications, P.R. China); Tao Luo (Beijing University of Posts and Telecommunications, P.R. China)

Road traffic jam is a major source of inefficiency and wasted fuel. Measuring and localizing the congestion is an important step towards reducing the time people spend stuck in traffic. With the rapid development of phones, smart phones can provide location estimates with GPS sensor. Using position samples from drivers' phones to monitor traffic delays opens up the possibility of road condition estimation. This paper describes a road state evaluation system using the GPS data obtained from mobile phones. First is to evaluate the link average speed of a single vehicle, piecewise cubic Hermite interpolation method is employed to improve the accuracy of evaluation. Concerning that the speed of the same type vehicle is relatively stable, next is to obtain this parameter using the method of weighting. Last, use the average speed of different types of vehicles and ratio of those types as the inputs, and the link average speed as the output to construct the RBF neutral network. With the network, we can get the link average velocity, and according to the statistical analysis we know the number of the vehicle in the period of time, so the traffic flow is easy to calculate. We present experimental results from 24 different link groups of bus GPS data, the analysis result proves that the piecewise cubic Hermite interpolation method has better performance and less error than traditional linear interpolation method. We show that after training the RBF network with large volumes of data obtained from VISSIM, the evaluation system provided by ourselves has good performance.

11:36 *Low Cost Implementation of a Remote Controlled Suzuki Car to Assist Physcially Challenged People*

Paul Molina (Monterey Institute of Technology and Higher Education, Ecuador)

This paper describes a project to modify the input interface from the steering wheel and pedals of a vehicle to a computer/phone (or any other internet-connected device) such that the car can be remotely controlled worldwide. In particular, the document presents the design of a low cost system which receives data from a web server and modifies the signal inputs of the actuators to control the steering, accelerating, and braking through an onboard computer. The final result is a low cost implementation of a remotely controlled vehicle for medical applications, exploration missions, and dangerous work environments.

S2: Smart Grid, Power Systems and Renewable Energy

Room: Rose-2 Hall at 5/F

10:00 *A Smart Charging Station for Electric Vehicles with Evaluation of Different Energy Storage Technologies*

Azhar Ul-Haq (University of L'Aquila and DigiPower, Italy)

Popularization and acceptable penetration of electric vehicles is fully dependent on on-site and on-time availability of charging facility. The charging stations are required to be deployed optimally so as not to overload the grid. In this paper, we evaluate energy storage system based charging station in order to avoid strain on the grid due to additional load of e-vehicles. The aim is to ensure grid stability delivering a certain level of quality of service to e-vehicles owners. We consider two different possibilities to recharge the vehicle; either drawing power from power grid or recharging through energy storage system. An optimum operating condition is identified by comparing diverse system parameters. The proposed charging facility does not only ensure on-time relatively fast charging but it also helps reduce stress on the power grid by proposing average power demand by electric vehicles rather than considering peak power demand, at better economy maintaining a good level of quality of service. Simulation results evaluate perofrmance of the proposed charging system in terms of operating efficiency of charging station and recharging time of EV.

10:20 *A 5μW Fractional CMOS Bandgap Voltage and Current Reference*

Ali Tasdighi Far (Independent Researcher, USA)

Design of a sub-1V, low power, fractional bandgap voltage reference (Vr≈0.612V) conjoined with a current reference (Ir≈1uA) in standard 90nm digital CMOS is proposed, utilizing standard parasitic substrate PNPs. A positive temperature coefficient (TC) voltage is generated across a feed-back resistor, Rf, via a negative TC emitter-base voltage (VEB) on one side of Rf and the looped-back Vr output, on the other side, which has a near zero TC. The resulting current, Ix=(Vr-VEB)/Rf, has a zero current crossing point that can be set roughly around the mid-point of minimum and maximum operating temperatures. As such, Ix supplies the needed positive TC current to the bandgap's PTAT current loop that facilitates generating the residual zero TC current, Ir, which is concurrently fed to Ro to produce Vr. Simulations show Vr of about 612mV at TC of about ±10ppm/℃ can be achieved over span of -50℃< T <150℃. Accordingly, simulating for bandgap's operation for +0.9V > VDD > +5V, indicates that Idd of about 5μA, and voltage coefficient (VC) of about ±50 ppm/V are achievable.

10:40 *Pollution of Renewable Energies to the Grid: Measured Data and Statistical Analysis via Large-scale Urban Power Quality Monitoring System*

Ling Luo (Electric Power Research Institute, SMEPC, State Grid, P.R. China)

Renewable energies such as solar systems and find famrs are available at no cost and generate electricity without polluting our environment. However, it has been proved that the power quality problems of current photovoltaic (PV) stations and wind farms cause pollution to the power grid. To control and analyze such pollution, this paper introduces a large-scale urban power quality monitoring system. By applying this novel approach, the paper presents long-term measured data and statistical analysis of power quality status of large-scale PV stations and wind farms in Shanghai.

11:00 *Power factor Correction by PFC Boost Topology Using Average Current Control Method*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

Different power converters like ac-dc or dc-dc are widely used for their flexible output voltage and high conversion efficiency. Mostly these converters are used in various electronic devices and they are designed to regulate the output voltage even in the variation of load current and input voltage. Presently, there is increasing demands of high power factor and low total harmonic distortion in the current drawn from the utility. There is a requirement of good power quality; significant efforts have been made for the developments of the PFC converters. The boost topology is widely used as PFC converter for its simplicity and efficiency. Conventional boost PFC converters are composed of a full bridge AC to DC diode rectifier followed by a boost converter. The bridge rectifier offers high conduction losses which lowers the system efficiency. A rectifier with the boost pfc topology has been analyzed in the report. Here, the open loop uncontrolled rectifier has been analyzed using Microsim Pspice software and later the controlled rectifier with pfc boost topology has been analyzed using Matlab.

11:20 *Studies on Performance of Current Control Loop for Controlled AC-DC Converter Using Single Phase Matrix Converter Fed Permanent Magnet DC Motor*

Anuar Idris (Universiti Teknologi MARA, Malaysia)

This paper presents a performance comparison between Hysteresis Current Control (HCC) technique and PI Control as Current Control Loop for AC to DC converter fed permanent magnet DC motor (PMDC) using single phase matrix converter (SPMC) topology. SPMC is utilized to function as controlled AC-DC Converter feeds the PMDC. Conventional rectifier often incurs non-sinusoidal supply current waveform with high harmonics content which contributes to high total harmonic distortion (THD) and low power factor of the power supply system. The implementation of HCC and PI control as Current Control Loop in Active Power Filter are proved to achieve high power factor and low total harmonic distortion (THD). Experimental works using laboratory test rig are presented to verify the proposed operations.

11:40 *Performance Analysis of a OFDM SISO Powerline Communication System with Non-white Gaussian Channel Noise*

Munshi Rahman (Military Institute of Science and Technology, Bangladesh)

Performance analysis is carried out for a power line communication (PLC) system taking into account the effect of background noise and the transfer function of the PLC. The analysis is carried out with orthogonal FDM (OFDM) carrier along with the effect of background channel noise which has non-white power spectral density. The expression of the SNR at the output of the OFDM demodulator is developed for k-th subcarrier. The bit error rate for the k-th subcarrier channel and the average BER is then found analytically. The performance results are evaluated numerically for different number of OFDM subcarriers and several bandwidths of the PLC channel upto 30 MHz. The results show that there is deterioration in BER performance with

increase in channel bandwidth. However, the performance can be significantly improved by increasing the number of OFDM subcarriers at a given signal to noise ratio.

10:00 - 11:00

S14: Enabling Technology

Room: Rose-3 Hall at 5/F

10:00 *Simulating Printed Circuit Board Assembly Manufacturing & Testing*

Stefan Mozar (UNSW, Sydney & Dynexsys Pty Ltd, Australia)

This paper looks at modelling printed circuit assembly lines, including PCBA testing. The various assembly stages have been included in the model, as has the final PCBA test and repair functions. The model allows simulation of PCBAs according to their complexity (with the aid of a complexity index). The proposed complexity index is explained. This index is based on the number of components, the component density, number and types of functional blocks. The complexity index is used to simulate the production model with respect to time. This index is integrated into a yield model, to predict first pass numbers. Reliability models are used to produce random failure data, which will help model actual scenarios. The main aim of this model is to identify yield issues, which are in contrast to other production modelling; that looks at cycle time reduction and bottle neck identification.

10:30 *Design and Performance Evaluation of PIC16F77A Microcontroller Based Fluid Velocity Meter*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

this paper elucidates simple design method of a low cost digital velocity meter based on PIC16F77A micro controller. This digital velocity meter identifies the linear velocity of any fluids as well as any kind of movable objects. LASER and light dependent resistor are two cardinal sensors to design this meter. By this sensor any moving object or moving fluid's initial and final time is calculated at a certain distance. An electrical switch measure this time duration of certain distance very precisely. With this input signal by using the velocity formula the single chip micro controller compute the velocity. Then the computed formats of velocity are displayed in a 16×2 character LCD. It also shows the time duration of objects to pass the two sensors. This design process is more effective than others as it is more economical, efficient and simple.

