CONTACT
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UBC Student Branch

- An introduction to the motion estimation techniques in video codecs
- Lunch and Learn

IEEE - Control Systems Society

- Combined feedforward and feedback control of flexible structures: from atomic force microscopes to megawatt wind turbines

IEEE Signal Processing Society

- From single media to multimedia - perception, coding, and quality

IEEE COMMUNICATIONS SOCIETY

- ICICS-IEEE Workshop on future communications

IEEE computer society

- IPv6 Networking

EMB IEEE Engineering in Medicine and Biology

- Medical devices rocky road – knowing when to switch gears

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

- Compressing colour maps and graphs via colour separation

Parisa Behnamfar
UBC ECE PhD Student

Thursday 04 March 2010
Noon
MacLeod 418, UBC

Information
Adam Noel
adamjgnoel@gmail.com

Website
http://www.ieeeubc.org/

An introduction to the motion estimation techniques in video codecs

A UBC IEEE Student Branch 'Lunch and Learn' Event

Widespread application of digital video images has increased the demand to store such data in finite memory space and to transmit them over channels with limited bandwidth. This increasing demand represents a critical need to compress video images.

Since in most cases successive video frames contain the same objects, "motion estimation" techniques examine the movement of objects in an image to define the differences between two consecutive frames. Compression algorithms store the first frame and then just the extra information produced by the motion estimation technique. In this way, lots of the temporal redundancy due to the high correlation between consecutive frames can be eliminated, resulting in a very high compression ratio. For reconstruction, the motion estimation data of the (N+1)th frame is added to the Nth frame to produce the (N+1)th frame. A variety of motion estimation techniques are being used in video codecs. These techniques are generally categorized into two groups: Block-based and Mesh-based. "Full search" and "Three step search (TSS)" algorithms are the two most popular block-based methods and "Regular" and "Irregular" algorithms are two Mesh-based ones. This talk is going to introduce some of these algorithms. We will also discuss about each one's advantages and drawbacks. We will also cover the most recent ideas and works in this field.

Speaker

Parisa Behnamfar received her B.Sc. and M.Sc. in Electrical Engineering both from Isfahan University of Technology, Isfahan, Iran. Her M.Sc. thesis was on "Motion Estimation in Video Images Based on Hybrid Methods". She joined UBC in September 2008 as a PhD student and research assistant in the System-on-a-Chip(SoC) lab. She has been with IEEE UBC branch since January 2009 and she is now an executive member of the "Seminars and workshops" team.

LUNCH AND LEARN

Information
Adam Noel
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http://www.ieeeubc.org/

Do you have an interesting topic to present to an engaging audience? Are you looking to share your experiences in a casual atmosphere?

The UBC IEEE Student Branch is looking for speakers for its ongoing Lunch and Learn seminar series. The sky is the limit for topics to discuss - the seminars thus far have included software workshops, introductions to various fields of research, and a presentation on patents and copyright. The presentations are geared towards undergraduate electrical and computer engineering students but all are welcome to attend.

There will be a pause for the Olympic break but in March the series will return every Thursday at noon.
For more information on giving a seminar, please email lunch.and.learn@ieeeubc.org.

Friday 05 March 2010 - 800am to 400pm
Kaiser 2020/2030 - 2332 Main Mall, UBC
Details and free registration (required) at
http://icics.ubc.ca/comm-workshop/
Open to the public

ICICS
CONNECTING KNOWLEDGE
INSTITUTE FOR COMPUTING, INFORMATION AND COGNITIVE SYSTEMS

ICICS-IEEE WORKSHOP ON FUTURE COMMUNICATIONS SYSTEMS

Formerly UBC-IEEE Workshop on Future Communications Systems

Lucy Y. Pao
University of Colorado

Distinguished Lecture

Friday 26 March 2010
14:00-15:00

Electrical & Computer Engineering
2332 Main Mall
Kaiser 2020, UBC

Information
Control Systems chair
Ryozo Nagamune
www.mech.ubc.ca/~nagamune/

Combined feedforward and feedback control of flexible structures: from atomic force microscopes to megawatt wind turbines

