OU CENTENARY INTERNATIONAL CONFERENCE of ECE (OU100ECE)

29-30, December 2017

PRE-CONFERENCE TUTORIALS

28th December 2017

DEPARTMENT OF ECE, OSMANIA UNIVERSITY, HYDERABAD

Venue : ECE Department, OU

REGISTRATION FEE

Full Time PhD/ PG/UG Students : Rs. 450/-
Faculty : Rs. 900/-
Sceintists and Engineers
from R & D and Industries : Rs. 1800/-

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CONFERENCE OVERVIEW

Osmania University is celebrating 100 years of its glorious existence and contribution to the field of higher education, during 2017-18. Department of Electronics and Communication Engineering in Collaboration with ECE Alumini Association is organizing a two day Conference. The Objective of this Conference titled: "Electronics & Communication Technologies: Learning from Past and Marching Towards Future", is to showcase the contribution of our ECE Graduates in various fields- Viz Academics, R&D, Entrepreneurship, Professional Management including IT sector and Govt., Public Sector Organizations. Pre-Conference Tutorials by the OUECE alumni are organized to get the benefit from the excelled alumni.

ABOUT DEPARTMENT OF ECE, OSMANIA UNIVERSITY

The Department of Electronics & Communication Engineering (ECE) was established in the year 1959 with only two faculty members. It bears the indelible stamp of its founder Head of the Department, late Prof.K.Krishnan Nair. He exhorted ECE Department to become a byname for Excellence, Creativity and Enterprise. In the span of around six decades, the Department has grown to 500 students at UG, PG and Ph.D with the staff specialized in various fields of Digital Systems, Control Systems, Signal Processing, Microwaves, Microprocessor Applications, Computer Systems, Communication Engineering, Embedded Systems and VLSI Design. The broad spectrum of subjects in the area of ECE is fully represented. At present the research areas in the department are VLSI & Embedded System, Signal Processing, GNSS, Microwave Engineering and Wireless Communications. The Faculty of the Department were instrumental in establishing and developing the Departments of Biomedical and CSE, and Research and Training Unit for Navigational Electronics.

ABOUT OUECE ALUMNI ASSOCIATION

The cardinal aim of the OUECEA Association is to help the Department of ECE and its students in academics and professional activities. To extend maximum help to the Department in the placement of students in the best organizations. Knowing the genuine needs of the Department, academic as well as non-academic & providing assistance to fulfill the same. Propose & execute special projects Viz. Building infrastructure facilities, projects, seminars, conferences, etc., Adoption of poor/economically backward students by floating scholarships, medals, etc.. Alumni association also conducts talks, seminars and workshops regularly so that students and faculty have a chance to upgrade their knowledge.

ABOUT TUTORIALS

Each Tutorial consists of one or two sessions. Each session will have one and half hour duration. There will be two tracks with four sssions per track. Registred participants of the tutorials can attend two or three tutorials based on the convenience without overlapping. Fill the registration form in the last page and send it by email to ……….

	TITLE	SPEAKERS	9.30AM-11.00AM	11.30AM-1.00PM	2.00PM-3.30PM	4.00PM-5.30PM
I	Sparse Signal Processing	Prof.KVS Hari, IISc Dr.V.Lalitha, IIITH	YES	YES	-	-
II	Protection of Highly Crowded Places from Remotely Controlled Explosive Devices	Prof.G.Kumaraswamy Rao Former Director, DLRL	YES	YES	-	-
III	Sub-Nyquist Sampling: Recent Advances and Applications	Dr. Chandra Sekhar Seelamantula IISc	-	-	YES	-
IV	Software Defined Radio for Automobile Applications	Ms.Padmavathi Ramanathan Jasmine Infotech	-	-	-	YES
V	Making Decisions From Unstructured Data	Dr. Sitaram Ramachandrula DXC.Technology	-	-	YES	-
VI	Role of AI and Deep Learning in Radiology Decision Support	Dr. Tanveer Syeda-Mahmood Fellow, IBM	-	-	-	YES

Sparse Signal Processing

Prof.K.V.S.Hari, IISc and Dr.V.Lalitha, IIITH

ABSTRACT:

The tutorial comprises two parts.