11:00 - 11:40

S6: Big Data, Analytics and Optimization

Room: Rose-3 Hall at 5/F

11:00 *An Infinite-source M/M/S Retrial Queuing Network Model with Balking and Impatient Customers*

Mou Wu (Central China Normal University, P.R. China); Liansheng Tan (Central China Normal University, P.R. China)

This paper discusses a multi-server retrial queuing system, where the customers may leave the system due to balking and impatience. Deviated from the classical retrial queue, we use a novel model that reflects the queue state, the ambition of queuing and the urgency of requests. In particular, when customers find that a certain amount of requests were in the service area, they

will enter in orbit or service area. We study the interrelation of the parameters in the model, and effect of balking, retrial, and buffer size on performance measurements in the steady-state conditions. We also study the performance of the model of the queuing transaction in the computer networks under the specific parameter settings. Simulation results are presented by using OPNET Modeler tool.

11:20 *Mobile Agent based New Framework for Improving Big Data Analysis*

Youssef Essa (Etisalat, Egypt)

Recently, big data analysis becomes very important aspect. Processing big data using a powerful machine is not efficient solution. So, companies focused on using Hadoop software for big data analysis. This is because Hadoop designed to support parallel and distributed data processing. However, Hadoop has several drawbacks affect on its performance and reliability against big data analysis. In this paper, a new framework is proposed to improve big data analysis and overcome the drawbacks of Hadoop. The proposed framework is called MapReduce Agent Mobility (MRAM). The MRAM is developed by using mobile agent and MapReduce paradigm under Java Agent DEvelopment Framework (JADE).

11:40 - 12:00

S13: Automotive Entertainment, Safety & Information

Room: Rose-3 Hall at 5/F

11:40 *Vehicle Speed Control Through Fuzzy Logic*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

Fuzzy logic can be used to construct a nonlinear controllers by heuristic information which can replace the human intelligence working in a chain to complete a process. So it is a smart option to use the fuzzy logic to construct a controller to control a vehicle. Different DC motors like the shunt motors are prominent and flexible for electric vehicles. To control the vehicle dynamics like acceleration, braking, gear and terrain need to control the motor speed in proper way. So this paper advocates a novel approach to design and analyze a controller using fuzzy logic to control the speed of the vehicle. Traditional control sometimes take long time to determine optimum control parameters. But the designed fuzzy logic controller has the self tuning algorithm which can adjust the control parameters to gain the optimum control characteristic automatically.

12:00 - 13:00

Luncheon

13:30 - 15:30

S1-2: Internet of Things

Room: Rose-1 Hall at 5/F

13:30 *On enhancing the performance of the Diffusion-Based Molecular Communication (DMC) networks: Challenges and Opportunities*

Ahmad Mohammad (Ainshams University, Egypt)

The ultimate aim of the nano molecular communication networks is to change the living organism behaviors (e.g. intelligent drugs "nano actuators"), and to obtain information from living organisms otherwise not accessible (e.g. nano-scale diagnosis for health monitoring "nano sensors"). This is a new paradigm for nanomachines to exchange information, by utilizing biological mechanism and/or components to transfer information (e.g., molecular diffusion, neuronal networks, and molecular motors). Diffusion-based communication refers to the transfer of information using molecules as message carriers whose propagation is based on the law of molecular diffusion. In this paper we briefly propose and discuss the Cognitive- DMC network scheme, and concatenated codes for the Diffusion-based molecular communication. Moreover, we discuss some other aspects and challenges that are related to DMC networks.

13:50 *Distribution Equipment Monitoring System Based on the Internet of Things*

Shan Li (Economic Research Institute, State Grid Henan Electric Power Company, P.R. China); Changqing Xu (Power Economic Research Institute, Henan Electric Power Corporation, P.R. China); Jian Qi (Tianjin Bohai New Energy Technology co., ltd, P.R. China); Zhaoqian Wu (Tianjin Bohai New Energy Technology co., ltd, P.R. China)

The Internet of Things technology has large potential in obtaining, analyzing, processing, controlling and feeding back the information of physical properties(location, status, behavior, characteristics, etc.), which will produce a tremendous positive role in promoting the development of smart grid. This paper describes how the distribution equipment monitoring can be represented as an event-based system in combination with the Internet of Things technology. The proposed monitoring system integrates wireless ad hoc network communications, distribution network monitoring system, and environmental monitoring system, and allows saving costs related with wear minimization and prolonging the actuator life, but keeping promising performance results.

14:10 *Experimental Study of Rate-aware Scheduling for 802.11n Wi-Fi Network with Legacy Devices*

Guolin Sun (University of Electronic Science and Technology of China, P.R. China)

In this paper, we investigate the scheduling issue in the coexistence scenarios of 802.11n devices and legacy devices. To guarantee compatibility with legacy devices such as 802.11b/g devices in the ISM bands, IEEE 802.11n protocols allow low-rate devices access wireless medium with the equal priority. However, the network system capacity decreases and user-experience of 802.11n clients degrades significantly with the introduction of legacy devices. In this paper, our aim is to improve user-experience and network capacity of 802.11n devices in case of the negative impact brought by the 802.11 legacy devices in low rate transmission mode. The main contribution in this paper is our proposed scheduling algorithm for a mixed Wi-Fi networking scenario provided with the method of identifying low-rate and high-rate packets. We implement this method on Atheros 9340 chipset with its Software Development Kit(SDK). We evaluate the performance with the Chariot testing tool to show the gains on our experimental prototype system.

14:30 *An Efficient Technique For Computing Shortest Path Tree In Dynamic Graphs*

Neeraj Maurya (University Of Mumbai, India); R Sedamkar (Thakur College Of Engineering, India)

This paper proposes an efficient technique for computing shortest path in dynamic graph. Which finds shortest path in a given graph which is static or intended to change its weight frequently. If that graph is static i.e. not changing its weight then SPT is being calculated once and that remains same. If graph is dynamic i.e. changing its weight then this technique finds new SPT with traversing minimum number of nodes or vertices. This technique extends a few state-of-the-art dynamic SPT algorithms to handle multiple edge weight updates, and find the

SPT. A function based on the location of current node/ state is used to vary the cost of the goal node and the search is done with minimum the state space and exploring only affected nodes, by using these approaches problem is solved in minimum time. Based on experimental results on sample data set we propose to device an algorithm which efficiently handles different traffic conditions. The performance of this algorithm is measured on the basis of Graph size, number of changed edge (NCE). To evaluate the proposed dynamic algorithm, comparison is done with the well-known static Dijkstra algorithm. Where proposed algorithm's complexity is O(bd) in worst case O(E) in average case and O(1) in best case.

14:50 *Resource Aware Spray and Focus Routing Scheme for Delay Tolerant Network*

Lalitesh Choudhary (UIT, RGPV BHOPAL, India)

One of the major problems of delay tolerant network is the absence of complete path in between the source and destination. The major challenge in opportunistic environment is that the conventional routing scheme can not be directly adopted. To deal with such adversity, routing protocol employs various techniques that come from flooding, forwarding or replication based routing scheme. In this paper, we propose a Resource aware spray and focus routing (Rasnf) scheme, which consist of resource aware spraying phase and a focus phase of spray and focus routing protocol. The simulation result shows that the proposed Rasnf routing performs better than other replication based routing scheme in terms of delivery probability, overhead ratio and the average delay.

15:10 *Minimizing WSN Energy and Cost by Embedding RFID Tags*

Wei Ding (New York Institute of Technology, USA)

A novel integration paradigm for RFID and WSN is proposed in this paper. With the paradigm, either sensors are embedded into a passive RFID tag or a passive tag itself is used as presence sensors or proximity sensor. The tag is hardwired to a sensor node of the wireless sensor network (WSN). The paradigm could significantly expand the coverage of a WSN with a given cost. The design details are described while the coverage gain is analyzed quantitatively. The correctness and efficiency of the paradigm have been demonstrated with a typical application.

S5: ICT and Electronics for Healthcare

Room: Rose-2 Hall at 5/F

13:30 *Parameters Optimization of Lateral Impact Ionization MOS (LIMOS)*

Ankit Dixit (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India); Sangeeta Singh (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India); Pravin Kondekar (PDPM IIITDM Jabalpur, Madhya Pradesh, India); Pankaj Kumar (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India); Bharti Modi (ABV-IIITM Gwalior, India)

Impact Ionization MOSFET (IMOS), has emerged to combat one of the most critical and fundamental prob- lem of sub-threshold slope (SS) which cannot be lower than 60mV/decade at room temperature for conventional MOSFET, as conventional MOSFET works on the principle of diffusion of charge carrier for the current flow in the device. Whereas, the IMOS devices work on the principle of avalanche breakdown to switch from the 'OFF' state to 'ON' state. In this paper, we have optimized the device performance of the Lateral impact ionization MOSFET (LIMOS) by varying the device dimensional parameters, such as gate length L_g , intrinsic length L_{in} , gate di- electric thickness tox and biasing voltages V_g and V_s . Simulation results claims that the ratio of L_g /L_{in} has to be properly tuned for the optimum device performance. If this ratio approaches to one LIMOS performance are optimized, whereas if it is very higher than one it behaves as Tunnel Field Effect Transistor (TFET) and if it is very less than one it effectively

behaves as gated PIN diode. Simulation results show the sub-threshold slope SS to be 1.373mV/dec for our optimized LIMOS. Considerable improvement in other device performance parameters namely Ion , Iof f , Ion /Iof f ratio, threshold voltage Vth , breakdown voltage Vbr , drain induced current enhancement DICE, and gate induced barrier lowering GIBL has been reported.