In the past, manipulators, machine tools, measurement and many other systems were designed with rigid structures and operated at relatively low speeds. With an increasing demand for fuel efficiency, smaller actuators, and speed, lighter weight materials are now often used in the construction of systems, making them more flexible. Flexible structures are also prevalent in space systems where lightweight materials are necessitated for fuel efficiency when carrying the structures into space. Achieving high-performance control of flexible structures is a difficult task, but one that is now critical to the success of many important applications, ranging from the shuttle remote manipulator system, satellites, megawatt wind turbines, robotic manipulators, gantry cranes, disk drives, tape systems, to atomic force microscopes. The unwanted vibration that results from maneuvering a flexible structure often dictates limiting factors in the performance of the system.

We will discuss a general combined feedforward and feedback control architecture and how it can be applied for controlling flexible structures. Depending upon the particular performance goals, such as tracking accuracy in a trajectory following task or rapid settle time for a point-to-point motion, there are different requirements for the controller. In many applications, the actuators and sensors are separated by the flexible structure, leading to nonminimum phase characteristics that are challenging for control. Over the last few decades, many feedback and feedforward control methods have been developed for flexible structures. We will overview and compare several of these control methods, and we will outline our recent and on-going investigations and applications in a few areas ranging from atomic force microscopes to megawatt wind turbines. Finally, we shall close by discussing a number of future challenges.

Speaker: Lucy Y. Pao received the B.S., M.S., and Ph.D. degrees in Electrical Engineering from Stanford University, and she is currently the Richard and Joy Dorf Professor of Electrical, Computer, and Energy Engineering at the University of Colorado at Boulder. She was a Visiting Scholar at Harvard University during 2001-2002 and a Visiting Miller Professor at the University of California at Berkeley in Fall 2008, and she has recently completed a term as a Visiting Scholar at the National Renewable Energy Laboratory during January to August 2009. She has interests in the areas of control systems (with applications to flexible structures, atomic force microscopes, disk drives, tape systems, power converters, and wind turbines), multisensor data fusion (with applications to unmanned autonomous vehicles, satellites, and automotive active safety systems), and haptic and multimodal visual/haptic/audio interfaces (with applications to scientific visualization and spatial communication).

Professor Pao has received a number of awards and has been active in many professional society committees and positions. Selected current activities include being an IEEE Control Systems Society (CSS) Distinguished Lecturer (2008-2011), Chair of the 2008-2011 International Federation of Automatic Control (IFAC) Triennial World Congress Young Author Prize (YAP) Selection Committee, and General Chair for the 2013 American Control Conference. She is also the Scientific Director for the Center for Research and Education in Wind (CREW), a multi-institutional wind energy center involving the University of Colorado at Boulder, the National Renewable Energy Laboratory, Colorado School of Mines, and Colorado State University, in partnership with the National Center for Atmospheric Research and the National Oceanic and Atmospheric Administration.

From single media to multimedia - perception, coding, and quality

Sheila S. Hemami
Cornell University

Distinguished Lecture

Friday 26 March 2010
1530 - 1630
Room KAIS 2020
Fred Kaiser Building
2332 Main Mall, UBC

Information
Signal Processing Chair
Z. Jane Wang
zjanew@ece.ubc.ca
Website
http://www.ece.ubc.ca/~zjanew/IEEESPvc.html

Humans are the ultimate consumers of multimedia information, and effective system design requires a performance metric. While such metrics have been extensively studied for single-media perception for one or more decades, those for multimedia perception and use are still in their relative infancy.

In this talk, I will focus on the development of single-media quality metrics for audio and visual information, and contrast it with the development of appropriate metrics for multimedia information. I will describe how humans perceive single-media information, how an understanding of perception has been incorporated into single-media coding and then quality measurement, and I will discuss the current state of understanding of multimedia perception as it has been applied to coding and quality measurement problems

Speaker

Sheila S. Hemami (F) received the B.S.E.E. degree from the University of Michigan in 1990, and the M.S.E.E. and Ph.D. degrees from Stanford University in 1992 and 1994, respectively. Her Ph.D. thesis was entitled "Reconstruction of Compressed Images and Video for Lossy Packet Networks" and she was one of the first researchers to work on what we now call "error concealment." She was with Hewlett-Packard Laboratories in Palo Alto, California in 1994 and worked on video-on-demand. She joined the School of Electrical Engineering at Cornell University in 1995, where she holds the title of Professor and directs the Visual Communications Laboratory.

