Ninth ICICS, December 10 -13 2013

Conference Report

Introduction

The 9th International Conference on Information, Communications and Signal Processing was held at the Shangri-La Far Eastern Plaza Hotel, Tainan, Taiwan. Such prestigious conference was made possible with sponsors from IEEE Tainan Section, IEEE Communications Society Singapore Chapter, IEEE Signal Processing Society Singapore Chapter, IEEE Signal Processing Society Tainan Chapter, IEEE Computational Intelligence Society Tainan Chapter and IEEE Circuits and Systems Society Tainan Chapter. There were a total of 299 papers that were submitted from 28 countries and regions. Among these were 186 regular papers for which only 108 good quality papers were selected for presentations. Our paper entitled “Measurement of packet train arrival conditions in high latency networks” were one of the accepted good quality papers.

The conference was divided into workshop and presentations. The workshop was held on the 10th whereas the presentations were held from 11th to 13th. Unfortunately most of tutorial/workshop require separate fees to be paid in advance and covers content such as heterogeneous cellular networks, self-organising networks, wireless video cameras in IoT/M2M applications, and opportunistic interference alignment in wireless networks. All of which are not related to my research. As a result, I did not attend any of workshop related activities on the 10th. Luckily, my supervisor Ulrich Speidel, was invited by local IEEE students of Yuan Ze University (YZU- www.yzu.edu.tw) to present on beacon project. I use this spare time to attend this presentation. It was a good experience meeting academic colleagues in this University. One notable advantage that I noticed in Asian Universities is the huge package grants that are provided to Universities by the government. With such grant, research students and academic staffs are able to purchase expensive equipment for research purposes. If the same opportunity is presented to students here in New Zealand, I believe that it will contribute to improving the standard of research and developments for the IT industry.

The presentations were very diverse and were organised into the following categories:

Day 1 Sessions – 11th December 2013

- Audio, Acoustic and Speech Signal Processing
- Large Scale Visual Recognition
- IT and Computing
- Information Security
- Enabling Technologies and Signal Processing for WDMs-PONs
- Signal Transforms, Filtering and Compressed Sensing
- Embedded Systems and Applications
- Adaptive, Multidimensional, Statistical Signal Processing
- Equalization & Estimations
- Optical Communications

Day 2 Sessions – 12th December 2013

- Video Coding and 3D Image Synthesis
- Sampling Theory and Compressed Sensing
- Time-frequency Analysis and System Identification
- Spread Spectrum
- Network Security & Others
• Digital Filter Design, Structures and Optimization Techniques
• Multimedia Processing and Applications
• Signal Processing for Communications
• Mobile Communications
• Optical Fibre Sensors
• Brain Computer Interface/Computational Vision
• Filters, MIMO Systems and Transform Techniques
• Acoustic Communications
• Cooperative Relay Communications
• Optical Access Networks
• Data Mining
• Multimedia System
• Beamforming and Multi-channel Filtering
• Network Coding & Sensor Network
• Communication Networks

**Day 3 Sessions – 13th December 2013**

• Signal Processing for Biomedical Applications
• High Efficiency Video Coding
• Video/Image Analysis
• Green Communications
• Wireless Ad Hoc Networks
• Advanced Biomedical Signal Processing Systems and 3D Multimedia System
• Solutions and Applications for Image/Video Processing
• Big Data Analytics
• Coding & Modulation
• Microwave & Antennas

Our paper was classified under Green Communications and I chose specific presentations to attend based on its relevance to my research on network measurement. The rest of this report describes my experiences during the meeting. I intend to align the experiences I had in this meeting with the objectives of my InternetNZ grant application.

**Conference Experiences**

In day 1, I attended keynote speeches from Prof. Tsuhan Chen of Cornell University, USA and Prof. Steven H.Low of California Institute of Technology, USA. The title of paper presented by Prof Chen is on *Visual Information Processing and Social Media*. His research is on enhancement of existing facial recognition algorithm that is used on surveillance camera. He emphasised the need to include things like the age, height, colour of person and other human attributes that can be used together with existing facial recognition algorithms to better detect objects with camera. The keynote delivered by Prof Steven was based on *Smart Grid: Power and Distributed Control*. Prof Steven’s paper presents an architecture where smart grids are able to efficiently transfer power between sites. His proposed method adopt the structure whereby end nodes in smart grid communicate with each other using some form of identifier which is similar to the way communication networks operate.

