Advancement in Speech Modeling and Applications

Monday, 05th – Friday, 09th, September 2022
(Online)

Department of Electronics and Communication Engineering, NIT Warangal

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Overview

Speech is the most natural form of human-human communications. Speech is related to language, human physiological capability, sound and acoustics. Therefore, speech is one of the most intriguing signals that humans work with every day. The speech production takes place under the controlled cognitive guidance. The production apparatus consists of vocal tract system having flexibility due to articulators and at the same time has some inertia. Based on short term processing, several methods have been proposed in the literature including short term Fourier transform, cepstral analysis, linear prediction analysis and sinusoidal analysis. The short-term Fourier transform is the modified version of Fourier transform using window functions for analyzing non-stationary signals like speech. The cepstral analysis is based on source system separation by performing nonlinear operation in the frequency domain. The linear prediction analysis involves source-system separation based on prediction process. The sinusoidal modeling is based on estimating amplitude, frequency and phase values of set of sine waves. All these methods are on the assumption of short term stationarity. The advanced sinusoidal modeling is the modified version of conventional sinusoidal modeling based on the motivation to minimize the effect of assumption of short term stationarity. The conventional sinusoidal modeling will have a set of sine waves whose frequency and/or amplitude are constant. In general, the adaptive sinusoidal is based on the principle of projecting a signal segment onto a set of non-parametric, time-varying, non-stationary set of sinusoidal basis functions inside an analysis window. The sinusoidal modeling has found widespread applications in the domains of speech and audio processing. The primary application of sinusoidal modeling is in speech and audio analysis. Stressed speech analysis and recognition, speech classification, voice transformation and synthesis are other applications. The course will explain in detail about these applications and future trends of these applications with the use of recent advancements in Artificial Intelligence and Machine Learning.

In this regard, it is decided to invite Prof. Yannis Stylianou from the University of Crete, Greece, Department of Computer Science, Greece and Senior Research Scientist at Apple, Cambridge UK, to have discussions and deliver lectures on advancement in speech modeling and applications. Course participants will learn these topics through lectures and hands-on experiments. Also, case studies and assignments will be shared to stimulate research motivation of participants.

Modules	**Advancement in Speech Modeling and Applications : September 05 – 09, 2022** **Number of participants for the course will be limited to fifty.**
You Should Attend If...	▪ Faculty of engineering colleges and science colleges. ▪ Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories. ▪ **Student and research scholars with research interest in Speech Signal Processing from reputed academic institutions and technical institutions.**
Fees	The participation fees for taking the course is as follows: **Faculty and Scientists : Rs 2000/-** **Participants from industry/ Training organizations/ consultancy firms: Rs 4000/-** **Students and research scholars** • **Without award of grade : Rs 500/-** • **With award of grade : Rs 1000/-** **Student participants from abroad : USD 50** **Other participants from abroad : USD 100** The above fee includes all instructional materials, access to video recorded lectures.

Selection and Mode of Payment:

Selected candidates will be intimated through **e-mail.** They have to remit the necessary course fee to the Bank as per the details given below.

Account Name	GIAN NITW
Account Number	62447453600
Bank	State Bank of India
Branch	NIT Branch, NIT Warangal
Branch code	20149
IFSC Code	SBIN0020149
SWIFT Code	SBININBBH14

Candidates who registered early will be given preference in short listing process.

How to Register?

Step-1: One-time Web (Portal) Registration:

- Visit **GIAN** Website at the link: **http://www.gian.iitkgp.ac.in/GREGN/index**
- Create login User ID and Password.
- Fill up the blank registration form and do web registration by paying Rs 500/- online through Net Banking / Debit / Credit card.
- This provides him/her with life time registration to enrol in any number of the GIAN courses offered in future.

Step-2: Course Registration (Through GIAN Portal):

- Log in to the GIAN portal with the user ID and Password created.
- Click on **"Course Registration"** option given at the top of the registration form.
- Select the Course titled **"Advancement in Speech Modeling and Applications"** from the list and click on '**Save'** option.
- Confirm your registration by Clicking on **'Confirm Course'.**

Step-3:

- The registered participants on GIAN portal will be informed by the Program Coordinator through E-mail regarding their shortlisting / selection for the program.
- The shortlisted candidates are then required to pay the applicable Registration fee, as mentioned above.