Dr. Hemami's research interests broadly concern communication of visual information, both from a signal processing perspective (signal representation, source coding, and related issues) and from a psychophysical perspective.

Dr. Hemami is an IEEE Fellow and has held various visiting positions, most recently at the University of Nantes, France and at Ecole Polytechnique Federale de Lausanne, Switzerland. She has received numerous college and national teaching awards, including Eta Kappa Nu's C. Holmes MacDonald Award. She is currently Editor-in-Chief, IEEE Transactions on Multimedia (2008-10); Member-at-Large of the IEEE Signal Processing Society Board of Governors (2009-11), and an SPS Distinguished Lecturer (2010-11). She has Chaired the IEEE Image and Multidimensional Signal Processing Technical Committee (2006-07); and served as Associate Editor, IEEE Transactions on Signal Processing (2000-06).

Medical devices rocky road – knowing when to switch gears

Paul Geyer
LightIntegra Technology
Tuesday 30 March 2010
400 – 500pm
CHBE Room 101
2360 East Mall, UBC
Information
EMBS Chair Ezra Kwok
ezra@chml.ubc.ca
Website
www.bme.ubc.ca

LightIntegra has developed the ThromboLux technology which is used as a point of care device to determine platelet quality for blood transfusions.

Mr. Geyer is also Chairman of Neovasc Inc. (formerly Medical Ventures Corp.), a new specialty vascular device company that develops medical devices for the rapidly growing vascular and surgical marketplace.

He has served on the Board of Directors of British Columbia Science World since 2003 and currently holds the position of Chairman.

Mr. Paul Geyer graduated with a B.A.Sc. in Electrical Engineering from the University of British Columbia in 1988. A Professional Engineer, he has taken numerous postgraduate courses in Bio-medical Engineering and medical technology and has completed the Canadian Securities Course.

He has been actively involved in the Cardiac Surgery and Interventional Cardiology markets for the past 18 years. Besides being an active angel investor in technology and life science companies, Mr. Geyer has established a private foundation, the PNG Enterprise foundation, which is actively involved in projects supporting a number of different Charitable organizations including World Vision, Red Cross and others.

Section News

The following changes to our Section organization have been approved by IEEE Member and Geographic Activities:

• A new IEEE Okanagan Subsection (Prof. Julian Cheng, chair, and Peter Haubrich, vice-chair) has been formed. The official formation date is 13 February 2010. A unit geo-code will be issued shortly.

• A new IEEE Northern British Columbia Subsection (Prof. Liang Chen, chair, and Prof. Jernej Polajnar, vice-chair) has been formed. The official formation date is 13 February 2010. A unit geo-code will be issued shortly.

• A new IEEE UBC Okanagan Student Branch (Prof. Jonathan Holzman, counsellor, and Jackie Nichols, chair) has been formed. The official formation date is 22 January 2010. The Branch Code is 05251.

IPv6 Networking

Andrew Daviel
TRIUMF
Monday 15 March
Time 730 - 9pm
BCIT, Building SW1
Room 1025

Sponsors

Co-sponsored by
Vancouver Linux
Users Group
http://www.vanlug.bc.ca

Information

Computer chair
Sathish Gopalakrishnan
gsathish@computer.org

The Internet Protocol, version 4 (IPv4), with its familiar dotted-quad addresses, is 30 years old. It works fairly well, but there's a problem - there are not enough addresses, and within a couple of years they will run out. A new version of the protocol (IPv6) was introduced in 1995, which has a vastly larger address space, but it is incompatible and implementation has been slow.

The Internet Protocol, version 6 (IPv6), is designed as a replacement for the familiar version 4. I will talk about the basic addressing concepts,and show some common tools (ping, traceroute, Wireshark) running on an IPv6 network. While IPv6 is largely transparent to the end user, there are significant implications for network administrators, security managers, and application programmers.

