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Department of Electrical Engineering

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Professional Interests

Speech and Language Processing, Affective Computing, Behavioral Signal Processing

Education

University of Southern California (USC), Signal Interpretation Analysis Laboratory (SAIL)

Ph.D. in Electrical Engineering

(Dec. 2012)

Thesis Advisor: Professor Shrikanth S. Narayanan

Thesis: Computational Approaches for Modeling and Quantifying Interaction Dynamics in Dyadic Human Interactions

University of Southern California (USC), California, USA

B.S. in Electrical Engineering, emphasis in digital signal processing

(May 2007)

Minor in Business Administration

(May 2007)

Professional Experiences

Feb. 2014 – present: Assistant Professor

National Tsing Hua University, Electrical Engineering, Hsinchu, Taiwan

Feb. 2013 – Dec. 2013: Data Scientist

id:a Lab, ID Analytics Inc., San Deigo, USA

Sept. 2007 – Dec. 2012: Graduate Research Assistant

Signal Analysis and Interpretation Laboratory (SAIL Lab), USC, Los Angeles, USA

Sept. 2006 – May 2007: Undergraduate Research Assistant

Information Laboratory (INFO Lab), USC, Los Angeles, USA

June 2006 – Sept. 2006: NSF Undergraduate Summer Research Program

Undergraduate Summer Research at Institute for Pure and Applied Mathematics, UCLA, Los Angeles, USA

Awards/Honors

Magna Cum Laude (2007)

Annenberg Fellowship, University of Southern California (2007-2009)

Undergraduate Dean's List (2003 – 2007)

2010 Interspeech Best Paper Award

11th Annual Conference of the International Speech Communication Association (InterSpeech 2009)

2009 Interspeech Emotion Challenge First Place Winner (Classifier Sub-Challenge)

10th Annual Conference of the International Speech Communication Association (InterSpeech 2009)

2008 Interspeech Student Best Paper Award Candidate

9th Annual Conference of the International Speech Communication Association (InterSpeech 2008)

Honors Societies: Phi Kappa Phi, Tau Beta Pi, Eta Kappa Nu

Publications

Google Scholar Profile <http://scholar.google.com/citations?user=MGqWqOAAAAAJ&hl=en>

Book

[1] **Chi-Chun Lee**, "Modeling Human Behaviors in Psychology Using Engineering Methods", River Publishers' Series in Information Science and Technology, May 2014, ISBN: 9788793102606

Book Chapter

[1] **Chi-Chun Lee**, Jangwon Kim, Angeliki Metallinou, Carlos Busso, Sungbok Lee, and Shrikanth S. Narayanan, "Speech in Affective Computing", in: R.A. Calvo, S.K. D'Mello, J. Gratch and A. Kappas (Eds). Oxford Handbook of Affective Computing, Oxford University Press, to appear 2014

Journal Articles

[1] Daniel Bone, **Chi-Chun Lee**, and Shrikanth S. Narayanan, "Robust Unsupervised Arousal Rating: A rule-based framework with knowledge-inspired vocal features", in: IEEE Transaction on Affective Computing, 2014 (accepted for publication)

[2] Daniel Bone, **Chi-Chun Lee**, Matthew Black, Marian Williams, Sungbok Lee, Pat Levitt, and Shrikanth S. Narayanan, "The Psychologist as an Interlocutor in ASD Assessment: Insights from a Study of Spontaneous Prosody", in: Journal of Speech, Language, and Hearing Research 2014 Feb 11. doi: 10.1044/2014_JSLHR-S-13-0062

[3] **Chi-Chun Lee**, Athanasios Katsamanis, Matthew Black, Brian Baucom, Andrew Christensen, Panayiotis G. Georgiou, and Shrikanth S. Narayanan, "Compute Vocal Entrainment: A Signal-Derived PCA-based Quantification Scheme with Application for Affect Analysis in Married Couple Interactions", in: Journal of Computer Speech and Language, 28(2): 518-539 doi:10.1016/j.csl.2012.06.006