14:00 *Gate Inside Junctionless Transistor (GI-JLT)- Characteristics & Sensitivity Analysis*

Sangeeta Singh (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India); Pankaj Kumar (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India); Pravin Kondekar (PDPM IIITDM Jabalpur, Madhya Pradesh, India); Ishu Agarwal (PDPM-IIITDM, JABALPUR Madhya Pradesh India, India)

In this paper, we have analyzed the effect of channel engineering, gate dielectric, and doping concentration on the characteristics and sensitivity of Gate Inside Junctionless Transistor (GI-JLT). A numerical TCAD device simulator 3-D ATLAS version 2.10.18.R shows that GI-JLT can deplete the channel carriers more effectively compared with Gate-All-Around Junctionless Transistor (GAA-JLT). The GI-JLT transistor exhibits good transfer characteristics and reduces short channel effect (SCE) than a conventional inversion mode transistor with a high ION/IOFF ratio of 1011 subthreshold swing of 64 mV/dec and DIBL of 35 mV for the channel length of 18 nm with Aluminum Nitride (AlN) as gate dielectric material of thickness 1 nm. The characteristics and sensitivity of GI-JLT are analyzed by varying dielectric material, dielectric thickness, doping concentration and channel length. The simulation results indicate the suitability of the proposed novel structure for replacing the conventional CMOS inversion mode device.

14:30 *ICT2TSK: An Improved Clustering Algorithm for WSN Using a Type-2 Takagi-Sugeno-Kang Fuzzy Logic System*

Feng Zhang (BeiHang University, P.R. China)

The routing protocol in the network layer has played a decisive role in the WSN (Wireless Sensor Network).Balance the network load, improve energy efficiency, and consequently increase the lifespan of the network are the main purpose of these protocols. For these, this paper proposes the ICT2TSK (Improved Clustering Algorithm Using a Type-2 Takagi-Sugeno-Kang Fuzzy Logic System) protocol. Compare with the classical LEACH protocol and the recently developed CHEATS protocol, two aspects of improvements are concerned: on one hand, a type-2 TSK FLS (Takagi-Sugeno-Kang Fuzzy Logic System) is employed to choose the cluster-head by calculating the probability of every node, which can deal with the rule uncertainties better than a type-1 TSK FLS; on the other hand, a fixed competition radius for each cluster-head is introduced to balance the network load and improve energy efficiency. Simulation results demonstrate that our proposed protocol ICT2TSK performs much better than LEACH and CHEATS, and also better than the unequal clustering algorithm named EEUC, according to metrics such as FND (First Node Dies) and HND (Half the Nodes Die) and ECPR (Energy Consumption Per Round).

15:00 *New architecture for an ultra low power and low noise PLL for biomedical applications*

Bahram Ghafari (The University of Melbourne, Australia); Leila Koushaeian (Melbourne Univ, Australia); Farhad Goodarzy (University of Melbourne, Australia)

A new architecture for a non-continuous operation for frequency divider, frequency & phase detector and charge pump to design a low-power, low-phase noise and small size PLL for biomedical applications is introduced in this paper. This PLL operates in the Medical Implant Communication Service (MICS) frequency band and uses an ultra-low power ring VCO on 65nm CMOS technology. This ring oscillator VCO doesn't need external inductor and capacitor

like other LC oscillators and so requires very small die area. This VCO has two voltage control points. First control point has a wide tuning range for the coarse tuning and the second control point has a narrow tuning range for fine tuning within the MICS band frequency. This PLL exhibiting performance exceeding that of previously published designs.

S3-1: Mobile Internet and Social Computing

Room: Rose-3 Hall at 5/F

13:30 *The Formation of Consumer's Role in Virtual Communities*

Zhiying Zheng (Donghua University, P.R. China)

Based on the degree of participation and contribution, the current study classified online community users into four categories, which are active login, active participant, indirect contributor and direct contributor. In order to help enterprises understand how users of different categories behave and how to guide users to the category which is beneficial to the enterprise's marketing efforts, the study adopted the relatively static variable of consumer's role to represent the dynamic consumer behaviors and empirically tested the path of user's role formation in an enterprise's official community with the applications of SEM.

14:00 *Security for Smart Mobile Networks: The NEMESYS Approach*

Erol Gelenbe (Imperial College London, United Kingdom); Gokce Gorbil (Imperial College London, United Kingdom); Dimitrios Tzovaras (Informatics and Telematics Institute, Greece); Steffen Liebergeld (Technische Universität Berlin & Deutsche Telekom Laboratories, Germany); David Garcia (HISPASEC, Spain); Madalina Baltatu (Telecom Italia, Italy); George Lyberopoulos (COSMOTE, Greece)

The growing popularity of smart mobile devices such as smartphones and tablets has made them an attractive target for cyber-criminals, resulting in a rapidly growing and evolving mobile threat as attackers experiment with new business models by targeting mobile users. With the emergence of the first large-scale mobile botnets, the core network has also become vulnerable to distributed denial-of-service attacks such as the signaling attack. Furthermore, complementary access methods such as Wi-Fi and femtocells introduce additional vulnerabilities for the mobile users as well as the core network. In this paper, we present the NEMESYS approach to smart mobile network security. The goal of the NEMESYS project is to develop novel security technologies for seamless service provisioning in the smart mobile ecosystem, and to improve mobile network security through a better understanding of the threat landscape. To this purpose, NEMESYS will collect and analyze information about the nature of cyber-attacks targeting smart mobile devices and the core network so that appropriate counter-measures can be taken. We are developing a data collection infrastructure that incorporates virtualized mobile honeypots and honeyclients in order to gather, detect and provide early warning of mobile attacks and understand the modus operandi of cyber-criminals that target mobile devices. By correlating the extracted information with known attack patterns from wireline networks, we plan to reveal and identify the possible shift in the way that cyber-criminals launch attacks against smart mobile devices.

14:30 *A Calibration method for Position, Gain and Phase Uncertainty of Nonplanar Array with Arbitrary Geometry*

Huiwen Wang (School of Marine Science and Technology, Northwestern Polytechnical University, P.R. China)

In this paper, a calibration method is proposed for a nonplanar array with arbitrary geometry. This method can estimate the errors of array sensor position, gain and phase simultaneously

using known calibration sources. Note that the technique does not use iterative calculation in estimating the array parameters and hence it has no convergent problem. However, it requires that four directions of arrival (DOAs) of signal sources to be known to calibrate the array. Some representative computer simulations are presented to illustrate the improved performance in resolution and accuracy for multiple source localization problems using this technique.

15:00 *Low Cost Implementation of a Remote Controlled Suzuki Car to Assist Physcially Challenged*

Paul Molina (Monterey Institute of Technology and Higher Education, Ecuador); Julian M Echeverry (Monterey Institute of Technology and Higher Education, Mexico); Virgilo Vásquez (Monterey Institute of Technology and Higher Education, Mexico)

This paper describes a project to modify the input interface from the steering wheel and pedals of a vehicle to a computer/phone (or any other internet-connected device) such that the car can be remotely controlled worldwide. In particular, the document presents the design of a low cost system which receives data from a web server and modifies the signal inputs of the actuators to control the steering, accelerating, and braking through an on-board computer. The final result is a low cost implementation of a remotely controlled vehicle for medical applications, exploration missions, and dangerous work environments.

15:30 - 15:45

Tea Break

15:45 - 16:45

S8: Entertainment & Services

Room: Rose-2 Hall at 5/F

15:45 *Development of TV Program-related Information Search Function on TV by Integration of Broadcast and Broadband Network*

Masashi Kamiya (Mitsubishi Electric Corporation, Japan); Isao Otsuka (Mitsubishi Electric Corp, Japan); Satoko Miki (Mitsubishi Electric Corporation, Japan); Shinsuke Azuma (Mitsubishi Electric Corporation, Japan); Yoshiaki Kato (Mitsubishi Electric Corporation, Japan)

A lot of information has been gathered in TVs by integrating technology broadcast and broadband network. It enables TVs to provide various convenient functions. For instance, users can seamlessly search favorite programs between broadcast and broadband network. However, these highly-developed functions are difficult to use, and reduce their user-friendliness. In this paper, we propose a TV program-related information search function that has been developed by integration of broadcast and broadband network. Users can satisfy both convenience and user-friendliness by this function. We will describe the prototype system and show our verification results that prove this system enables users to search TV program-related information from Internet quickly and easily.