Speaker

Andrew Daviel is the Network Security Manager at TRIUMF, where he also has responsibilities for videoconferencing, email, PKI and DNS. He graduated in Physics+Electronics at the University of Manchester when they still used punch cards, and worked on computer-assisted sonar in the UK before moving to Canada in 1981.

He built his first home computer in 1978 and has been a Linux user since 1994.

Congratulations to Meliha Selak on winning the IEEE Canada 2010 E.F. Glass Western Canada Merit Award

Meliha B. Selak is a Specialist Engineer with BC Hydro where she is working in the Power System Protection & Control Planning group. She holds a degree in Electrical Engineering from the University of Sarajevo and has over 30 years of experience in various aspects of power systems engineering including utility protection, research & development, project management and consulting on international projects.

Prior to joining BC Hydro in 2000, she worked as a research engineer in the Power System Group at the University of British Columbia, in connection with the development of an EMTP based real-time power system simulator. Her technical activities include power system protection and control applications, power system analysis, evaluations and interconnection studies for the various plants connecting to the power system, as well as development of BC Hydro's power system protection guidelines.

She is a registered professional engineer in the Province of British Columbia and she is a senior member of IEEE. Meliha is a member of the IEEE Power & Energy Society (PES) Governing Board and she is currently serving as the Vice President for Chapters. Also, she is a member of the IEEE Power System Relay Committee (PSRC). She has written numerous technical reports and papers on the power system subjects and she is also a paper reviewer. Meliha is a distinguished lecturer of IEEE PES.

Meliha's involvement with the IEEE started about 10 years ago with the IEEE Vancouver Section. Among other roles within the Section, she served as a PES Vancouver Chapter Chair for three years during which time Vancouver PES Chapter achieved the high performance chapter status in two consecutive years, and received IEEE PES Outstanding Large Chapter Award for 2006. At the some time, Vancouver chapter won membership contest in two consecutive years. She also continue activities in the local Section as a PES Chapter Past Chair and Student Activities Chair. She received numerous awards for her service to British Columbia's Power and Energy community through her leadership role in IEEE Vancouver Section and IEEE PES Chapter Chair (Outstanding Service to the Vancouver Section 2005/2006, IEEE Vancouver Section Outstanding Chapter Award 2006/2007 & 2007/2008 and Vancouver Section Outstanding Award 2009).

Currently, Meliha is a member of the IEEE Power & Energy Society (PES) Governing Board and she is serving as the Vice President for Chapters. As a VP Chapters, she is responsible for the operation of the PES Chapters organization for the chapters throughout Regions 1 – 10 and has both line responsibility for chapters and staff responsibility for the support functions within the Chapters organization. The Chapter organization includes Region Representatives for USA, Canada, Latin America, Europe, Middle East & Africa, Asia & Pacific, PES Distinguished Lecturers Program (DLP), Awards and Resources, Electronic Communications who report to the Vice President Chapters

Meliha will receive her award at the IEEE Canada Awards Gala in Calgary in May.

Meliha B. Selak, P. Eng BC Hydro, Protection& Control Planning Applications IEEE PES Governing Board, VP IEEE Vancouver Section, Student Branch Activities

Message from the Chair

Getting Involved with IEEE Vancouver Section

As our 100th anniversary approaches, IEEE Vancouver Section can look back on an outstanding record of providing: (1) engineers with opportunities for continuing professional development and building their professional network, (2) companies - and especially start-ups - with opportunities for community exposure.

Our Section continues to develop and implement innovative ways to extend our reach and contribute more effectively to our community. During the past year, we have established two new subsections in the Okanagan and Northern British Columbia, formed a Women in Engineering affinity group, expanded our technical chapter organization to include representation for the IEEE Electromagnetic Compatibility Society, Microwave Theory and Techniques Society and Photonics Society and formed a LinkedIn group for active members of the Section.

We're are also continuing to develop new ways for both companies and members to contribute to the Section. Here are two opportunities.