[4] Matthew Black, Athanasios Katsamanis, Brian Baucom, **Chi-Chun Lee**, Adam Lammert, Andrew Christensen, Panayiotis G. Georgiou and Shrikanth S. Narayanan, "Toward Automating a Human Behavioral Coding System for Married Couples' Interactions using Speech Acoustic Features", in: Journal of Speech Communication Speech Communication, 55:1 (1-21)

[5] **Chi-Chun Lee**, Emily Mower, Carlos Busso, Sungbok Lee, and Shrikanth S. Narayanan, "Emotion Recognition Using a Hierarchical Binary Decision Tree Approach", in: Journal of Speech Communication, 53:9-10(1162-1171)

[6] Carlos Busso, Murtaza Bulut, **Chi-Chun Lee**, Abe Kazemzadeh, Emily Mower, Samuel Kim, Jeannette Chang, Sungbok Lee and Shrikanth S. Narayanan, "IEMOCAP: Interactive emotional dyadic motion capture database (2008)", in: Journal of Language Resources and Evaluation, 42:4 (335-359)

Peer-Reviewed Conference/Workshop Papers

[1] Bo Xiao, Panayiotis G. Georgiou, **Chi-Chun Lee**, Brian Baucom Shrikanth Narayanan, "Head Motion Mimicry and its Correlation to Affectivity in Dyadic Interactions", in: Proceedings of IEEE International Conference on Multimedia and Expo (ICME), 2013

[2] Daniel Bone, **Chi-Chun Lee**, Vikram Ramanarayanan, Shrikanth Narayanan, Renske S. Hoedemaker, Peter C. Gordon "Modeling Eye-Voice Coordination in Rapid Automatized Naming: Smooth Patterns of Fast Performance", in: Proceedings of Conference of the International Speech Communication Association, 2013

[3] Daniel Bone, **Chi-Chun Lee**, Theodora Chaspari, Matthew P. Black, Marian Williams, Sungbok Lee, Pat Levitt and Shrikanth S. Narayanan, Acoustic-Prosodic, Turn-taking, and Language Cues in Child-Psychologist Interactions for Varying Social Demand, in: Proceedings of Conference of International Speech Communication Association, 2013

[4] Theodora Chaspari, Daniel Bone, James Gibson, **Chi-Chun Lee**, Shrikanth Narayanan, "Using Physiology and Language Cues for Modeling Verbal Response Latencies of Children with ASD", in: Proceedings of International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2013

[5] Rahul Gupta, **Chi-Chun Lee**, Sungbok Lee, Shrikanth Narayanan, "Assessment of a Child's Engagement Using Sequence Model Based Features", in: Proceedings of Workshop on Affective and Social Speech Signals, 2013

[6] **Chi-Chun Lee**, Athanasios Katsamanis, Brian Baucom, Panayiotis G. Georgiou, Shrikanth Narayanan, "Using Measures of Vocal Entrainment to Inform Outcome-Related Behaviors in Marital Conflicts", in: APSIPA ASC Conference, 2012

[7] Rahul Gupta, **Chi-Chun Lee**, Daniel Bone, Agata Rozga, Sungbok Lee, Shrikanth S. Narayanan, "Acoustical analysis of engagement behavior in children", in: Proceedings of the Workshop on Child, Computer, and Interaction, 2012

[8] **Chi-Chun Lee**, Athanasios Katsamanis, Panayiotis G. Georgiou, Shrikanth S. Narayanan, "Based on Isolated Saliency or Causal Integration? Toward a Better Understanding of Human Annotation Process using Multiple Instance Learning and Sequential Probability Ratio Test", in: Proceedings of Conference of the International Speech Communication Association, 2012

