

Curriculum Vitae

Surname **Ahadi Sarkani**
First name **Seyed Mohammad**
Affiliation Associate professor,
Electrical Engineering Department
Amirkabir University of Technology

Contact
Electrical Engineering Department
Amirkabir University of Technology
Hafez Avenue, Tehran 15914, Iran
Tel. +98 21 6454 3336
Fax. +98 21 6640 6469
Email sma@aut.ac.ir

Education

University of Cambridge, Cambridge, England
PhD in Engineering, 1996
Research title: Bayesian and Predictive Techniques for Speaker Adaptation

Amirkabir University of Technology, Tehran, Iran
M.Sc. in Electrical Engineering (Electronics), 1987, First rank graduate
B.Sc. in Electrical Engineering (Electronics), 1984, First rank graduate

Research interests

- Automatic speech recognition
- Speaker and language adaptation in speech recognition
- Robust speech recognition
- Speech enhancement
- Digital and microprocessor-based systems

Memberships etc.

- IEEE Senior member
- IEEE Iran Section secretary, Jan. 2009-

Projects

- "Intelligent telephone central", carried out for Iran Telecommunications Company. Project leader: A.A. Sepehri (Currently being undertaken).
- "A comprehensive study of the Iranian research projects on Farsi speech processing", carried out for *Iranian Industrial Development and Reconstruction Organization*, 2004. Project leader: A.A. Sepehri.
- "Robust speech recognition", research carried out during the period Jan. 2003 to Dec. 2003 at the Electrical and Computer Engineering Department, University of Waterloo, Waterloo, Canada. This research was funded by Amirkabir University of Technology (sabbatical leave) and partially funded by and carried out in collaboration with Dspfactory, Waterloo, Canada.
- National research project No. 357 granted by the Iranian National Research Council for Persian continuous and isolated-word speech recognition, 1998-2002.
- "Derivation of standard methods in design and implementation of Farsi speech corpora", Amirkabir university research project, 2002.
- "A limited continuous speech recognizer", Amirkabir university research project, 1997.

Supervisions

- Ph.D.
- Subspace-based speech enhancement in non-stationary noise (Faraji - currently being undertaken).

- Improvement of the underdetermined source separation methods for accurate sound source localization (currently being undertaken).
- Robust speech recognition based on spectral compensation and feature normalization (currently being undertaken).
- Improvement of hidden Markov model-based acoustic modeling (advisor - currently being undertaken).
- Phonetic pronunciation variation modeling to generate a dynamic adaptive lexicon for CSR (advisor), Sep. 2008.
- A Front-end for Improved Robustness in Automatic Speech Recognition, Dec. 2006.
- Prosody in Persian language and its use in speech recognition, Nov. 2004.

Recent M.Sc.

- Digital audio watermarking robust to intentional and non-intentional attacks (currently being undertaken).
- Speech Watermarking With Feature-Based Embedding (currently being undertaken).
- On the use of phase in robust speech recognition (currently being undertaken).
- Design and implementation of an automatic acoustic scene recognition system (currently being undertaken).
- Design, statistical evaluation and implementation of robust multimedia watermarking systems, 2009.
- Spoken language identification using statistical methods, 2009
- Robust speech recognition using sub-band processing, 2009.
- Speech noise reduction using Singular Value Decomposition, 2009.
- Voice source localization and separation, 2009.
- Speaker adaptation via speaker clustering in speech recognition systems, 2008.
- Improvement in speech/music discrimination methods using LDA, 2008.
- Voice activity detection in noisy environments using combination of multiple features, 2008.
- Who really speaks when? Speaker segmentation and identification in a multi-speaker environment using novel algorithms, 2008.
- Independent component analysis and its use in improving Farsi speech recognition, 2007.
- Feature-based noise-robust automatic speech recognition, 2007.
- Design and simulation of a robust speech recognition system based on robust features, 2007 (advisor).
- Distortion cancellation in speech signals, 2006.
- Speaker clustering and segmentation in a multi-speaker environment, 2006.
- Voice activity detection in noisy environments, 2006.

B.Sc. Projects:

More than 60 B.Sc. projects in electronics and communications.