The first part of the tutorial will present an overview of solving underdetermined system of linear equations. The definition of sparsity will be introduced and the optimization problem will be formulated. L1-norm based optimization for solving the sparse recovery problem will be presented. Conditions on the measurement matrix like the Restricted Isometry Property (RIP) and RIC will be discussed. The popular greedy pursuit algorithms, for solving the sparse recovery problem, like Orthogonal Matching Pursuit(OMP) Subspace Pursuit (SP), CoSamp will be introduced and their performance analysis will be presented. A recent Fusion framework to improve the performance will be presented. A brief introduction of the Bayesian framework will be presented.

The second part of the tutorial will consider algorithms for computing discrete fourier transform efficiently when a signal is known to be sparse in the frequency domain. The problem of interest is to compute the DFT of the sparse signal with sample complexity and computational complexity less than those of conventional FFT. One of the algorithms, recently developed, for computing sparse FFT will be reviewed. Subsequently, two applications of sparse FFT will be discussed. The first application deals with synchronization in GPS, where sparse FFT can be used to reduce the time and power for locking to the location of the GPS receiver. In the second application, the problem of GHz wide spectrum sensing and a solution for the same based on sparse FFT will be presented.

BIODATA

K.V.S. Hari received the B.E. (1983), M.Tech(1985) and PhD(1990) degrees from Osmania University, IIT Delhi, University of California at San Diego, respectively. Since 1992, he has been a Faculty Member at the Department of ECE, Indian Institute of Science (IISc), Bangalore, where he is currently a Professor. He was an Affiliated Professor in the Department of Signal Processing, KTH-Royal Institute of Technology, Stockholm, Sweden(2010-2016). He has been a visiting faculty member at Stanford University, KTH and Aalto Univ. He also worked at DL Research Lab (1985-87), and at Research and Training Unit for Navigational Electronics, Hyderabad, India (1991). His research interests are in developing signal processing algorithms for MIMO wireless communication systems, sparse signal recovery problems, indoor positioning and DOA estimation, autonomous navigation and visual neuroscience. During his work at Stanford University, he worked on MIMO wireless channel modeling and is the co-author of the IEEE 802.16 (WiMAX) standard on wireless channelmodels for fixed-broadband wireless communication systems. He was an Editor of EURASIP's Journal on Signal Processing published by Elsevier (2006-16) and the Senior Associate Editor of Sadhana - Academy Proceedings in EngineeringSciences, published by Springer. He is also a co-founder of the company, ESQUBE CommunicationSolutions, Bangalore. He is a Fellow of IEEE and Fellow of Indian NAE.

Lalitha Vadlamani received her B.E. degree in Electronics and Communication Engineering from the Osmania University, Hyderabad, in 2003 and her M.E. and Ph.D degrees from the Indian Institute of Science (IISc), Bangalore, in 2005 and 2015 respectively. She is a recipient of Prof. I.S.N. Murthy medal from IISc, 2005 and the TCS Research Scholarship for the year 2011. From May 2015, she is working as Assistant professor in IIIT Hyderabad, where she is affiliated to Signal Processing and Communications Research Centre. Her research interests include coding for distributed storage and computing, index coding, polar codes and signal processing on graphs

Protection of Crowded Sport Arenas, Public Meetings and VVIP Convoys from Remotely Controlled Improvised Explosive Devices (RCIEDs)

Prof.G.Kumaraswamy Rao

ABSTRACT:

Improvised Explosive Devices (IEDs) or Remotely Controlled Improvised Explosive Devices (RCIEDs) is a homemade bomb assembled by terrorists or an anti national group or non state actors. IED/RCIED is the most dreaded weapon in the hands of terrorists and feared by the democratically elected governments across the world and by the military armed forces. It is easy to make an IED. Only Improvised material commonly available in local market is necessary. But to prevent IED from exploding, highly sophisticated technologies are required for detecting, locating and muting an IED/RCIED.