Host an IEEE Mini-Symposia

In January, April and September 2009, we held three half-day mini-symposia that focused on satellite communications, the smart grid and UWB wireless technology, respectively. Hosted by MDA, BC Hydro and the IEEE ICUWB 2009 conference, these no-charge events attracted over 100 attendees each. Our members appreciated the opportunity to hear several high quality speakers address topics of current interest while our industry sponsors appreciated the opportunity for visibility and employee participation that afternoon presentations on company premises offer.

Given the extremely positive response, we will continue this highly successful program in 2010.

If your company is interested in hosting a half-day mini-symposium on a topic relevant to your company, please do not hesitate to contact us. Our section executive and chapter chairs will arrange a quality event that will benefit everyone.

Serve as a Guest Chair

Can you help us recruit a guest speaker for an IEEE Vancouver Section technical meeting? If so, we invite you to serve as the Guest Chair at that meeting. While the Chapter Chair handles meeting arrangements, you'll introduce the speaker, moderate the question and answer session, and thank the speaker at the conclusion. Being a guest chair is a great way to increase your company's visibility and gain some valuable volunteer experience for yourself.

For more information about any of these opportunities, please don't hesitate to contact me!

Dave Michelson, dmichelson@ieee.org.

IEEE Okanagan and Northern British Columbia Subsections

Improving our support for members, academic institutions and industry in the Interior of our province has become a key Section priority in recent years. As noted in the December 2009 issue of Contact, this has led us to support the formation of IEEE Okanagan and Northern British Columbia Subsections. The formation petitions were approved by the Section EXCOM and submitted to IEEE MGA in December 2009. The IEEE MGA board formally approved establishment of the new subsections on 13 February 2010.

Background

Both the Okanagan Valley and Northern British Columbia are emerging as major technology centres within the Province of British Columbia, as underscored by:

• the recent establishment of the Okanagan Campus of the University of British Columbia (UBC-O), the Okanagan Research & Innovation Centre (ORIC), the Okanagan Science & Technology Council (OSTEC), and the emergence of the Silicon Vineyard technology cluster, and,

• the recent establishment of the University of Northern British Columbia (UNBC), the presence of a large portion of BC Hydro's electrical generating capacity and virtually all of British Columbia's thriving oil and gas industry within the region, and the formation of the Northern Development Initiative Trust to drive economic growth within the region.

The population of both regions is rapidly approaching 300,000. However, both regions are located some distance from Vancouver and it is difficult for IEEE members in the Okanagan or Northern British Columbia to participate in the majority of activities that are organized by Vancouver Section.

Subsection Leadership and Goals

The new IEEE Okanagan subsection (chair: Prof. Julian Cheng of UBC-O; vice-chair: Peter Haubrich, President and Founder of ORIC) and IEEE Northern British Columbia subsection (chair: Prof. Liang Chen; vice-chair: Prof. Jernej Polajnar, both of UNBC) will bring together the more than 150 IEEE members in the Interior to:

(1) host IEEE technical presentations,
(2) organize IEEE social events,
(3) recruit new IEEE members,
(4) provide local support to the recently formed or proposed IEEE Student Branches at UBC-O and UNBC and
(5) support initiatives that aim to foster economic development in the region.

IEEE Vancouver Section supplied extensive support during the subsection formation process and has provided each Subsection with a $500 startup grant to pay for incidental expenses during the first year of operation. The Section will also provide the Subsection officers with training and support during the critical startup period and, where possible, will involve the subsections when we host Distinguished Lecturers.

Contact:

Julian Cheng: julian.cheng@ubc.ca
Peter Haubrich: peter@oric.ca
Liang Chen: lchen@ieee.org
Jernej Polajnar: jernej.polajnar@gmail.com

Looking back..

This article appeared in the April 1977 issue of the IEEE AP-S Newsletter
VANCOUVER CHAPTER

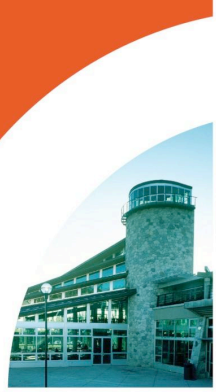
(This is the first in a series of articles about our “overseas” chapters.)