16:15 *A Proposed Video Complexity Measurement Method to be used in a Cluster Computing*

Demostenes Zegarra Rodriguez (University of Sao Paulo & Nokia Technology Institute, Brazil); Renata Rosa (University of São Paulo, Brazil); Graca Bresan (University of Sao Paulo, Brazil)

Cluster computing is widely used for image and video processing in entertainment applications. The video complexity can be experimentally determined according to the time spent to render it

in a cluster. This paper analyzes the time spent for rendering 3D videos with different characteristics by a process of ray tracing on a cluster computing with Povray software. For another hand, the video complexity is determined by a novel metric named Video Complexity Index (VCI) that considers both, the spatial and temporal video characteristics. Experimental results demonstrate that VCI metric successfully classifies the videos regarding their complexity, considering the processing time consumed for a cluster. As a consequence, VCI metric can be useful to choose the right number of cluster nodes in accordance to the 3D video complexity.

15:45 - 17:45

S3-2: Mobile Internet and Social Computing

Room: Rose-3 Hall at 5/F

15:45 *The Design and Implementation of EMP: A Message-Oriented Middleware for Mobile Cloud Computing*

Joseph K.H. Wang (Volapu Tech, P.R. China); Yihuan Wei (Harbin Institute of Technology, P.R. China); Xinpei Jia (Harbin Institute of Technology, P.R. China)

Message-oriented middleware could used for communications among mobile devices and servers in data center. As an example of communications, we described a framework of message-oriented middleware on Erlang runtime environment, named EMP, to process the messages among the different devices. The platform includes the service-oriented protocol, unified message interface, and the message process engine. This paper has discussed the message-oriented middleware architecture and its implementation methods, which includes message-oriented architecture, protocol used for communication between cloud to cloud and between mobile device to cloud, unified message interface and message definitions and formats. In this paper, we also shared some of the test results of the middleware.

16:15 *A Evaluation Study of the Reconstruction Analysis of Visualization for Three Ways Construction Using Epipolar Geometry*

Abdul Jabbar Shaikh Azad (ATPOST MHASAWAD TALUKA SHAHADA DIST NANDURBAR & Babasaheb Bhimrao Ambedkar Bihar University Bihar, India)

In this paper, we have to try to show for various 3D reconstructions from three cameras video sequences prior to decoding. Scene changes may be easily detected all the images on the projective geometry. If the all the images which include subject is the reconstruct the synthesizing various picture from new viewpoint to different view like 2D and 3D style. The Picture reconstruction all the time it's not necessary and projective reconstruction gives enough information to synthesize new view point images. Rather than converting the color image to grayscale with the Image Processing Toolbox's RGB2GRAY function, I elected to simply use the first (red) color plane, and to use adaptive histogram equalization. In addition by analyzing the DCT coefficients, regions JPEG and MPEG encoded video sequences. Taking advantage of these projective views System analysis PVSA, we apply different task in the PVSA to acquire bounding space of the object. Regions of interest may be isolated prior to decompression, increasing efficiency of any subsequent images processing steps, such as edge detection. We proposed the method three input cameras images are rectified so that the vertical and horizontal are direction can be completely aligned to the Epipolar planes between the cameras is sufficient.

16:45 *A new offline transaction model in mobile payment system*

Yi Wang (Chong Qing Electric Power Research Institute & Postdoctoral Workstation of Chongqing Electric Power Corporation, P.R. China); Zhen Shan (Chongqing University of Posts and Telecommunications, P.R. China); Xingzhe Hou (Chong Qing Electric Power Research

Institute, P.R. China); Hongliang Sun (Chong Qing Electric Power Research Institute, P.R. China); Ke Zheng (Chong Qing Electric Power Research Institute, P.R. China); Chao Liu (Chongqing University of Post and Communications, P.R. China); Jun Ye (Chong Qing Electric Power Research Institute, P.R. China); Yu Zhang (Chong Qing Electric Power Research Institute, P.R. China)

Mobile payment is a killer wireless network service in the e-commerce. Currently, the typical e-commerce modes based on mobile payment still encounter the problems to meet consumers' daily needs such as: supporting the macro payment, supporting the offline transaction, improving the validity of payment. This paper puts forward an Offline transaction e-commerce system model based on mobile payment which includes the offline POS terminal, mobile device, payment center. The key idea of this model is using the mobile device as a medium to transfer the offline terminals' transaction voucher and payment center's payment confirmation to complete the transaction. In this model, the transaction voucher, a random generated ID on the offline POS terminal, is encrypted by symmetric cryptography to protect it from being stolen and signed by the digital signature technology on the payment center to generate the payment confirmation. And the digital signature verification of payment confirmation, which applies the emerging ID-based cryptography for key agreement and authentication, is the guarantee of the validity in offline transaction. The offline transaction model based on mobile payment saves the costs of wiring and also makes the transaction process more convenient.

17:15 *An Efficient Carrier Estimation Algorithm for Two-Way Relay Systems with Physical-Layer Network Coding*

Ronghai Guo (PLA University of Science and Technology & Institute of Communications Engineering, P.R. China); Jiping Li (PLA University of Science and Technology, P.R. China); Tuanfeng Wu (PLA University of Science & Technology, P.R. China); Fuhua Yang (PLA University of Science and Technology, P.R. China)

A key issue in physical-layer network coding (PLNC) is how to recover the network-coded packet by the relay from the superimposed signals transmitted simultaneously by multiple transmitters. In order to decode correctly, the asynchrony between signals must be perfectly dealt with. That is, symbols transmitted by different transmitters could arrive at the receiver with relative carrier frequency offset (CFO), relative carrier phase offset and different channel fading. In this paper, we propose an algorithm to estimate the relative carrier offset from the PLNC signals, and investigate two decoding schemes, JCNC and M-JCNC, to construct the XORed packet. As shown in the simulation results, the algorithm can efficiently estimate the relative carrier offset and significantly reduce the SNR penalty due to asynchrony.

16:45 - 17:45

S4: Cloud Computing and Consumer Services

Room: Rose-2 Hall at 5/F

16:45 *Architecture on Mobility Management in OpenFlow-based Radio Access Networks*

Guolin Sun (University of Electronic Science and Technology of China, P.R. China)

With the aim to simplify network management and control, Software defined network is proposed as a new paradigm and architecture in networking areas. The concept of Cloud and cognitive cellular network will be important features in the next generation radio access networks. In this paper, we propose a distributed hierarchical architecture for heterogeneous radio access networks based on OpenFlow. SDN architecture enables resource and infrastructure sharing among heterogeneous radio access networks. Mobility management in this new heterogeneous radio access network architecture and a OpenFlow-enabled node architecture for

AP infrastructures are defined. We compared it with the one defined in 3GPP LTE standard to show the required changes. An architecture of cognitive information processing is defined to support new features of mobility management, which is taken as an service of network operation system. In the end, typical network applications of mobility management in this SDN architecture are introduced. New topics with technical challenges are analyzed in this SDN based heterogeneous RANs towards the ongoing research and prototypes.

17:15 *A Small Overhead Storage Room MDS Code with Zigzag-decodable Property for Distributed Storage*

Mingjun Dai (Shenzhen University, USA); Dandan Shen (Shenzhen University, P.R. China); Bin Chen (Shenzhen University, P.R. China); Xiaohui Lin (Shenzhen University, P.R. China); Hui Wang (Shenzhen University, P.R. China); Cong Sun (Heilongjiang Vocational Institute of Ecological Engineering, P.R. China)

A code that has the following property: binary field operation, MDS property, zigzag decodable property, requiring symmetric storage room, and requiring small additional storage overhead is designed. To ensure the above properties, the key technique we utilize is cyclic shift plus permutation misalignment. Though the code is designed specially for (4; 8) MDS code in this stage, it sheds light on further generalization to arbitrary MDS code.

Tuesday, November 20

09:30 - 12:00

S9-1: Image & Video Processing

Room: Rose-1 Hall at 5/F

09:30 *Hierarchical Real-Time Depth Map Generation Algorithm*

Istvan Andorko (DigitalOptics Corporation Europe Ltd., Ireland); Piotr Stec (DigitalOptics Corporation Europe Ltd., Ireland); Alexandru Drîmbărean (Tessera Ireland, Ireland); Petronel Bigioi (DigitalOptics Corporation Europe Ltd. & National University of Ireland, Galway, Ireland)

A depth map generation algorithm suitable for real-time hardware implementation is proposed. Currently, there are algorithms capable of providing high quality depth maps, but due to their complexity, they cannot be used in real-time applications. The aim of the proposed algorithm is to provide depth maps at a suitable quality for dedicated embedded applications, in the same time meeting the key requirement of matching the frame rate of the image acquisition devices.

09:51 *Visual Words Refining Exploiting Spatial Co-occurrence Table*

Wang Yunhe (Peking University, P.R. China); Shi Miaojing (Peking University, P.R. China); Gao Yuan (Peking University, P.R. China); Chao Xu (Peking University, P.R. China)

Bag of visual word (BOVW) model is widely used to represent the images in Content based Image Retrieval (CBIR). Spatial information is lost during the quantization from visual features to visual words in BOVW. A lot of researches have been committed in incorporating the spatial correlations of visual words into BOVW model. In this paper, exploiting the spatial co-occurrence of visual words, we build visual word co-occurrence table over the entire dataset and propose a hierarchical clustering approach to group visual words those usually co-occurrence into clusters as new visual words. Any two clusters are correlated via the calculation of the conditional probability of the multiple visual words in them. Utilizing the correlated clustering results, we succeed in refining the visual words and reducing the similar words' distinction in image ranking. Experimental results have demonstrated the effectiveness of the proposed scheme, without incurring any additional cost on the BOVW model.