Patent

- S.M. Ahadi, G. Farahani and M.M. Homayounpour, "Noise Subtraction Algorithm in Autocorrelation Domain," Iranian patent No. 42009, 15 Aug. 2007.

Publications

Books and Book Chapter:

- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Autocorrelation-based Methods for Noise-Robust Speech Recognition," in Robust Speech Recognition and Understanding, M. Grimm and K. Kroschel, Eds., I-Tech Education and Publishing, Vienna, available at <http://www.books.i-techonline.com>
- *Fundamentals of Microprocessors and Interfacing* (In Persian), 3rd Edition, Tehran: Amirkabir University Publications, 2009.
- *Fundamentals of Microprocessors and Interfacing* (In Persian), 2nd Edition, Tehran: Amirkabir University Publications, 2006.
- *Fundamentals of Microprocessors and Interfacing* (In Persian), Tehran: Amirkabir University Publications, 2002.

Recent Journal Papers:

- S. Seyedin and S.M. Ahadi, "A New Subband-Weighted MVDR-based Front-end for Robust Speech Recognition," to appear in *IEICE Trans. Inf. & Syst.*

- N. Khademi Kalantari and S.M. Ahadi, "A Logarithmic Quantization Index Modulation for Perceptually Better Data Hiding," *IEEE Trans. Image Proc.*, vol. 19, No. 6, June 2010.
- B. Vahidi, N. Ghaffarzadeh, S.H. Hosseinian and S.M. Ahadi, "An Approach to Detection of High Impedance Fault Using Discrete Wavelet Transform and Artificial Neural Networks," *Simulation*, vol. 86, No. 4, April 2010.
- N. Khademi Kalantari, S.M. Ahadi and M. Vafadoost, "A Robust Image Watermarking in the Ridgelet Domain Using Universally Optimum Decoder," *IEEE Trans. Circ. Syst. for Video Tech.*, vol. 20, No. 3, March 2010.
- B. Vazirnezhad, F. Almasganj, S.M. Ahadi and A. Chanen, "Speaker adapted dynamic lexicons containing phonetic deviations of words," to appear in *Journal of Zhejiang University-SCIENCE A* vol. 10, doi:10.1631/jzus.A0820761, 2009.
- N. Khademi Kalantari, M.A. Akhaee, S.M. Ahadi and H.R. Amindavar, "Robust Multiplicative Patchwork Method for Audio Watermarking," *IEEE Trans. Audio, Speech and Lang. Processing*, vol. 17, No. 6, August 2009.
- D. Gharavian and S.M. Ahadi, "Emotional Speech Recognition and Emotion Identification in Farsi Language," *Tarbiat Modarres Scientific Research Journal*, No. 34, Winter 2009 (in Persian).
- B. Vahidi, S. Taghipour Boroujeni and S.M. Ahadi, "An Investigation of the Applicability of Barbed Shield Wires to Protect Transmission Lines Using Charge Simulation Method," *International Review of Electrical Engineering*, Vol. 4, No. 1, Jan.-Feb. 2009.
- J. Kabudian, M.M. Homayounpour and S.M. Ahadi, "Bernoulli versus Markov: Investigation of State Transition Regime in Switching-State-Model Based Acoustic Modeling," *Signal Processing*, 89(2009), 662-668.
- B. Vazirnezhad, F. Almasganj and S.M. Ahadi, "Hybrid statistical pronunciation models designed to be trained by a medium-size corpus," *Computer Speech and Language*, 23 (2009), 1-24.
- B. Vahidi, M. Yahyaabadi, M. R. Bank Tavakoli, and S. M. Ahadi, "Leader Progression Analysis Model for Shielding Failure Computation by Using Charge Simulation Method," *IEEE Trans. Power Delivery*, vol. 23, No. 4, pp. 2201-2206, October 2008.
- D. Gharavian and S.M. Ahadi, "Stressed Speech Recognition Using a Warped Frequency Scale," *IEICE Electronics Express*, vol. 5, No.6, 187-191, March 2008.
- S.M. Ahadi, "Improved Bayesian Training for Context-Dependent Modeling in Continuous Persian Speech Recognition," *Journal of the Iranian Association of Electrical and Electronics Engineers*, vol. 4, No. 1, Spring-Summer 2007.
- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Features based on filtering and spectral peaks in autocorrelation domain for robust speech recognition," *Computer Speech and Language*, 21 (2007), 187-205.
- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Robust Feature Extraction of Speech via Noise Reduction in Autocorrelation Domain," *Lecture Notes in Computer Science*, LNCS-4105, 466-473, Springer-Verlag, September 2006.
- B. Vahidi, A.M. Jafari and S.M. Ahadi, "Modeling the Effects of Trace and Parameters of Transmission Lines on the Lightning Stroke," *Iranian Journal of Electrical and Computer Engineering*, vol. 5, No. 2, Summer-Fall 2006.