For any queries regarding the course, please contact

Prof. T. Kishore Kumar, Coordinator
Professor, Department of ECE, NIT Warangal
Phone : Mob - 8332969353, Office - 0870-2462400.
E-mail : kishoret@nitw.ac.in , kishorefr@gmail.com

The Faculty

Prof. Yannis Stylianou is Professor of Speech Processing at University of Crete, in Greece and Senior Research Scientist at Apple, Cambridge UK. From 1996 until 2001 he was with AT&T Labs Research (Murray Hill and Florham Park, NJ, USA) and until 2002 he was with Bell-Labs Lucent Technologies, in Murray Hill, NJ, USA. He is with University of Crete since 2002. From 2013 until 2018 (July) he was Group Leader of the Speech Technology Group at Toshiba Cambridge Research Lab in Cambridge UK. He holds MSc and PhD from ENST-Paris on Signal Processing and he has studied Electrical Engineering at NTUA Athens Greece (1991). He is an IEEE Fellow.

He has (co-)authored more than 200 scientific publications in journals, conferences and chapters in books related to signal processing, and holds about 30 UK and US patents, which have received more than 6000 citations (excluding self-citations) with H-index=38. He was the General Chair of the IEEE Workshop on Spoken Language Technology (SLT2018), in Athens Greece (Dec 2018) while he was the co-organizer of the 1st IEEE SPS Winter School on Speech and Audio Processing for Immersive Environments and Future Interfaces (2012) and the 1st ISCA Summer School on Speech Processing (2014), while every year since 2014 he is organizing an international Summer School on Speech Processing in Crete, Greece. He was member of the organizing committee for Interspeech 2018 (India, Hyderabad) as a co-chair of the Tutorial program. He has given tutorials at various Interspeech conferences and has organized special sessions at ICASSP and Interspeech.

He is member of the IEEE Speech and Language Technical Committee (2007-2010, 2017-2019). He was on the Board of the International Speech Communication Association (ISCA) (2009-2013), of the IEEE Multimedia Communications Technical Committee, and on the Editorial Board of the Digital Signal Processing Journal of Elsevier and Associate Editor for the IEEE Signal Processing Letters. As a member of ISCA Board he designed and implemented the ISCA Seasonal Schools.

Prof. T. Kishore Kumar, Professor, Department of ECE, NIT Warangal obtained Ph.D. degree in the area of signal processing in the year 2004. With his unflinching commitment and ardent passion towards teaching, Dr. T. Kishore Kumar Headed the Department of Electronics & Communication Engineering, NIT Warangal during March 2015 to November 2017. He was the head of the Institute Computer Center, NIT Warangal from 2018 to 2020. He was the Visiting Professor for Asian Institute of Technology, Bangkok during August - December, 2019 under Secondment of Indian Faculty by MHRD, Govt. of India. Prior to this, he was selected for Cabinet Secretariat, Prime Minister Office, and Government of India as Technical officer (Tele). He is a member for Central Council Board (CCB), AIEEE during 2009-10 and Member of E & ICT Academy, NIT Warangal during 2015-17. Presently, he is a member of Andhra Pradesh State Council of Higher Education (APSCHE). He was awarded BEST ENGINEERING RESEARCHER AWARD – 2017 by NIT Warangal and NITW Alumni Association in recognition of his outstanding research, consultancy and training in the field of Electronics & Communication Engineering and RESEARCH EXCELLENCE AWARD - 2017 by Institute for Exploring Advances in Engineering (IEAE). He has been recently deputed as member of review committee by Ministry of Defence, Govt. of India for reviewing the project "Design and Development of Digital Signal Processor for Extended Range MMW Seeker" of RCI, DRDO.

Dr. T. Kishore Kumar has contributed substantially to the qualitative research endeavors in the department. His current areas of research include "signal processing and speech processing". He has completed two DRDO projects worth 18 Lakhs and one MHRD, NMEICT pedagogy project worth 7 lakhs. He has completed two major research projects sponsored by SERB worth 41.92 Lakhs. To add another feather in his cap, he has the credit of receiving two research projects worth of 50 lakhs sponsored by SERB (CRG) and DRDO in year 2021-22. Under his amiable guidance eleven scholars have been awarded PhDs. He has also guided over 50 M. Tech. and 50 B. Tech. students. He has published 29 international journals and 9 international conferences during the last five years. He has travelled across many countries like, Czech Republic, France, Israel, Singapore, Dubai, Estonia etc... He has organized several Faculty Development programs in the domains of "Signal Processing", "Speech Processing" and "Real Time Embedded Systems" at NIT Warangal and outside. He has coordinated MHRD initiated GIAN course on 'Biomedical Signal Analysis' in 2016. He is the member of IEEE, ISTE, IETE and Senior Member of IACSIT.

One week GIAN Course

On

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Course Coordinator:

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