Tens of thousands of innocent civilian lives were lost across the world due to IED explosions and more than 15 times of this number were maimed. IEDs have destroyed number of military vehicles and damaged valuable infrastructure during the Middle East and Afghan wars. Statistics showed that in Iraq and Afghan war, 63% of coalition forces deaths occurred due to RCIEDs. An IED/RCIED consists of (i) An initiator (ii) Switch (activated locally or remotely) (iii) Main charge (main explosive material) (iv) Power source and (v) Container.

The tutorials deals with (i) Composition of an IED/RCIED (ii) Detection (iii) Muting (jamming). RCIED exploded in crowded places like sports arenas , public meetings etc. cause maximum casualties. Countering them requires special innovative technologies like using Remotely piloted vehicles etc. Countering IED attack is the most challenging task, which the organized military and established governments are facing today. In spite of pumping billions of dollars into research, the effective solution still remains elusive.

BIODATA

Prof.G.Kumaraswamy Rao served DRDO for more than 36 years in various capacities starting from Scientist and retired as Director & Outstanding Scientist of Defence Electronics Research Lab (DLRL) Hyderabad. Under the guidance of Dr. A.P.J. Abdul Kalam, the father of missiles, Prof. Rao designed and developed the Ground Guidance Radar System for India's first short range Surface to Air Missile Weapon System Trishul. He was the Electronics Group Head for Development of Battery Control Centre, Ground Control Centre for Akash Missile Weapon System. Prof. Rao, guided and directed the Integrated EW Programs SAMYUKTA, SANGRAHA & DIVYADRISHTI whose combined project cost was more than Rs. 2500 crores.

In recognition of the contributions as Director DLRL, he received the Best Performance Lab Award in May 2005 at Vigyan Bhawan, New Delhi. 2005 from the hands of Dr. Manmohan Singh, the then Hon'ble Prime Minister of India.

Prof. Rao passed M.E, from Osmania University in 1968 with First Rank. He studied Radar Systems course in Holland. He was one of the Board of Governors of Electronics Corporation of India. Presently he is the Senior Director at Bharat Institute of Engineering and Technology Manganpally. He published and presented more than 50 technical papers in various journals, International and national conferences. He is a member of IDST, Fellow IETE etc.
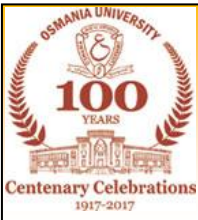
Sub-Nyquist Sampling: Recent Advances and Applications
Dr. Chandra Sekhar Seelamantula

ABSTRACT:

The Shannon-Nyquist sampling theorem is a widely used method for discrete representation of analog bandlimited signals. In this framework, the signal is represented by its samples taken at the Nyquist rate, which is greater than equal to twice the maximum frequency present in the signal. In 1977, Papoulis proposed a generalized multichannel sampling method for bandlimited signals where the signal is represented by samples of filtered signals taken at a sub-Nyquist rate. Hence, the overall sampling rate is equal to Nyquist rate. In many practical applications, signals are not bandlimited. To accommodate such signals within the Shannon-Nyquist framework, one passes the signal through an anti-aliasing filter, which retains most of the signal energy in a certain band.

With the advancement of the communication technologies such as cognitive radio, software defined radio, ultra wideband communication for infostations, wideband RADAR, etc. the requirement of higher sampling rate is continuously increasing. It is difficult to realize analog-to-digital converters with higher bits per sample at large sampling rates. Hence, one has to look for alternate ways to discretize such wideband analog signals.

In the past two decades, various sampling methods have been developed for sampling non-bandlimited signals by using prior information about the analog signals. In applications such as RADAR, SONAR, ultrasound imaging, optical coherence tomography (OCT), multiband signal communication, wideband spectrum sensing, etc., the signals to be sampled have a certain structure, which could be of in a form such as: (i) sparsity or parsimony in certain basis function; (ii) signals belonging to a shift-invariant space; (iii) multiband structure of the signal spectrum; (iv) a finite rate of innovation, etc. By using the structure to advantage, one can sample and reconstruct such signals at much lower rates than the Nyquist rate.