- S. Sharifian and S.M. Ahadi, "Speaker Adaptation in Continuous Speech Recognition Using MLLR-based MAP Estimation," *Esteghlal Journal* (in Persian), vol. 23, No. 2, February/March 2005.
- S.M. Ahadi, H. Sheikhzadeh, R.L. Brennan and G.H. Freeman, "A weighted overlap add-based front-end for speech recognition," *Journal of the Iranian Association of Electrical and Electronics Engineers*, vol. 1, No. 2, pp.15-20, Summer and Fall 2004.
- D. Gharavian and S.M. Ahadi, "Statistical Evaluation of Stress in Farsi and its Effect on Vowel Pitch Frequencies, Durations and Energies", *Amirkabir Scientific Research Journal*, Vol. 15, No. 58-A, pp.258-268, Spring 2004 (in Persian).
- J. Habibi-Markani and S.M. Ahadi, "Category-based Statistical Modeling of Farsi Language for Continuous Speech Recognition," *International Journal of Engineering Sciences*, vol. 15, No.1, Spring 2004 (in Persian).
- S.H. Shams and S.M. Ahadi, "Context Dependent Modeling in Continuous Speech Recognition based on a Persian Phonetic Decision Tree", *Tarbiat Modarres Scientific Research Journal*, vol. 13, Autumn 2003 (in Persian).
- S.H. Shams and S.M. Ahadi, "Weighted Training of Context-Dependent Models for Continuous Persian Speech Recognition", *Amirkabir Journal of Science and Technology*, vol. 14, No. 53, Winter 2003 (In Persian).

Recent Conference Papers:

- A. Pourmohammad and S.M. Ahadi, "TDE-Based 2D Real Time High Accuracy Sound Source Location Calculation Using a Special Microphones Arrangement," to appear in *Proc. International Conference on Signal Processing Systems (ICSPS)*, July 2010, Dalian.
- E. Shokri and S.M. Ahadi, "Burst-Like Packet loss Compensation Using DTW/HMM Hybrid," to appear in *Proc. International Conference on Signal Processing Systems (ICSPS)*, July 2010, Dalian.
- E. Loveimi and S.M. Ahadi, "Objective Evaluation of Phase and Magnitude Only Reconstructed Speech: New Considerations," in *Proc. 10th International Conference on Information Science, Signal Processing and their Applications (ISSPA)*, May 2010, Kuala Lumpur.
- N. Khademi and S.M. Ahadi, "Rational Dither Modulation Using Logarithmic Quantization With Optimum Parameter," in *Proc. ICASSP*, March 2010, Dallas.
- E. Loveimi and S.M. Ahadi, "Objective Evaluation of Magnitude and Phase Only Spectrum-based Reconstruction of the Speech Signal," in *Proc. 4th International Symposium on Communications, Control and Signal Processing (ISCCSP)*, March 2010, Limassol.
- S. Seyedin and S.M. Ahadi, "Robust MVDR-based Feature Extraction for Speech Recognition," in *Proc. International Conference on Information, Communications and Signal Processing (ICICS)*, Dec. 2009, Macau.
- A. Pourmohammad and S.M. Ahadi, "Using Single-Layer Neural Network for Recognition of Isolated Handwritten Persian Digits," in *Proc. International Conference on Information, Communications and Signal Processing (ICICS)*, Dec. 2009, Macau.