10:12 *Real Time Gesture Recognition and Processing to Control Television Set by Hand Beacon*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

The goal of this research is to develop a program for real time gesture recognition and classify the sign and send to TV. A continuous stream of hand signs images is recorded and has to be processed immediately. The camera that records these signs provides pictures in real-time conditions to a PC that has to classify the signs. Such systems should offer the possibility to command computers just using hand signs. To simplify the task the research tried to find a robust solution for recognizing signs correctly as well as make the computation faster and interface with remote controller which sends the signal to the television. The system function is divided into four major parts. Firstly, from the hand gesture some features have been extracted. To calculate height and area of the gesture, centroid and distance of that centroid from the origin are the extracted feature. Secondly, an input array is formed using these features and converted it into formatted feature matrix. For this the decimal input matrix has been converted into binary matrix

by using a ranging method. The test image is collected from the camera of the computer in real time environment. Then, this binary matrix is used as the input of a feed-forward back-propagation neural network and tries to find the decimal output from it and convert it into binary. Finally, that corresponding character of channel is sent through serial port to the television via remote controller.

10:34 *A Low Power and High Speed Adder design for Digital Signal Processing Applications*

Shubham Paliwal (IIT (BHU), Varanasi & IIT (BHU), Varanasi, India)

The present day technology has reached below 30 nm. All kinds of effects have become common in MOS devices at this level due to different leakage mechanisms at deep sub micron level. These lead to errors in the system. If we incorporate error tolerance (ET), an emerging concept in the field of VLSI, design and test by easing the restriction on accuracy, all kinds of improvements in speed and power can be achieved depending on the amount of accuracy required. In this paper we propose a novel scheme for adders which has highly reduced area and performance can be 33% better than the existing ET Adder (ETA) which was proposed earlier and more than 80% then the conventional adders. One of the applications of these ETA flavors in digital signal processing which can tolerate certain errors is given in the paper.

10:55 *"A High Capacity Reversible Data Embedding Scheme For MPEG-4 video by using HVS Characteristics"*

Madhu Oruganti (JNTU Hyderabad, India)

Authentication or hiding the data in the image or video for better identification of our property for avoiding the data or video theft. In present era multimedia plays a major role as well as we should require the embedded data should be reversible or lossless,with high capacity embedded for better authentication of our original video. In present technology maximum data hiding in the video is possible but the extraction of original data for embedded video is a very complicated task. In C.C.Chang like technologies are used to extract data presented in DCT based system by u sing data average method. But it is not possible for maintaining robustness in the technology. In various technologies lot of disturbances are observed because they do not consider the HVS characteristics. Finally we would like to avoid the disturbance in MPEG-4 video by using HVS characteristics and better PSNR values. A high capacity reversible data embedding scheme for video can be used for better visual qualities in the terminology of HVS characteristics.

11:17 *Performance Assessment of High Efficiency Video Coding - HEVC*

Demostenes Zegarra Rodriguez (University of Sao Paulo & Nokia Technology Institute, Brazil); Graca Bresan (University of Sao Paulo, Brazil)

The main goal of this paper is to evaluate the performance of the proposed new video coding standard, the High Efficiency Video Coding (HEVC), also known as H.265. This evaluation considers mainly a comparison with the baseline profile of H.264/AVC encoder in terms of: compression efficiency, the video quality achieved by decoding the video signal at the receiver, and the computational complexity of encoding and decoding algorithms. As material test are used different spatial resolutions of video and also videos with different temporal and spatial information parameters. For video quality assessment are used two objective metrics, PSNR and SSIM. Furthermore, a transcoding H.264/HEVC scenario is evaluated considering the cascade method, which is very important for the first service applications that will use HEVC. The results indicate that compressed video file sizes using HEVC is 40-52% in relation with H.264 depending of the video content type without any significant video quality degradation at the receiver.

11:38 *A Probabilistic Approach to Pattern-Matching Based on a Dynamic Rule-Driven System*

Christian John (University of Wuppertal, Germany); Reinhard Moeller (University of Wuppertal, Germany)

This paper presents a concept for pattern-matching based on a dynamic rule-driven system for optimization of constraints. The concept uses a non-linear parameter optimization method with an iterative variation of parameters. Boundary conditions and constraints are expressed as rules, managed by a specific rule engine. The method is applicable to a wide range of pattern-matching problems due to its dynamically parametrized rules. Pattern-matching is integrated in several applications in various scopes, such as gaming, audio, character recognition or augmented reality.

S11-1: RF & Wireless

Room: Rose-2 Hall at 5/F

09:30 *High bandwidth optical wireless network for Gigabit communication*

Boris Glushko (RIT Technology LTD, Israel)

A new wireless access system incorporating high bandwidth line-of-sight free space optical wireless is described and demonstrated. This system is capable of supporting several gigabits/second up-stream and down-stream data transmission and is ideally suited for high bandwidth indoor applications such as personal area networks. A simple, user friendly system of beam alignment is used between a central station and multiple local subscribers. Even within real-world office scenarios with limited mobility, alignment is performed easily. Using a modest transmitted power of only 5dBm, we demonstrate satisfactory performance of bit error rates better than 10-9 over the entire room while serving up to 8 subscribers connected to a single central station. Using simulations, the effectiveness of the proposed system architecture is investigated and the key performance trade-offs identified. Proof-of-concept experiments have also been carried that validate the simulation model. Initial experimental results successfully demonstrate that the system is capable of supporting 1-10 Gbps over a 2-6 meter bi-directional optical wireless link in an indoor environment for the first time.

09:51 *Two-Stage High Gain Low Power OpAmp with Current Buffer Compensation*

Sachin Kumar Rajput (Amity University, Noida, India); B K Hemant (MSIT, GGSIP University, India)

This paper presents the classic two stage CMOS opamp design by employing the current buffer compensation strategy. The designed low power opamp produces an open loop gain above 78 dB, an improved gain-bandwidth product (GBW)5.82 MHz with an adequate pahse margin of 63.9º in 0.35 μm CMOS technology. The circuit is operated at the single supply voltage of 3.3V with power dissipation of 144.3 μW and an enhanced offset voltage of only 61.5 μV compare to 318 μV offset in [7].

10:12 *A Short Delay Spread-Aware PHY Layer Design for the Femtocell in LTE Networks*

Kuo-Chang Ting (Minghsin University of Science and Technology, Hsinchu, Taiwan); Chiapin Wang (National Taiwan Normal University, Taiwan); Fang-Chang Kuo (National Ilan University, Taiwan); Hwang-Cheng Wang (National Ilan University, Taiwan); Chih-Cheng Tseng (National Ilan University, Taiwan)

As the cloud computing prevails in the future, the demand for the connection of high data rate will increase tremendously for data transfer in these cloud applications. A mass of smart phones and other mobile devices will connect with the clouding center at any time at any place. The

Long Term Evolution (LTE) technologies [1-8] offer ultra-wide bandwidth and high spectrum efficiency techniques for providing for high throughput data rate. The Femtocell is used to connect to the Internet due to its many advantages over connecting to Macro-cell such as high SNR and low power consumption in an indoor environment. However, it seems unreasonable for the design of the PHY layer in Femtocell networks to follow the standard of LTE [5] since the channel model used in indoor environments is entirely different from that used in urban or rural areas. The Cyclic Prefix (CP) used in indoor environment should be much shorter than that applied in urban or rural areas due to much shorter for the delay spread in indoor environments than that in urban or rural areas; hence the guard interval used in each symbol can be reduced tremendously and the OFDM symbol rate can be increased for the new design in Femtocell networks. The increased throughput can let Femtocell technology have the more appealing characteristics than the 802.11ac used in the future wireless LAN.

10:34 *An Ultra Low Power Low Noise Amplifier for 3.1~10.6 GHz UWB Receivers*

Jingru Sun (College of Information Science and Engineering, Hunan University, P.R. China); Chunhua Wang (Hunan University, P.R. China); Kui Fu (College of Information Science and Engineering, Hunan University, P.R. China)

An ultra-low-power low noise amplifier (LNA) for ultra-wideband (UWB) receivers is proposed in this paper. The first stage of the amplifier employs a resistive shunt feedback topology and a parallel LC load to provide wideband input impedance matching. The current-reuse configuration is used to ensure the first and second amplifier transistors share the same bias current. By applying forward body bias technique, the proposed circuit can operate at a reduced supply voltage. The UWB LNA was fabricated using a chartered 0.18μm CMOS process. Operating in 3.1~10.6GHz, the maximum power gain is 11.4~12.2dB, the input and output reflection coefficient are lower than -10dB, and the noise figure (NF) is lower than 4dB, while the power consumption is only 1.9mW from a 0.8V supply voltage.