The goal of this tutorial is to introduce the audience to some recent sub-Nyquist sampling methods and give a review of major technical advancements and challenges. Starting from the Shannon sampling technique, we shall discuss different sampling and reconstruction methods for multiband signals. We will give a brief overview of sampling signals in shift-invariant spaces and analog compressive sensing. We conclude with a detailed discussion on the topic of finite-rate-of-innovation signals sampling, which has been widely used for low-rate sampling in many practical applications.

BIODATA

Chandra Sekhar Seelamantula obtained a Bachelor of Engineering degree in 1999 with a Gold Medal and Best Thesis Award from the University College of Engineering, Osmania University, Hyderabad, with a specialization in Electronics and Communication Engineering. He obtained a direct Ph.D. degree in 2005 from the Indian Institute of Science (IISc.), Department of Electrical Communication Engineering. During April 2005-- March 2006, he worked as a Technology Consultant for M/s. ESQUBE Communication Solutions Private Limited, Bangalore, and developed proprietary audio coding solutions. In April 2006, he joined the Biomedical Imaging Group, Ecole Polytechnique Federale de Lausanne, Switzerland, as postdoctoral fellow and specialized in the fields of Image Processing, Optical-Coherence Tomography, Holography, Splines, Sparse Signal Processing, and Sampling Theories. In 2009, he joined the Department of Electrical Engineering, IISc., Bangalore, where he is currently Associate Professor and directs the Spectrum Lab. He is also Associate Faculty at the Centre for Neuroscience, IISc. In 2013, he received the Prof. Priti Shankar Teaching Award from IISc. He is currently also the Vice-Chair of the IEEE Signal Processing Society Bangalore Chapter, and an Associate Editor of IEEE Signal Processing Letters and SPIE Journal of Electronic Imaging.

Software Defined Radio
Ms.Padmavathi Ramanathan

ABSTRACT:

Digital Radio today comprises of various global standards like DAB/DAB+/DMB (Digital Audio Broadcasting), DRM (Digital Radio Mondiale), HD Radio and DVB (Digital Video Broadcasting). The switch from analog AM/FM to Digital Radio was triggered mainly because FM band had reached its limits. In addition to providing an increased number of programs, Digital Radio also provides benefits such as, easy channel selection, improved audio quality and additional features like radio text, slide show, program information, traffic and travel information etc. Many European countries are in the process of switching completely to Digital Radio and phasing out analog radio transmissions in the next couple of years.

Software Defined Radio (SDR) is a system where components that have been traditionally implemented in hardware (e.g. filters, modulators/demodulators) are instead implemented by means of software. With the proliferation of powerful SoCs, tuner-agnostic receiver solutions have become more attractive due to cost-effectiveness and flexibility. This tutorial talks about the transition of radio from Analog to Digital and implementation aspects of radio receivers.

BIODATA

Padmavathi Ramanathan is a Sr. Program Manager at Jasmin Infotech Pvt. Ltd, with 18+ years of experience in Embedded Software development for Automotive domain, especially in the areas of Speech, Audio, Digital Radio and Telematics. Her responsibilities include Key account management and developing Functional domains (SDR, Audio, Telematics).

She received her bachelors degree in Electronics and Communication Engineering, Osmania University, Hyderabad and Master's degree in Electrical Engineering from Villanova University, USA. Prior to Jasmin Infotech she has worked with KLA-Tencor, CouthIT and Analog Devices in various positions of increasing responsibility. Her interests include coaching teams and exploring new technologies.

Making Decisions From Unstructured Data

Dr. Sitaram Ramachandrula

ABSTRACT:

Most of the natural and human-generated data appears to be unstructured in nature. Some of the examples of unstructured data include: a) speech/audio b) images/video c) text d) handwriting, etc. Humans find it easy to process and consume these kinds of data. Each type of unstructured-data has inherent patterns/regularities which have to be exploited for a machine to consume these kinds of data. This tutorial focuses on how to deal with unstructured data. This covers aspects of representation and modeling of unstructured data.