- A. Ziaei, S.M. Ahadi, H. Yeganeh and S.M. MirRezaei, "A New Approach for Spoken Language Identification Based on Sequence Kernel SVMs," in *Proc. DSP 2009*, Santorini.
- N. Khademi, M.A. Akhaee, S.M. Ahadi and H.R. Amindavar, "Robust Multiplicative Patchwork Method for Audio Watermarking," in *Proc. DSP 2009*, Santorini.
- B. Nazari and S.M. Ahadi, "A Method for Noise Reduction in Speech Signal Based on Singular Value Decomposition and Genetic Algorithm," in *Proc. Eurocon 2009*, Saint-Petersburg.
- N. Khademi and S.M. Ahadi, "Logarithmic Quantization Index Modulation: A Perceptually Better Way to Embed Data Within A Cover Signal," in *Proc. ICASSP-09*, Taiwan.
- A. Ziaei, S.M. Ahadi, H. Yeganeh and M. MirRezaei, "A Novel Approach in Spoken Language Identification Using Sequence Kernel-based SVMs," in *Proc. 14th Computer Society of Iran Annual Conference (CSICC)*, March 2009, Tehran (in Persian).
- N. Khademi and S.M. Ahadi, "Intelligent Decoding for Mean Quantization Based Audio Watermarking in the Wavelet Transform Domain," in *Proc. IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2008)*, Sarajevo.
- A. Ziaei, S.M. Ahadi, M. MirRezaei and H. Yeganeh, "Spoken Language Identification Using a New Sequence Kernel-based SVM Back-end Classifier," in *Proc. IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2008)*, Sarajevo.
- H. Yeganeh, S.M. Ahadi and A. Ziaei, "Weighting of Mel Sub-bands Based on SNR/Entropy for Robust ASR," in *Proc. IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2008)*, Sarajevo.
- A. Ziaei, S.M. Ahadi and H. Yeganeh, "A New Approach to Automatic Object Detection and Tracking Using Wavelet Features and ANN," in *Proc. International Conference on Signal Processing (ICSP'08)*, Beijing.
- A. Ziaei, S.M. Ahadi and H. Yeganeh, "Enhanced Spectral Features for Spoken Language Identification," in *Proc. International Conference on Signal Processing (ICSP'08)*, Beijing.
- H. Yeganeh, S.M. Ahadi and A. Ziaei, "A New MFCC Improvement Method for Robust ASR," in *Proc. International Conference on Signal Processing (ICSP'08)*, Beijing.
- S. Seyedin and S.M. Ahadi, "Feature Extraction Based on DCT and MVDR Spectral Estimation for Robust Speech Recognition," in *Proc. International Conference on Signal Processing (ICSP'08)*, Beijing.
- M. MirRezaei and S.M. Ahadi, "Speaker Diarization in a Multi-Speaker Environment Using Particle Swarm Optimization and Mutual Information," in *Proc. IEEE International Conference on Multimedia and Expo (ICME 2008)*, Hannover.
- Nima Khademi Kalantari, Seyed Mohammad Ahadi and Hamidreza Amindavar, "A Universally Optimum Decoder for Multiplicative Audio Watermarking," in *Proc. IEEE International Conference on Multimedia and Expo (ICME 2008)*, Hannover.
- A.H. Hadjahmadi, M. M. Homayounpour, S. M. Ahadi and G. Farahani, "Evaluation of the effect of methods based on the autocorrelation sequence peaks on the robustness of speaker identification systems," in *Proc. 16th Iranian Conference on Electrical Engineering*, May 2008, Tehran (in Persian).
- A.H. Hadjahmadi, M. M. Homayounpour and S. M. Ahadi, "Robust Weighted Fuzzy C-Means Clustering," to appear in *Proc. IEEE World Congress on Computational Intelligence 2008*, Hong Kong.