10:55 *One-Step-Ahead Spectrum Sensing in Cognitive Radio Systems with Wireless Energy Harvesting*

Dan Li (Beijing University of Posts and Telecommunications, P.R. China); Sixing Yin (Beijing University of Posts and Telecommunications, P.R. China); Shufang Li (Beijing University of Posts and Telecommunications, P.R. China)

In this paper, we consider a cognitive radio system operating in slotted mode, in which the SU is only powered by the energy harvested from radio signals around via energy harvesting. Considering the resources allocation among energy harvesting, spectrum sensing and data transmitting, we propose the one-step-ahead spectrum sensing strategy, which is based on the current system resources and estimation of subsequent state, in order to maximize the average throughput of secondary user. The experiment results show that the proposed one-step-ahead spectrum sensing strategy outperforms the random one as well as the influence of different factors to the one-step-ahead spectrum sensing strategy.

11:17 *Loop Interference Suppression in Full-Duplex MIMO Relays Based on Space Projection*

Hao Liu (University of Electronic Science and Technology of China, P.R. China); Jisong Yang (University of Electronic Science and Technology of China, P.R. China); Chen Sun (University of Electronic Science and Technology of China & National Key Laboratory of Science and Technology on Communications, P.R. China)

Full-duplex MIMO relays can provide cost-effective coverage and higher spectral efficiency, but simultaneous reception and transmission in the same frequency band could make relays prone to oscillate. Because the loop back channel response matrix is frequently full rank, conventional

spatial loop interference suppression techniques using receive and transmit filters are not feasible. This paper presents an algorithm which uses the null space projection and subspace projection to enhance the loop interference mitigation. Meanwhile, the multipath propagation of loop interference channel is also taken into account. Analysis and simulation proved that the proposed algorithm outperforms conventional algorithms. Especially, even though the loop back channel matrix is full rank, the proposed algorithm can still completely suppress the loop interference.

11:38 *Slotted Substrate Integrated Waveguide Leaky-Wave Antenna With Bow-Tie Apertures*

Neelesh Gupta (IIITDM JABALPUR, India); Dinesh Vishwakarma (IIITDM JABALPUR, India)

In this paper, we have proposed a novel bow-tie slotted substrate integrated waveguide (SIW) leaky wave antenna (LWA) and its spectrum has been investigated. This antenna works in the TE10 mode. Proposed antenna leads to more intense electric field and better coupling of E-field in adjacent slots, which results more uniform spectral behavior in comparison with transverse slot leaky wave antenna . In addition to this proposed antenna gives improved broad side behavior and can scan larger angular range with in lesser frequency change.

S12: Network Technology & Energy Management

Room: Rose-3 Hall at 5/F

09:30 *Water Savior System*

Vanchhit Khare (Amity University Rajasthan, Jaipur, India)

This concept is the solution of handles the water problem in most of developing countries and developed Countries. Our System can provide the limited use of water in the secure electronic environment. In the logic, we are using an electronic circuit which gives the indication or warning (limitation to people) if they use water beyond the limit (that they are doing in current scenario), that means A person will take only a limited amount of water in a whole day. Even after if he/she tries to use water after the completion of all limits of their whole day, then person will blocked for whole day to use the water. If someone tries to crack the circuitry then the circuitry will block water supply for all users who are in the region of the circuitry database. So no-one will be allowed to use the water the same day.

09:51 *Neural Network Based PID Control Analysis*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

Through the popularity of the traditional PID control technology, the implementation of the neural network on PID has gained a special concern in the control technology. Sometimes the traditional PID control technology is less encouraged for its slow convergence and easy to fall into local minimum. So this paper analyzed an improved BP algorithm and tried to design an implementation process to apply on PID control system. The algorithm convergence speed for the training process is quite good. Moreover, the trained BP neural network has self learning capability and has strong adaptive capability as well. So by applying this in the PID controllers can improve the performance very well. In the paper the PID and BP neural network, control process and control algorithm and the simulation results of neural network based PID control has been analyzed.

10:12 *A Combined PTS-SLM Scheme for PAPR Reduction in Multicarrier Systems*

Ahmad Mohammad (Ainshams University, Egypt)

In this paper, we propose a distorionless PAPR reduction scheme for multicarrier system that's combining the partial Transmit Sequence (PTS) and the selective mapping (SLM) techniques. Afterwards, we numerically discuss the PAPR characteristics using the complementary cumulative distribution function (CCDF) of the Peak-to-Average-Power-Raito (PAPR). Also, we discuss and compare the computational complexity and the Bit Error Rate (BER) of the proposed scheme with the various schemes. The simulation results show that the combined PTS-SLM scheme (CPS) has a better PAPR and BER performances than (PTS). Besides, (CPS) generates PAPR performance approximately near to the PAPR performance of (SLM).

10:34 *Performance Comparison between Iterative Waterfilling and Cooperative Broadcasting for Frequency Selective Channels*

Mingjun Dai (Shenzhen University, USA); Dandan Shen (Shenzhen University, P.R. China); Bin Chen (Shenzhen University, P.R. China); Cong Sun (Heilongjiang Vocational Institute of Ecological Engineering, P.R. China)

Transmission schemes for a two-user wireless network are studied. The performance of a non-cooperative scheme called iterative waterfilling is compared with that of a cooperative scheme called cooperative broadcasting. Their characteristics in various conditions are studied and their achievable sum rates are compared. Numerical results show that cooperative broadcasting outperforms iterative waterfilling as long as the inter-source link gain and the cross link gain are both large.

10:55 *Virtual Machine Power Metering and Its Applications*

Zhiying Jiang (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China); Chongya Ma (Institute of Computing Technology, Chinese Academy of Sciences, P.R. China); Ke Zhang (Chinese Academy of Sciences, P.R. China); Guangfei Zhang (Institute of Computing, P.R. China); Zhixiong Jiang (Information Technology Center, China National Petroleum Corporation, P.R. China); Chunyang Lu (Information Technology Center, China National Petroleum Corporation, P.R. China); Yushan Cai (Information Technology Center, China National Petroleum Corporation, P.R. China)

With the rapid growth of power consumption and the cooling cost in data centers, it is more and more important to improve the utilization rate of power by more sophisticate power monitoring and management strategy. VM power consumption measurement and related scheduling strategy contribute to make cloud computing center more efficient on the basis of making full use of existing power and cooling resources. In this paper, we propose methods to meter the power consumption of VM, and design scheduling strategies based on power consumption to migrate VM between hosts in order to achieve power capping. Specifically, we propose an improved VM power metering method, in which the power consumption of cooling fans is isolated. Besides, we solve the problem of the dynamic power metering where the hyper-threading of host processor is enabled. In addition, we propose VM migration and scheduling strategy on the basis of power consumption. Last but not the least, we propose a strategy to monitor data center status, including power consumption and resource utilization of all hosts and VMs. All above are demonstrated and evaluated in a prototype system.

11:17 *A Multi-Functions Digital Public Address System for Campus Broadcasting and Security*

Tsung-Hsing Lin (BXB Electronics Co., Ltd., Taiwan); Liang-Bi Chen (BXB Electronics Co., Ltd. & National Sun Yat-Sen University, Taiwan); Chung-Heng Chuang (BXB Electronics Co., Ltd., Taiwan); Tung-Lin Lee (BXB Electronics Co., Ltd., Taiwan); Chaio-Hsuan Chuang (BXB Electronics Co., Ltd., Taiwan); Yung-Chang Tseng (BXB Electronics Co., Ltd., Taiwan); Chun-Long Chiu (BXB Electronics Co., Ltd., Taiwan); Chih-Lin Hung (BXB Electronics Co., Ltd., Taiwan); Chao-Wen Wu (BXB Electronics Co., Ltd., Taiwan)

This paper introduces a multi-functions digital public address broadcasting system, called WMP-2100, which is a complete all-in-one solution, not only could it broadcast by single zone and groups, it could also be connected to PSTN to make telephone broadcast. In addition, WMP-2100 could expand the system for emergency call, burglar control and two-way intercom. Moreover, the WMP-2100 includes GUI user-friendly control software that is very easy and convenient to use for the non-engineering background users. The WMP-2100 digital PA system has been successfully installed and has very good responses in many campuses in Taiwan.

11:38 *Energy Conservative Wireless Sensor Networks for Black Pepper Monitoring in Tropical Area*

Jing Li (Hainan University, P.R. China); Chong Shen (Hainan University & University of Strathclyde, P.R. China)

One of the major challenges in design of Wireless Sensor Networks (WSNs) is to reduce energy consumption of sensor nodes to prolong lifetime of finite-capacity batteries. In this paper, we design an energy-efficient solution for monitoring the black pepper cultivation in tropical area. Initially, we optimize the base station antenna height in order to facilitate reliable communication. Then Energy-efficient Sensor Protocol for Information via Negotiation (ESPIN) routing protocol is proposed to solve the challenge of energy saving and packet loss. We have conducted radio propagation experiments in actual black pepper fields. The actual test results indicate that the ESPIN protocol reduces redundant data transmission, improves the network lifetime and success rate of data transmission compared with traditional Sensor Protocol for Information via Negotiation (SPIN) protocol.