The Vancouver Section of the IEEE, which is simultaneously a joint AP, VT, AES, COMP, and COM chapter, was formed in 1911 when Vancouver was a small Pacific seaport and service center for a growing mining industry. Electric lighting, although delayed by the Great Vancouver Fire of 1886, was introduced in 1887, with energy supplied by steam driven Edison-type generators.

Electric street cars had displaced the 50 horses of the Vancouver Street Railway Company in 1890. Growing electrical demand was met by a succession of small engine-driven generating plants, but in 1897 the British Columbia Electric Railway Company was chartered to provide centralized electric light, power, and transportation for the entire region.
Electrical communications were also introduced near the end of the nineteenth century. The first actual telephone installation had been at a remote indian village where a forward-looking Anglican missionary had connected a telephone line from the village store to the local sawmill, as part of his plan to bring his flock gently into the 20th century.
For many years, the familiar phenomenon of a multitude of small local telephone installations, with a switchboard in a store or someone’s back kitchen, was the general rule in British Columbia, and the last decade of the 19th century and first two decades of the 20th century witnessed a steady merging into larger and larger groups, by physical interconnection and acquisition of assets, of these wide-spread local systems. But it was not until 1923, that the British Columbia Telephone Company was chartered as a fully coordinated province-wide telephone system under a single authority.

As these electrical power and communications facilities expanded in the Vancouver area, there was a growing number of technical personnel to operate, maintain, plan, and engineer the expansion of the power, light, and electrical transportation system, the telephone network, and the equally expanding telegraph systems, including those of the railways, as well as technical representatives of firms specializing in the provision of the necessary electrical hardware. The need for a forum for the discussion of mutual technical problems, the exchange of views, and,equally important, contact with engineers engaged in related work in other parts of the country and the world, was soon felt. Consequently, authority was sought from the A.I.E.E. in New York to form a Vancouver Section of the Institute. On October 11, 1911, the Section was formally organized, and two days later the first meeting was held and officers were elected.

In 1963, as an administrative convenience, the Vancouver Section also became chartered as a Joint AP, VT, AES, COMP, and COM Chapter. With this diverse membership, the Chapter offers an active and widely varied monthly program in the form of technical talks, social functions, and at least one field trip each year.



UNBC

IEEE

COMPUTER SCIENCE DEPT. & IEEE NBC

Faculty, Staff, Students, and Public are invited to attend the following presentation:

"Compressing Color Maps, and Graphs via Color Separation"

Dr. Saif Zahir

Computer Science Department
University of Northern BC

Friday, March 12, 2010
10:00 – 11:00 AM
7-152 Lecture Theatre

Dr.Saif alZahir received his PhD degree in Electrical Engineering from the University of Pittsburgh. He is presently an associate professor with the computer science program at the University of Northern British Columbia, Canada. Dr. alZahir is involved in research in the areas of image compression, image retrieval and indexing, wireless communications, graphics, mobile computing, m-learning and corporate governance. He has authored or co-authored more than 50 journal papers, conference papers, and book chapters.

Dr. alZahir is the editor-in-chief of the International Journal of Corporate Governance; the editor-in-chief of the International Journal on Signal Processing; and editor in Recent Patents Signal Processing - Journal. He has served on many Technical Program Committees and chaired numerous technical sessions in International Conferences.

Color maps and graphs are widely used in a variety of applications such as geographic information systems, intelligent transportation systems, mobile computing, and the Internet. The relatively large size of color maps and graphs has negatively impacted their usage in many of such application especially in small storage mobile wireless devices and limited bandwidth data transmission systems. To meet storage and transmission requirements, the use of efficient compression methods becomes imperative. In this research, a fast lossless compression scheme for digital map images and graph images in the raster image format is introduced. This scheme consists of two main contributions. The first is the creation of a codebook that is based on symbol entropy and the second is our row-column reduction coder. The scheme parcels each color in a layer against a background and compresses each layer separately. The experimental results show that the proposed scheme achieved on average a compression of 0.035 bpp for map images and 0.03 bpp for charts and graphs. These results are better than reported results in the literature. Moreover, the proposed scheme is fast and can be used as real time coder.