[9] Theodora Chaspari, **Chi-Chun Lee**, Shrikanth S. Narayanan, "Interplay between Verbal Response Latency and Physiology of Children with Autism during ECA Interactions", in: Proceedings of Conference of the International Speech Communication Association, 2012

[10] Daniel Bone, **Chi-Chun Lee**, Shrikanth S. Narayanan, "A Robust Unsupervised Arousal Rating Framework using Prosody with Cross-Corpora Evaluation", in: Proceedings of Conference of the International Speech Communication Association, 2012

[11] Daniel Bone, Matthew P. Black, **Chi-Chun Lee**, Marian E. William, Pat Levitt, Sungbok Lee, Shrikanth S. Narayanan, "Spontaneous-Speech Acoustic-Prosodic Features of Children with Autism and the Interacting Psychologist", in: Proceedings of Conference of the International Speech Communication Association, 2012

[12] Rahul Gupta, **Chi-Chun Lee**, and Shrikanth S. Narayanan, "Classification of Emotional Content of Sighs in Dyadic Human Interactions", in: Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2012

[13] **Chi-Chun Lee**, Athanasios Katsamanis, Matthew Black, Brian Baucom, Panayiotis G. Georgiou, and Shrikanth S. Narayanan, "Affective State Recognition in Married Couples' Interactions Using PCA-based Vocal Entrainment Measures", in: Proceedings of Affective Computing and Intelligent Interaction (ACII), Lecture Notes in Computer Science, Memphis, TN, 2011

[14] **Chi-Chun Lee**, Athanasios Katsamanis, Matthew Black, Brian Baucom, Panayiotis G. Georgiou, and Shrikanth S. Narayanan, "An Analysis of PCA-based Vocal Entrainment Measures in Married Couples' Affective Spoken Interactions", in: Proceedings of Conference of the International Speech Communication Association, 2011

[15] Emily Mower, **Chi-Chun Lee**, James Gibson, Theodora Chaspari, Marian Williams, and Shrikanth S. Narayanan, "Analyzing the Nature of ECA Interactions in Children with Autism", in: Proceedings of Conference of the International Speech Communication Association, 2011

[16] **Chi-Chun Lee**, Matthew Black, Athanasios Katsamanis, Adam Lammert, Brian Baucom, Andrew Christensen, Panayiotis G. Georgiou and Shrikanth S. Narayanan, "Quantification of Prosodic Entrainment in Affective Spontaneous Spoken Interactions of Married Couples", in: Proceedings of Conference of the International Speech Communication Association, 2010

[17] Matthew Black, Athanasios Katsamanis, **Chi-Chun Lee**, Adam Lammert, Brian Baucom, Andrew Christensen, Panayiotis G. Georgiou and Shrikanth S. Narayanan, "Automatic Classification of Married Couples' Behavior using Audio Features", in: Conference of the International Speech Communication Association, 2010 [Best Paper Award]

[18] **Chi-Chun Lee** and Shrikanth S. Narayanan, "Predicting interruptions in dyadic spoken interactions", in: Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2010

[19] Angeliki Metallinou, **Chi-Chun Lee**, Carlos Busso, Sharon Carnicke and Shrikanth S. Narayanan, "The USC CreativeIT Database: A Multimodal Database of Theatrical Improvisation", in: Multimodal Corpora: Advances in Capturing, Coding and Analyzing Multimodality (MMC), 2010

[20] Emily Mower, Angeliki Metallinou, **Chi-Chun Lee**, Abe Kazemzadeh, Carlos Busso, Sungbok Lee and Shrikanth S. Narayanan, "Interpreting ambiguous emotional expressions", in: Proceedings of the International Conference on Affective Computing and Intelligent Interaction (ACII), 2009

[21] **Chi-Chun Lee**, Emily Mower, Carlos Busso, Sungbok Lee and Shrikanth S. Narayanan, "Emotion recognition using a hierarchical binary decision tree approach", in: Proceedings of Conference of the International Speech Communication Association, 2009 [Emotion Challenge Winning Paper]

