The 9th Beijing-Hong Kong International Doctoral Forum
28th – 30th October, 2016

Dr. Taifeng WANG

Lead Researcher
Machine Learning Group
Microsoft Research Asia

Key Note Speech I
Tackling Big-Model and Big-Data Challenges of Deep Learning

Abstract:
AI is making fast progress in recent year. Deep learning has been serving as the driving force. To make the model more accurate and powerful, researchers invent big model with large number of parameters and train the model with big data set. It raises severe challenges to the deep learning system to complete training with reasonable time cost, efficiently serve the applications. In today's talk, I will introduce the work which has been done in machine learning group of MSRA to handle the big model and big data learning problems in real applications. More specifically, I will introduce our new algorithm which is call lightRNN to handle large scale model parameter in Recurrent Neural Network language model training. And I will also introduce our new algorithm called DC-ASGD to effectively train image classification models with the data parallel method. We will make these advanced technologies available publicly through Microsoft's open source project, so that more machine learning researchers and practitioners can do further work based on them.

About the speaker:
Dr. Taifeng Wang is a lead researcher in Machine Learning group, Microsoft Research Asia. His research interests include machine learning, distributed system, search ads click prediction, graph mining. Many of his technologies have been transferred to Microsoft's products and online services, such as Bing, Microsoft Advertising, and Azure. Currently, he is working on distributed machine learning, and leading Microsoft's open source project DMTK (Microsoft Distributed Machine Learning Toolkit). He has published tens of papers at top conference and journals and served as the PC member of many premium conferences such as KDD, NIPS, AAAI, WWW, SIGIR, IJCAI, and WSDM. He has been invited as tutorial speakers in WWW 2011, SIGIR 2012, ACML2016 and AAAI2016.

Date: 28 October 2016 (Friday)
Time: 09:40 a.m. - 10:40 a.m.
Venue: 9/F, William MW Mong Engineering Building, ERB Lecture Theatre

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Professor Jia JIA

Associate Professor
Department of Computer Science and Technology
Tsinghua University

Key Note Speech II
Affective Computing on Social Media Data

Abstract:
Social Media Data embed users' emotions. Understanding the emotional impact can benefit many applications such as information retrieval and context-aware recommendation. However, fulfilling the task is not a trivial issue, and the biggest challenge is to model the social media data to capture the intrinsic relationships between the data features and the emotional impact. Traditional methods usually treat the relation modeling as a simple regression problem, and use machine learning methods directly on various low-level features. However, these methods usually ignore the essential emotion related characteristics, which narrow the deep and high level understanding of emotions. Another, challenge usually ignored is that social media data are generated in social networks, where users have complex and subtle influence with the emotional impact of each other. We study the problem of understanding the emotional impact of social media data and its applications. We introduce a novel notion of dimensional space as the intermediate layer to model high level semantics of emotions, and develop a semi-supervised factor graph combined with deep learning method which incorporates both the low-level features and the social correlations to better predict the emotional impact. The proposed method is general and can be applied to various applications. In particular, we will introduce several our applications such as Emotion Modifier, Magic Mirror, Anidraw, and Senserun etc in the final.

About the speaker:
Dr. Jia Jia is an associate professor in Department of Computer Science and Technology, Tsinghua University. She got bachelor degree at Tsinghua University in 2003, and received her Ph.D. degree from Tsinghua University in 2008. Her main research interest is social affective computing and human computer speech interaction. She is serving as the secretary-general of Professional Committee of Speech in Chinese Information Processing Society, and also the committee member of Multimedia Federation in China Society of Image and Graphic, the committee member of Multimedia Federation in CCF, and the member of the International Speech Communication Association (ISCA). She has been awarded ACM Multimedia Grand Challenge Prize and Scientific Progress Prizes from the National Ministry of Education. She has authored about 70 papers in leading conferences and journals including IEEE Transaction on Audio, Speech and Language Processing, IEEE Transaction on Multimedia, IEEE Transaction on Affective Computing, ACM Multimedia, AAAI, IJCAI, ICASSP, Interspeech, etc. She also has wide research collaborations with Siemens, MSRA, Huawei, Bosch, Sohu and Tencent, etc.

Date: 28 October 2016 (Friday)
Time: 11:00 a.m. - 12:00 noon
Venue: 9/F, William MW Mong Engineering Building, ERB Lecture Theatre

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Professor Lei XIE

Professor,
School of Computer Science,
Northwestern Polytechnical University

Key Note Speech III
Personalized Voice and Low Resource Speech Processing: Some Latest Developments in ASLP@NPU

Abstract:
In this talk, I will talk about some latest research activities conduced in NPU audio, speech and language processing research group (ASLP@NPU). Firstly, I will present our developments on deep learning for personalized voice, including voice conversion, speaker adaptation for TTS and talking avatars. Secondly, I will introduce a non-parametric graphic model called DPGMM for low resource acoustic modelling and its application in query-by-example spoken term detection.