12:00 - 13:00

Luncheon

13:30 - 16:00

S9-2: Image & Video Processing

Room: Rose-1 Hall at 5/F

13:30 *Kinect-based 3D Video Conference System*

Dongdong Zhang (Tongji University, P.R. China); Ye Yao (Tongji University, P.R. China); Dian Liu (Tongji University, P.R. China); Yanyu Chen (Tongji University, P.R. China); Di Zang (Tongji University, P.R. China)

In this paper, we proposed a 3D video conference system based on Kinect. In the sending module, a parallel scheme is designed for data acquisition, preprocessing and encoding of color video frames, depth video frames and audio data. A simple color-matching method is introduced for depth optimization to recover the lost depth information. H.264 and MP3 encoder are used to perform data compression. All the encoded data is transmitted to the receiver using the RTP network protocol. The receiving module is responsible for the decoding of video and audio, 3D rendering and video display. We use Depth-Image-Based-Rendering (DIBR) technology to construct one virtual view scene. Then 3D video is generated using the virtual view video and the decompressed color video. Experimental results show that our system can achieve 15f/s real time communication with better 3D quality.

13:51 *An Quality Metric for 3D Rendered Image Based on Stereo Saliency and Structural Similarity*

Dongdong Zhang (Tongji University, P.R. China); Jiahe Huang (i University, P.R. China); Di Zang (Tongji University, P.R. China); Dian Liu (Tongji University, P.R. China); Yanyu Chen (Tongji University, P.R. China)

In this paper, we propose an objective quality metric based on stereo saliency and structural similarity for rendered image which is produced by depth image based rendering (DIBR) method. The rendered image and color image is not from same view, which will lead to disparity between the two images and traditional method cannot work. To deal with the problem, we use Scale-invariant feature transform (SIFT) to extract matching points. The Structural Similarity (SSIM) is further used to assess compression and geometric distortions around the matching points. Additionally, we take 3D saliency map as a description of visual attention effect into account, which is used to determine the weight of the SSIM distortion values. Experimental results show that the proposed metric achieves a high correlation with subjective perception.

14:12 *Fpga implementation of image enhancement techniques for bio medical image processing*

Praveen Vanaparthy (VNR VJIET JNTUH & JNTU, India)

Digital image enhancement techniques are to improving the visual quality of images. Main objective of image enhancement is to process an image so that result is more suitable than original image for specific application. This paper presents real time hardware image enhancement techniques using field programmable gate array (FPGA). This paper focus on implementation of image enhancement algorithms like brightness control, contrast stretching, negative transformation, thresholding, filtering techniques on fpga that have become a competitive alternative for high performance digital signal processing applications. These algorithms successfully implemented on retinal images in Verilog HDL using Xilinx ISE, MATLAB and MODELSIM. The aim of this paper is to simulate and implement these algorithms using verilog HDL. The device selected here for implementation is (Spartan-3E) from Xilinx.

14:34 *Guided Iterative Back Projection Scheme for Single Image Super Resolution*

Li HaiLiang (the Hong Kong Polytechnic University, P.R. China); Lam Kenneth Kin-Man (The Hong Kong Polytechnic University, Hong Kong)

Iterative Back Projection (IBP) technique is an effective approach on single image Super Resolution (SR) reconstruction, but the conventional IBP based SR method suffers from the jaggy and ringing effect around edges since the up-sampling process and back projection of the reconstructed image are isotropically. In this paper, we present an improved IBP approach named as Guided Iterative Back Projection (GIBP) which employ an effective edge guided interpolation for up-sampling and use joint bilateral filter or guided filter to constraint the projection on error coefficients also suppress the noise and ringing artifacts (halo effect). For up scaling with arbitrary ratio, the author also proposed an edge persevering bilinear up scaling interpolation for cooperation with GIBP. The experimental results validate that the proposed algorithm can promote the SR reconstruction precision considerably while suppressing the main artifacts, ringing, jaggy and noise cased by traditional IBP.

14:55 *Improved Retargeting Algorithm Based on Optimized Scale-and-Stretch*

Zijuan Zhang (Northwest University, P.R. China); Baosheng Kang (Northwest University, P.R. China)

Effective resizing of images should not only use geometric constraints, but consider the image content as well. According to the fact that it is not necessary that the image content in the middle is more important than on the border, the image resizing technology in view of content is

becoming new hotspot in image retargeting domain. At first, this technology treat the area that attract the eyes as important region, but the area that not attract the people as unimportant district, then to the greatest extent maintain the important area but changing unimportant area in order to fit target image size. This technology is known as content-aware image resizing. Among all the algorithms relating to content-aware image retargeting, the status of SNS method is beyond all doubt, its inauguration and innovation is better than other methods. This text analyses the classical SNS algorithm and presents a improved algorithm basing on scale-and-stretch, in our experiment it is easy to see that our new method enhances the performance and makes better effect.

15:17 *A Lane Recognition System Based on Priority*

Kun Zheng (Beijing University of Technology, P.R. China); Guangmin Sun (Beijing University of Technology, P.R. China); Qing-wu Fan (Beijing University of Technology, P.R. China); Xiaomeng Wang (Beijing University of Technology, P.R. China); Qing Zhang (Beijing University of Technology, P.R. China); Linan Jia (Beijing University of Technology, P.R. China)

Using OpenCV, a lane recognition system is designed. In this study, a lightweight approach is proposed to real-time detection of lanes using ROI (region of interest) based on priority setting. The traditional ROI is further divided into two regions of different priorities. The left line of the lane, detected in the left region, is given a higher priority. And it can deduce the other line of the Lane using camera calibration. It implements the fast lane detection and generation combined with Hough transform. Experimental results show the method has significant high output effectiveness. It reduces the time of image processing, and improves the real-time performance of the system. Even if the road information completely lost, the system could mark lane for temporary help.

15:38 *A novel background subtraction method using graph-based image segmentation*

Yuanqing Luo (Tongji University, P.R. China); Changqing Yin (Tongji University, P.R. China); Daqiang Zhang (Tongji University & Department of Software Engineering, P.R. China)

In wireless network, the resource limitations and process speed are the main constraints. They make many traditional background subtraction methods unable to be applied in wireless network. Vibe algorithm is a newly proposed background subtraction technique and its computational load is very low. That makes it available in the wireless network. However, Vibe is a pixel-level algorithm and it does not take the information of region into consideration. So it can be easily influenced by the background disturbance, noise and illumination change. In this paper a novel background subtraction algorithm which can be used in wireless network is proposed. To deal with these problems, the proposed algorithm employs graph-based image segmentation to segment every frame and construct the region-level information. With the region-level information, the proposed algorithm provides several strategies such as classification of regions, modification in neighboring regions and fast elimination of ghost region to improve the result of Vibe algorithm. Experiment results demonstrate that the proposed method can effectively extract the moving objects in various categories of scenes.

13:30 - 16:10

S11-2: RF & Wireless

Room: Rose-2 Hall at 5/F

13:30 *Weighted Centroid Localization Algorithm Based on RSSI for an Indoor Environment*

Shaoguo Xie (Key Laboratory of Intelligent Computing & Signal Processing, Ministry of Education, AnHui University, P.R. China); Yanjun Hu (Anhui University, P.R. China); Jingjing Liu (Anhui University, P.R. China); Yi Wang (Anhui University, P.R. China)

Localization is one of the most important services in the field of wireless sensor networks (WSNs). Compared to other proposed non-interactive localization algorithms, the weighted centroid localization scheme only uses the received signal strength information, which makes it simple to implement and robust to variations in the propagation environment. In this paper, we propose an improved weighted centroid localization algorithm based on RSSI for an indoor environment. By theoretically analyzing, we can know that the proposed algorithm has the advantage of lower complexity, little prior information and lower power consumption. The simulation results show that the proposed algorithm is better than AMWCL-RSSI, and at least as well as WCL in terms of the localization accuracy. Our real experimental results show that IWCL-RSSI is better than WCL in terms of the localization accuracy.

13:50 *Joint processing for Heterogeneous Networks with Individual Channel State Information*

Jing Jiang (Xi'an University of Posts & Telecommunications, P.R. China); Shuang Xu (Xi'an University of Posts & Telecommunications, P.R. China)

The heterogeneous network is a wide and important application scenario in the future of the wireless communication, but the inter-cell interference is the bottleneck of its performance improvement. The joint processing is an effective transmission scheme to reduce the inter-cell interference, but the user equip-ment need feedback channel information of all nodes to each cooperative collaboration node. To reduce the feedback overhead and simply the feedback procedure, the joint processing based on the individual channel state information (I-CSI) feedback is put forward in this paper, in which the user equipment only needs to feedback the individual channel information to each node, as well as the large-scale fading factors of other cooperating nodes. Then respective precoding weights of each node are computed according to the I-CSI feedback and Hermitian precoding characters. Macro and micro base stations will use its own weights transmitting signal, but the received signal can achieve jointly processing gains from multiple base stations. At last simulation results proved that in low SNR the performance of the proposed scheme is better than the precoding with full CSI feedback, and in high SNR lower 1dB than the full CSI feedback. The proposed joint processing with I-CSI not only can greatly reduce the feedback overhead and can get similar joint processing gains with full CSI feedback, so it's worth to be widely used.