BIODATA

Dr. Sitaram Ramachandrula is a Master Data Scientist in DXC.Technology, Bangalore, and leads "Unstructured Data Analytics" CoE there. He has completed his B.E. in Electronics and Communication Engineering, Osmania University, College of Engineering, in 1989 and M.Tech in 1991 from Cochin University in Digital Electronics. He later obtained his Ph.D in 1997, from Indian Institute of Science, Bangalore in the area of Speech Recognition and has worked as a Senior Research Scientist in Hewlett Packard Labs India (2003 - 2013) and as a Senior Technical Leader in Philips Semiconductors (1998 - 2003). His areas of research interests are Speech recognition, Offline handwriting recognition, Document image processing, Computer vision, Bio-metrics, Data Analytics, Text Processing and Deep Learning. He is having 5 USA patents and nearly 40 research publications.
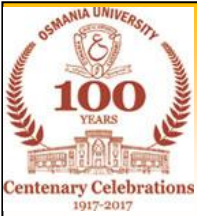
Role of AI and Deep Learning in Radiology Decision Support

Dr. Tanveer Syeda-Mahmood

ABSTRACT:

The field of diagnostic decision support in radiology is undergoing rapid transformation with the availability of large amounts of patient data and the development of new artificial intelligence methods of machine learning such as deep learning. They hold the promise of providing imaging specialists with tools for improving the accuracy and efficiency of diagnosis and treatment. In this tutorial, I will describe the growth of this field for radiology and outline general trends highlighting progress in the field of diagnostic decision support from the early days of rule-based expert systems to cognitive assistants of the modern era that use deep learning and reasoning to enable decision support.

BIODATA

Dr. Tanveer Syeda-Mahmood is an IBM Fellow and the Chief Scientist/overall lead for the world-wide Medical Sieve Radiology Grand Challenge project in IBM Research. As a worldwide expert in clinical decision support, she is leading the company's future in cognitive health and defining new IBM products through her groups research in biomedical imaging, computer vision, pattern recognition and machine learning.

Dr. Tanveer Syeda-Mahmood received her bachelors degree in Electronics and Communication Engineering, Osmania University, Hyderabad and Master's degree from Indian Institute of Technology, Chennai. She graduated with a Ph.D from the MIT Artificial Intelligence Lab in 1993. Prior to coming to IBM, Dr. Syeda-Mahmood led the image indexing program at Xerox Research and was one of the early originators of the field of content-based image and video retrieval. Over the past 30 years, her research interests have been in a variety of areas relating to artificial intelligence ranging from computer vision, image and video databases, to recent applications in medical image analysis, healthcare informatics and clinical decision support. She has over 200 refereed publications and nearly 100 filed patents. Dr. Syeda-Mahmood was the Industrial Chair at Medical Imaging and Computer Assisted Interaction (MICCAI) conference in 2016. She was the General Chair of the First IEEE International Conference on Healthcare Informatics, Imaging,and Systems Biology, San Jose, CA 2011 and the program co-chair of IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) in 2008.

Dr. Syeda-Mahmood is a Fellow of IEEE. She is also a member of IBM Academy of Technology. Dr. Syeda-Mahmood was declared Master Inventor in 2011. She is the recipient of key awards including IBM Corporate Award 2015, Best of IBM Award 2015, 2016 and several outstanding innovation awards. In 2016, she received the highest technical honor at IBM and was awarded the title of IBM Fellow
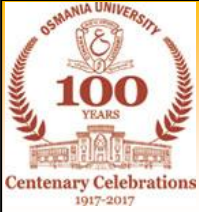
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PRE-CONFERENCE TUTORIALS

28th December 2017

DEPARTMENT OF ECE, OSMANIA UNIVERSITY, HYDERABAD

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	TITLE	9.30AM-11.00AM	11.30AM-1.00PM	2.00PM-3.30PM	4.00PM-5.30PM	Choose the Tutorials to Attend Without Overlapping
I	Sparse Signal Processing	YES	YES	-	-	
II	Protection of Highly Crowded Places from Remotely Controlled Explosive Devices	YES	YES	-	-	
III	Sub-Nyquist Sampling: Recent Advances and Applications	-	-	YES		
IV	Software Defined Radio for Automobile Applications	-	-		YES	
V	Making Decisions From Unstructured Data	-	-	YES		
VI	Role of AI and Deep Learning in Radiology Decision Support	-	-		YES	

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