About the speaker:
Dr. Lei Xie received the Ph.D. degree in computer science from Northwestern Polytechnical University, Xian, China, in 2004. He is currently a Professor with School of Computer Science, Northwestern Polytechnical University, Xian, China. From 2001 to 2002, he was with the Department of Electronics and Information Processing, Vrije Universiteit Brussel (VUB), Brussels, Belgium, as a Visiting Scientist. From 2004 to 2006, he was a Senior Research Associate in the Center for Media Technology, School of Creative Media, City University of Hong Kong, Hong Kong. From 2006 to 2007, he was a Postdoctoral Fellow in the Human-Computer Communications Laboratory (HCCL), Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong. He has published more than 90 papers in major journals and conference proceedings, such as the IEEE TRANSACTIONS ON AUDIO SPEECH AND LANGUAGE PROCESSING, IEEE TRANSACTIONS ON MULTIMEDIA, INFORMATION SCIENCES, PATTERN RECOGNITION, ACM/Springer Multimedia Systems, ACL, ICASSP, Interspeech, ICPR and ICME. He serves as the Publication Chair of Interspeech2014. He serves as guest editors for Springer Multimedia Tools and Applications Journal and Springer Soft Computing Journal, reviewers for IEEE Transactions on Multimedia, IEEE Transactions on Audio, Speech and Language Processing, IEEE Transactions on Visualization and Computer Graphics, Pattern Recognition and Information Sciences. He is a Senior Member of IEEE, a member of ISCA, a member of ACM, a member of APSIPA and a senior member of China Computer Federation (CCF). He is a Board-of-Governor of the Chinese Information Processing Society of China (CIPSC), a TC member of the APSIPA Speech, Language and Audio (SLA) technical committee, a board member of the multimedia technical committee of CCF, a board member of the multimedia technical committee of China Society of Image and Graphics (CSIG). His current research interests include speech and language processing, multimedia and human-computer interaction.

Date: 29 October 2016 (Saturday)
Time: 01:30 p.m. - 02:30 p.m.
Venue: 9/F, William MW Mong Engineering Building, ERB Lecture Theatre

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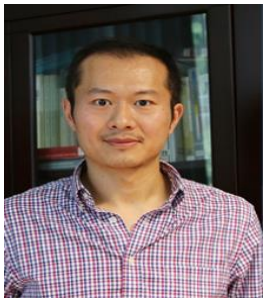
Professor Xunying LIU

Associate Professor
Systems Engineering and Engineering Management
The Chinese University of Hong Kong



Key Note Speech IV
Scalable Deep Language Models

Abstract:
Statistical language models (LMs) form key parts of many human language technology applications including speech recognition, machine translation, natural language processing and handwriting recognition. Key research problems are modelling long range context dependencies and handling data sparsity. Deep language modelling approaches represented by recurrent neural network (RNNs) are becoming increasingly popular for current speech and language technology applications due to their inherently strong sequence modelling ability and generalization performance.
This talk presents a series of recent research efforts aiming to improve the scalability and performance of RNN language models (RNNLMs) on large data sets. A noise contrastive estimation (NCE) based RNNLM training criterion combined with an efficient GPU based bunch mode training algorithm obtained over 50 times training and evaluation time speed up over the publicly available RNNLM toolkit. Two history clustering schemes based efficient RNNLM lattice rescoring approaches produced over 70% more compact decoding network size than tree structured 10k-best lists with comparable performance. Novel approaches modelling multiple paraphrase alternatives and topic variation increased the total RNNLM improvements over baseline n-gram LMs by a factor of 2.5. Experimental results are presented for multiple state-of-the-art large vocabulary speech recognition tasks.

About the speaker:
Dr. Xunying Liu received his PhD degree in speech recognition and MPhil degree in computer speech and language processing both from University of Cambridge, after his undergraduate study at Shanghai Jiao Tong University. He was a Senior Research Associate at the Machine Intelligence Laboratory of the Cambridge University Engineering Department, prior to joining the Department of Systems Engineering and Engineering Management, Chinese University of Hong Kong, as an Associate Professor in 2016. He was the recipient of best paper award at ISCA Interspeech2010 for his paper titled "Language Model Cross Adaptation For LVCSR System Combination". He is a co-author of the widely used HTK toolkit and has continued to contribute to its current development in deep neural network based acoustic and language modelling. His research outputs led to several large scale speech recognition systems that were top ranked in a series of international research evaluations. These include the Cambridge Mandarin Chinese broadcast and conversational telephone speech recognition systems developed for DARPA sponsored GALE and BOLT speech translation evaluations from 2006 to 2014, and the Cambridge 2015 multigenre broadcast speech transcription system. His current research interests include large vocabulary continuous speech recognition, machine learning, statistical language modelling, noise robust speech recognition, speech synthesis, speech and language processing. He is a regular reviewer for journals including IEEE/ACM Transactions on Audio, Speech and Language Processing, Computer Speech and Language, Speech Communication, the Journal of the Acoustical Society of America Express Letters, Language Resources and Evaluation, and Natural Language Engineering. He has served as a member of the scientific committee and session chair for conferences including IEEE ICASSP and ISCA Interspeech. Dr. Xunying Liu is a member of IEEE and ISCA.

Date: 29 October 2016 (Saturday)
Time: 02:30 p.m. - 03:30 p.m.
Venue: 9/F, William MW Mong Engineering Building, ERB Lecture Theatre

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