14:10 *Performance Analysis for PAPR Reduction using PTS technique in 2 x 1 and 2 x 2 Differential STBC RS OFDM Systems*

Sunil Kumar (Bannari Amman Institute of Technology, India)

Orthogonal frequency division multiplexing (OFDM) may be united with antenna arrays at the transmitter and receiver side to improve the diversity gain and to improve the system competence on time-variant along with the frequency-selective channels, resulting in a multiple-input multiple-output (MIMO) composition. The space-time block coding (STBC) incorporated for OFDM systems with multiple transmit antennas is actually a type where coding is implemented in the time domain, that is, OFDM symbols. The Differential Space time block codes (DSTBC) are ways of transmitting data in wireless communications and they are forms of space time code that do not need to know the channel impairments at the receiver in order to be able to decode the signal. When Reed Solomon (RS) codes are used at the demodulator side the system becomes a DSTBC RS OFDM system and a performance analysis study is investigated based on Peak to Average Power Ratio (PAPR) using Partial Transmit Sequence (PTS) for different DSTBC RS OFDM Systems under Quadrature Phase Shift Keying (QPSK) modulation scheme and its performance is evaluated in terms of Bit Error Rate (BER) under Rayleigh Multipath channel

14:30 *Compressive Wideband Spectrum Sensing Using High-Order Statistics for Cognitive Radio Network*

Kaitian Cao (Nanjing University of Posts and Telecommunications, P.R. China); Hequn Shao (Beihang University, P.R. China)

Fast and accurate wideband spectrum sensing faces considerable technical challenges in cognitive radio network (CRN). In this paper, a high-order statistics (HOS)-based wideband spectrum sensing (HOS-WSS) scheme with compressive measurements is proposed. Different from traditional spectrum sensing schemes based on compressed sensing (CS) requiring the signal recovery, HOS-WSS scheme resorts to HOS directly fed by compressive measurements for detecting the licensed wideband spectrum, which can significantly reduce the computational complexity and improve the sensing agility. Both theoretical analyses and simulation results show that the proposed algorithm has lower computational complexity and is more robust to the noise uncertainty compared to the HOS-WSS scheme with generalized orthogonal matching pursuit (GOMP) reconstruction algorithm and HOS-based scheme with Nyquist samples.

14:50 *The Simulation of Statistical Characteristics of Dense Chaff Clouds*

Bo Tang (School of Computer and Communication Engineering, University of Science and Technology Beijing, P.R. China); Xin-Qing Sheng (School of Information and Electronics, Beijing Institute of Technology, P.R. China)

The probability density functions (PDF) of the elements in the backscattering matrix of dense chaff clouds with small volume are studied through simulation in this paper. It is found that the phase of the co-polarization elements satisfies bell shaped distribution. And the amplitude of the co-polarization elements satisfies Rice distribution. The cross-polarization elements satisfy the same kind distribution with that of the sparse. Six computing examples of chaff clouds with different sizes, shapes, and densities are given.

15:10 *Overview of LTE-A technology*

Shubhrika Sandilya (Mumbai University, India); Deesha Bhosale (Mumbai University, India); Adwait Pitkar (Mumbai University, India); Sravanthi Kanchi (Mumbai University, India); Mayur Gondhalekar (Vidyalankar Insittute of Technology & Yoshida Insitute of Japanese Language, India)

Along with the rapid development in cellular technology, there has also been a significant increase in its user demands. Ever since LTE technology has been established in 2009, the work on its enhancements and requirements had begun and these have been fulfilled successfully by LTE-Advanced. The 3GPP Release 10 or LTE-A has proven to be one of the fastest developing mobile technologies in the world. Further improvements of LTE-A is still on the go and its future releases have enhanced features of MIMO, Carrier Aggregation, co-ordinated multipoint transmission (CoMP), high data rates and speed in order to provide the best user experience as well as proving to be a complete 4G network. In this paper, an overview on the features of LTE-A and its requirements fulfilled in release 11 and 12 for LTE-A is described.

15:30 *A Weighted Cooperative Spectrum Sensing Scheme Based on Dynamic Double Energy Thresholds In Cognitive Radio Networks*

Tangsen Huang (South China University of Technology, P.R. China)

Energy detection is a promising spectrum sensing method. Setting suitable threshold is very important to the performance of the spectrum sensing. To improve the global spectrum sensing performance, this paper proposes a novel weighted cooperative spectrum sensing scheme based on dynamic double energy thresholds. Firstly, an optimal energy threshold is obtained by

minimizing the sum of probabilities of false alarm and detection. Then, a control parameter is introduced to accurately fine tune the double energy thresholds. Finally, a new fusion method which applies weighted and majority rule in cooperative sensing is presented. Simulation results demonstrate that the probability of detection is improved significantly by our spectrum sensing scheme under different signal to noise ratio.

15:50 *Infinite Series Expression of 2×2 MIMO System Capacity in Correlated Rayleigh Fading Channels*

Bo Tang (School of Computer and Communication Engineering, University of Science and Technology Beijing, P.R. China)

The multiple-input multiple-output (MIMO) system can significantly improve the capacity of the wireless communication system through multiple transmitting antennas and multiple receiving antennas. The capacity of the MIMO system in particular situation is focused for some certain communication purpose. This paper studied the capacity of a 2×2 MIMO system in correlated Rayleigh fading channels based on analytical derivation. The infinite series expression of the capacity is obtained explicitly for a 2×2 MIMO system, in the assumption that the SNR is large enough. The result is helpful to evaluate the capacity of the 2×2 MIMO system and is useful to the system design.

13:30 - 15:30

S7: Human-Device Interaction

Room: Rose-3 Hall at 5/F

13:30 *Design and Analysis of the Control of an Inverted Pendulum System by MATLAB*

Khizir Mahmud (Northwestern Polytechnical University, P.R. China)

Analysis of a typical inverted pendulum control system is very effective to evaluate and understand the different control strategies and aspects of the control engineering. Fundamental ideas of the inverted pendulum control system can be applied in different industrial applications. Moreover, the stability control of the walking robot and the vibration control of launching platform for shutters is also have the same fundamental concept. In this paper a typical inverted pendulum system has been considered and then that system has been converted to mathematical equations based on motion. Later the equation has been linearized to analyze different parts of the control system through Matlab. The dynamic behavior of the inverted pendulum has been discussed along with the stability condition and also the controllability and observability of the system. To improve the performance and stabilize the system a state feedback controller has been designed. Finally a tracking controller with no steady state error has been designed and analyzed.

14:00 *A Novel Protective Proximity Sensor for Machinery Based on the Effects of ELF Fields on Human Body*

Samer Abuzeid (German University in Cairo, Egypt); Ramy Hana (German University in Cairo, Egypt); Moemen Hafez (German University in Cairo, Egypt); Alaa Issa (German University in Cairo, Egypt); Hatem Elfekey, student (German University in Cairo, Egypt); Hany A Bastawrous (German University in Cairo, Egypt)

A novel concept to implement sensitive protective device for machinery based on the effects of ELF (Extremely Low Frequency) fields on the human body is proposed, designed, and tested in this paper. Although the proposed technique is relatively simple with significantly low

implementation cost compared to other available techniques, its experimental results obtained in real-time at both laboratory and workshop environments reveal its potential effectiveness in minimizing hazards associated with machinery.

14:30 *Pragmatic Quality of Experience Optimization for wireless multimedia applications on Intelligent Terminals*

Zhiguo Deng (Beijing University of Posts and Telecommunications, P.R. China); Xin Zhang (Beijing University of Posts and Telecommunications, P.R. China); Dacheng Yang (Beijing University of Posts and Telecommunications, P.R. China)

Wireless multimedia Quality of Experience (QoE) is not only a matter of Quality of Service (QoS). Network-based metrics such as delay, jitter and packet loss are critical indicators for multimedia service; but not well enough without considering the intelligent terminal-related metrics. This paper present a new QoE Evaluation Model which integrates application, network and terminal layers factors and works in a self-adaptive pattern for wireless applications on intelligent terminal. However, this is not the whole world for QoE. We further describe pragmatic strategies along with realistic application examples for Quality of Experience Optimization in mobile internet.

15:00 *Design of Heart and Lung Auscultation Training System Based on BF518*

Kai Liu (Beijing Uninversity of Technology, P.R. China)

In this paper, we design a system that it is used for simulating heart and lung auscultation for medical students. The single chip BF518 with low power assumption and higher performance is used in the system as the core processor. And it can play 16 audio files at the same time. So the system becomes more realistic in the operation of the real clinical environment. In the class, the reproduction of clinical scenarios for learners could provide a risk-free learning environment of the clinical knowledge and skills. Additionally, for added security of the audio of case, they are all encrypted and stored in the SD card.

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