

Samuel Kim

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Qualification/Skills

Research interest: Digital signal processing and machine learning algorithms for multimedia data with applications to information retrieval, compression, enhancement; specifically audio, speech, and music signals

Program languages: C/C++, MATLAB, PHP, HTML, XML, MySQL, Fortran

Tools: Microsoft Visual Studio, KDevelop, Xcode, CMAKE, Subversion (SVN), WEKA, LaTeX

Operating systems: OS X, Linux, and Windows

Education

Ph.D., University of Southern California, Los Angeles, CA

expecting 2010

Electrical Engineering (Advisor: Dr. Shrikanth Narayanan)

Thesis title "Contextual models of audio signals for information retrieval"

M.S., Yonsei University, Seoul, Korea

Feb. 2005

Electrical and Electronic Engineering (Advisor: Dr. Hong-Goo Kang)

Thesis title "On feature extraction algorithms for GMM-based text independent speaker recognition systems"

B.S., Yonsei University, Seoul, Korea

Feb. 2003

Electrical and Electronic Engineering (Advisor: Dr. Hong-Goo Kang)

Experience

Research Assistant, University of Southern California, Los Angeles, CA

08/2005–present

Signal Analysis and Interpretation Lab. (SAIL)

- Speech interface system
 - Developing speech recognition applications to various DARPA projects (along with Sphinx-based OtoSense)
 - Multi-threaded, cross-platform, and real-time configurable programming based on C++ (utilizing various libraries, such as BOOST, APR, LOG4CXX, PortAudio, PThread, etc.)
 - Communicating through various message protocols, such as ActiveMQ, Open Agent Architecture (OAA)
 - Collaboration with BAE systems, Adapx, General Dynamics, and Institute of Creative Technology (ICT)
- Microphone array system
 - Real-time processing of audio signals from multiple microphones in SMARTROOM project using ASIO
 - Speaker localization, speaker identification, audio segmentation, speech recognition, emotion recognition
 - Highly multi-thread and sophisticated synchronization with OpenCV-based video processing components
- Music and audio information retrieval system
 - Music fingerprint: compact context modeling of music with application to Classical music opus and composer identification
 - Acoustic topic models: contextual analysis of unstructured audio signals with application to environmental sound understanding
- Emotional speech analysis
 - Analysis on emotional modulation of speech signals and glottal movement
 - Real-time emotion recognition system (emotion mirror)

Internship, Samsung Advanced Institute of Technology (SAIT), Kiheung, Korea

06/2005-08/2005

Human Computer Interaction (HCI) Lab.

- Music highlight extraction algorithms

Visiting Researcher, Chalmers University of Technology, Gothenburg, Sweden

07/2004-09/2004

Signals and Systems

- Speaker identification system; information theoretic performance analysis

Research Assistant, Yonsei University, Seoul, Korea

03/2003-06/2005

Media and Communication Signal Processing (MCSP) Lab.

- Speaker identification system
 - Feature extraction algorithms for robust speaker identification systems
 - Build a C++ speaker recognition library based on ITPP library