[22] **Chi-Chun Lee**, Carlos Busso, Sungbok Lee and Shrikanth S. Narayanan, "Modeling mutual influence of interlocutor emotion states in dyadic spoken interactions", in: Proceedings of Conference of the International Speech Communication Association, 2009

[23] **Chi-Chun Lee**, Sungbok Lee and Shrikanth S. Narayanan, "An analysis of multimodal cues of interruption in dyadic spoken interactions", in: Proceedings of Conference of the International Speech Communication Association, pages 1678-1681, 2008 [Best Student Paper Award Candidate]

Conference Abstract

[1] **Chi-Chun Lee**, Brian Baucom, Athanasios Katsamanis, Panayiotis G. Georgiou and Shrikanth Narayanan, "Modeling Vocal Interdependence during Marital Interaction: A Vector-based Approach", In S. Weusthoff (Chair), Applied speech signal processing methods in couple and family research. Paper (oral) presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, National Harbor, MD, November 2012

[2] Brian Baucom, Esti Iturralde, **Chi-Chun Lee**, Panayiotis G. Georgiou, Shrikanth Narayanan and Gayla Margolin, "Multisystemic family aggression and dynamic emotional processes during triadic family interaction". In S. Weusthoff (Chair), Applied speech

signal processing methods in couple and family research. Paper (oral) presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, National Harbor, MD, November 2012.

[3] Theodora Chaspari, **Chi-Chun Lee**, Matthew P. Black, and Shrikanth S. Narayanan, "Analyzing the Physiological Synchrony of Children with Autism and Their Parents with Signal Processing Techniques", in: Proceedings of the International Meeting for Autism Research, Toronto, 2012

[4] **Chi-Chun Lee**, Brian Baucom, Athanasios Katsamanis, Andrew Christensen, Panayiotis G. Georgiou and Shrikanth Narayanan, "Analyzing Vocal Entrainment in Married Couples' Interactions: a Signal-derived PCA-based Quantification Scheme and Affect Recognition using Factorial Hidden Markov Model", in: Conference of Association for Behavioral and Cognitive Therapies (ABCT): Clinical Research Methods and Statistics SIG (poster), Toronto, Nov. 2011

Review Services

IEEE Transaction on Affective Computing

Elesiver Speech Communication

IEEE Transaction on Information Forensic and Security

IEEE Wireless Communication Magazine

IEEE Journal on Emerging and Selected Topics in Circuits and Systems

The International Conference on Pattern Recognition (2013, 2014)

The IEEE International Symposium on Circuits and Systems (2013)

The IEEE International Conference on Acoustics, Speech and Signal Processing (2014)

Professional Membership

IEEE member, International Speech Communication Association member, Association of Behavioral and Cognitive Therapies member

Teaching Experiences

National Tsing Hua University

EE 6640: Speech Signal Processing (Spring 2014)

Graduate Teaching Assistant at University of Southern California

EE 619: Advanced Topics in Automatic Speech Recognition, (Spring 2011)

EE 519: Speech Recognition and Processing for Multimedia, (Spring 2010, Fall 2010)

Related Media News and Articles

So happy together

(USC News, February 4th, 2013)

How motion capture technology can measure human behaviour

(BBC News, August 20th, 2010)

Actions Speak Louder Than Words

(USC News, June 29th, 2010)

Theatre and Engineering Schools Collaborate to Study Interactions

(USC Daily Trojan News, April 6th, 2010)

Two Cultures

(Language Log by Professor Mark Liberman – University of Pennsylvania, March 20th, 2010)

USC SAIL Researchers Win the Interspeech 2009 Emotion Challenge Award

(USC EE News, November 05th, 2009)

The INTERSPEECH 2009 Emotion Challenge: Results and Lessons Learnt

(IEEE Signal Processing Society SLTC Newsletter, October 2009)