At the end of keynotes, there was a short break and at this stage I transitioned into specific sessions to attend specific presentations of my choice. My preferred sessions for day 1 were *IT and Computing, Information*...
Security and Optical Communications. In IT and computing session, I attended presentations from the following papers

1. **Price and Renewable Aware Geographical Load Balancing Technique for Data Centres**
   This presentation review existing load balancing methods and propose a new technique for improving the efficiency of data transmissions between infrastructures located in data centres.

2. **One-Step and Multi-Step Ahead Prediction Using Back-propagation Neural Networks**
   The author review existing work on neural network for predicting stock price. Although not related to my research, I attended this presentation to discover new areas.

In Information Security session, I attended a presentation on **User Authentication Scheme on Multi-server Environments for Cloud Computing**. This paper proposes a more efficient way of enforcing security for user authentication over cloud, while achieving minimal computational costs.

The optical communication session was held in the afternoon. From the 5 papers that were presented, only 2 were somewhat relevant to my research. These were **Self-seeding Reflective Semiconductor Optical Amplifiers for WDM Access Networks** and **Experiments on Using Spatial Light Modulators to Realize Optical CDWMA Network Coder/Decoder**. The self-seeding presentation reviews the area of wavelength division multiplexed passive optical networks. Although there was no mention of any improvement to this area, it focuses on some of drawbacks of existing methods for amplifying optical fibre signal. Moreover, the paper on experiments with partial light modulators proposes a new scheme on optical code-division multiple-access (OCDMA). The scheme was tested in a controlled environment and can improve the extinction ratio and cross talk in optical signal.

In day 2, I attended sessions on **Network Security and Others, Optical Fibre Sensors, and Communications Networks**. At the network security session, 2 of the 5 presented papers were of interest. The paper **Take a Bite – Finding the Worm Apple** develop honeypot known as iHoneyClient which runs on Mac operating system. The functionality of this honeypot is to analyse URLs that is listed as part of drive by download; a malicious activity that involve downloading of malware code into a device as users browse the Internet. This paper then compare the impact of drive by download on Windows and Mac operating system, and conclude that such activity is more common in Windows operating system. The other interesting presentation was **Provably Secure Mutual Authentication and key Agreement Scheme with User anonymity**. Although the content of this paper was not related to my work, the interesting aspect of it is the novel mutual authentication and key agreement scheme with user anonymity support. Such support comes with advantages such as defending against redirection attack and forging of mobile user attack.

In the optical fibre session, one of the 5 presented papers was of interest. This paper is **Optical Fiber Laser Sensor for Refractive Index Measurement**. The paper proposed method in this paper demonstrates a novel reflective index sensor that was developed from properties of multi-mode and single mode fiber. The end results produced from experiments demonstrate an improvement in multiplexing operation, and sensing range of optical rays.

The communications networks session was held in the afternoon and 2 of the presented papers were interesting. The paper on **Dynamic Bandwidth Allocations and Guarantee for Virtualised Networks in the Cloud**, argued that Software Defined Network (SDN) could be used to efficiently allocate bandwidth for isolated tenants in cloud. I did not agree with proposed method presented in this paper as the results were purely theoretical. There were no real world tests being conducted to find out the impact of SDN in network throughput in cloud. The other interesting presentation on this session was **Efficient Transport Architecture for Big Data Movement**. The paper present generalised multi-protocol label switching (GMPLS) controlled network, where big data is dynamically delivered on field trail. The experiments demonstrate the promising
improvements on throughput from this method. Although the experiments show promising result, I did not see the end result of how it is doable in real world networks.

In day 3, we presented our paper in the Green Communications session. However the fact that most of participants in the room were experts in other fields (mostly signal processing at Layer 1), there were few interests in our paper. I believe that if our paper were to be presented in the right crowd, the end result will be different. Other session that I attended was Wireless Ad hoc. At this session, the paper on Hybrid Routing in Lossy Link Mobile Ad Hoc Networks proposes a new method where video information is transmitted as text messages. The proposed methods were developed to improve transmission of video information for clinical patients in rural areas of Singapore. There is promising future in this method as it can be used to further develop conversion of voice to text and for it to be decoded and played out in destination.

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I would like to thank InternetNZ for accepting my application for a grant to present our work here in New Zealand, the Pacific, Asia, U.S and Africa.

Conclusion

Overall the conference was too general and a lot of presented papers tend to focus on specific discipline. The ordering of presentations was not at its best, as some of network related researches were presented in odd sessions. As for the contribution of my trip to the objectives of InternetNZ, it was great opportunity for me to meet other network related researchers to either host our software, or contribute ideas that help in further developments of our utility. This research will at one point in time, provide insight into whether the Internet is getting better with Internet infrastructure developments, or worst.

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