Teaching Assistant, Yonsei University, Seoul, Korea

03/2003-06/2004

Electrical and Electronic Engineering Department

- Random process, Information Theory, Digital Signal Processing

Publications

1. Samuel Kim, Panayiotis Georgiou, Shrikanth Narayanan, and Shiva Sundaram, "Using naïve text queries for robust audio information retrieval system," IEEE International Conference on Acoustic, Speech and Signal Processing (ICASSP), in press, Mar. 2010.
2. Samuel Kim, Shiva Sundaram, Panyoitis Georgiou, and Shrikanth Narayanan, "Audio scene understanding using topic models," Neural Information Processing Systems (NIPS) Workshop on Applications for Topic Models: Text and Beyond, Dec. 2009.
3. Samuel Kim, Shrikanth Narayana, and Shiva Sundaram, "Acoustic Topic Model for Audio Information Retrieval," IEEE Workshop on Applications of Signal Processing to Audio and Acoustic (WASPAA), Oct. 2009.
4. Samuel Kim, Panayiotis G. Georgiou, and Shrikanth Narayanan, "A robust harmony structure modeling scheme for Classical music opus identification," IEEE International conference on Acoustic, Speech and Signal Processing (ICASSP), Apr. 2009.
5. Samuel Kim and Shrikanth Narayanan, "Dynamic chroma feature vectors with applications to cover song identification," IEEE Multimedia Signal Processing (MMSP) Workshop, Oct. 2008.
6. C. Busso, M. Bulut, C. Lee, A. Kazemzadeh, E. Mower, S. Kim, J. Chang, S. Lee, and S. Narayanan, "IEMOCAP: Interactive emotional dyadic motion capture database," Journal of Language Resources and Evaluation, 2008.
7. Kyu Jeong Han, Samuel Kim, Shrikanth Narayanan, "Strategies to Improve the Robustness of Agglomerative Hierarchical Clustering under Data Source Variation for Speaker Diarization," IEEE transaction of speech, audio, and language processing, pp. 1590-1601, Nov. 2008.
8. Samuel Kim, Erdem Unal, and Shrikanth Narayanan, "Music fingerprint extraction for classical music cover song identification," International Conference of Multimedia and Expo (ICME), pp. 1261-1264, May. 2008.
9. Kyu Jeong Han, Samuel Kim, and Shrikanth S. Narayanan, "Robust speaker clustering strategies to data source variation for improved speaker diarization," Automatic Speech Recognition and Understanding (ASRU), Dec. 2007.
10. Samuel Kim, Sungbok Lee, and Shrikanth Narayanan, "On voicing activity under the control of emotion and loudness," 154th Meeting of the Acoustic Society of America (ASA), Nov. 2007.
11. Samuel Kim, Panayiotis G. Georgiou, Sungbok Lee, and Shrikanth Narayanan, "Real-time Emotion Detection System using Speech: Multi-modal Fusion of Different Timescale Features," Multimedia Signal Processing (MMSP) Workshop, Oct. 2007.
12. Samuel Kim, Sungwan Yoon, Thomas Eriksson, Hong-Goo Kang, and Dae Hee Youn, "A noise-robust pitch synchronous feature extraction algorithm for speaker recognition systems," Proc. INTERSPEECH'05, p.p. 2029-2032, Sep. 2005.
13. Thomas Eriksson, Samuel Kim, Hong-Goo Kang, and Chungyoung Lee, "An information-theoretic perspective on feature selection in speaker recognition," IEEE Signal Processing Letters, Vol. 12, No. 7, pp. 500-503, Jul. 2005.
14. Samuel Kim, Jeong-Tae Seo, and Hong-Goo Kang, "Quantitative measure of speaker specific information in human voice: from the perspective of information theoretic approach," Journals of Acoustical Society of Korea, vol. 24, Mar. 2005.
15. Samuel Kim, "On feature extraction algorithms for GMM-based text independent speaker recognition systems," Master thesis, Yonsei University, Feb. 2005.
16. Sungwan Yoon, Samuel Kim, Hong-Goo Kang, and Dae Hee Youn, "An experiment of supplementary feature for speaker verification in constrained environment," Proc. Korean Institute of Communication Sciences, vol.29, p.p. 206, Nov. 2004.
17. Bongjin Lee, Samuel Kim, and Hong-Goo Kang, "Speaker recognition based on transformed line spectral frequencies," Proc. International Symposium on Intelligent Signal Processing and Communication System, p.p. 177-180, Nov. 2004.
18. Samuel Kim, Thomas Eriksson, and Hong-Goo Kang, "On the time variability of vocal tract for speaker recognition," Proc. Internat. Conf. Spoken Language Process. INTERSPEECH'04, vol. III, p.p. 2377-2380, Oct. 2004.
19. Thomas Eriksson, Samuel Kim, Hong-Goo Kang, and Chungyoung Lee, "Theory for speaker recognition over IP," Proc. Internat. Conf. Spoken Language Process. INTERSPEECH'04, vol. I, p.p. 625-628, Oct. 2004.
20. Sungwan Yoon, Samuel Kim, and Hong-Goo Kang, "Preliminary experiment searching for the supplementary feature in speaker verification," Proc. ISISP, p.p.189-192, July 2004.
21. Samuel Kim, Thomas Eriksson, Hong-Goo Kang, and Dae Hee Youn, "A pitch synchronous feature extraction method for speaker recognition," Proc. Internat. Conf. Acoust. Speech Signal Process., vol. I, p.p. 405-408, May 2004.
22. Thomas Eriksson, Samuel Kim, and Hong-Goo Kang, "On feature extraction in speaker recognition," Technical Report 485L, Department of Signals and Systems, Chalmers University of Technology, Gothenburg, Sweden, Apr. 2004.

Patents

1. Method and system for pitch synchronous feature generation of speaker recognition system, Registered, KR 10-05261100-000, 2005.
2. Method and apparatus for feature vector generation using a supplementary feature, Registered, KR 10-05633160-000, March 2006.
3. Transformation method of speaker feature vector for speaker recognition, Registered, KR10-0596558-000, June 2006.

Services

Good Shepherd Christian Group, University of Southern California, Los Angeles, CA	08/2005–present
Representative leader (01/2007 – 01/2008)	
General leader (01/2006 – 08/2009)	
Lamp Presbyterian Church of Los Angeles, Gardena, CA	12/2005-present
Ordained deacon (11/2009 – present)	
Music director (03/2007 – present)	
Tsunami Relief Activity, Trincomollee, Sri Lanka	03/2005
Youth With A Mission	09/2000 – 07/2001
Jabalpur, Madhya Pradesh, India / Charlotte, NC / Los Angeles, CA	
Military Service	03/1998 – 05/2000
Korean Army, Wonju, Kangwondo, Korea	