- S.A. Soleimani and S.M. Ahadi, "Voice Activity Detection based on Combination of Multiple Features using Linear/Kernel Discriminant Analyses," in *Proc. International Conference on Information and Communication Technologies: from Theory to Applications (ICTTA'08)*, Damascus.
- N. Khademi, and S.M. Ahadi, "Vector quantization index modulation watermarking using concentric hyperspherical codebooks," in *Proc. ICASSP-08*, Las Vegas.
- J. Kabudian, M. M. Homayounpour and S.M. Ahadi, "Time-Inhomogeneous Hidden Bernoulli Model (TI-HBM): A New Alternative to Hidden Markov Model in Automatic Speech Recognition," in *Proc. ICASSP-08*, Las Vegas.
- O. Hazrati, S.M. Ahadi and O. Sadjadi, "Kernel-based Speaker Clustering for Rapid Speaker Adaptation," in *Proc. International Conference on Information Technology: New Generations (ITNG)*, Las Vegas, April 2008.
- A.H. Hadjahmadi, M.M. Homayounpour and S. M. Ahadi, "Robust speaker recognition using missing feature theory for reconstruction of spectral peaks of autocorrelation sequence," in *Proc. 4th International Colloquium on Signal Processing and its Applications (CSPA 2008)*, Kuala Lumpur.
- S.A. Soleimani and S.M. Ahadi, LDA-based multiple feature weighting for voice activity detection," in *Proc. 13th Computer Society of Iran Annual Conference (CSICC)*, March 2008, Kish (in Persian).
- M.M. Homayounpour, A. H. Hajahmadi and S.M. Ahadi, "Noise-Robust Hybrid Feature Extraction for Speaker Identification," in *Proc. 13th Computer Society of Iran Annual Conference (CSICC)*, March 2008, Kish (in Persian).
- N. Khademi, S.M. Ahadi and A. Kashi, "A Robust Audio Watermarking Scheme Using Mean Quantization in the Wavelet Transform Domain," in *Proceedings IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2007)*, Dec. 2007, Cairo.
- S.M. Mirrezaie, S.M. Ahadi and A. Kashi, "Robust Speaker Diarization in a Multi-Speaker Environment Using Autocorrelation-based Noise Subtraction," in *Proceedings IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2007)*, Dec. 2007, Cairo.
- N. Faraji, S. M. Ahadi and S. S. Shariati, "Threshold Reduction for Improving Sparse Coding Shrinkage Performance in Speech Enhancement," in *Proceedings International Conference on Information, Communications and Signal Processing (ICICS 2007)*, Dec. 2007, Singapore.
- N. Faraji and S.M. Ahadi, "Evaluation of a Feature Selection Scheme on ICA-based Filter-Bank for Speech Recognition," in *Proceedings International Conference on Information, Communications and Signal Processing (ICICS 2007)*, Dec. 2007, Singapore.
- S.O. Sadjadi, S.M. Ahadi, O. Hazrati, "Unsupervised Speech/Music Classification Using One-Class Support Vector Machines," in *Proceedings International Conference on Information, Communications and Signal Processing (ICICS 2007)*, Dec. 2007, Singapore.
- D. Gharavian and S.M. Ahadi, "Statistical Evaluation of the Effect of Gender on Prosodic Parameters and their Influence on Gender-Dependent Speech Recognition," in *Proceedings International Conference on Information, Communications and Signal Processing (ICICS 2007)*, Dec. 2007, Singapore.
- A. H. Hajahmadi, M.M. Homayounpour and S.M. Ahadi, "Improved Gaussian Mixture Model Using Robust Weighted Fuzzy C-Means Clustering," in *Proc. 3rd Conf. on Information and Knowledge Technology*, Nov. 2007, Mashad, Iran (in Persian).

- N. Khademi, M.A. Akhaee, S.M. Ahadi, M. Moradi and A. Kashi, "Audio Watermarking based on Quantization Index Modulation in the Frequency Domain," in *Proc. IEEE International Conference on Signal Processing and Communications (ICSPC 2007)*, Nov. 2007, Dubai.
- D. Gharavian and S.M. Ahadi, "Evaluation of the Effect of Prosodic Parameters on Gender Dependent Speech Recognition in Farsi Language," in *Proc. International Conference on Speech and Computer (SPECOM 2007)*, Oct. 2007, Moscow.
- A. H. Hajahmadi, M.M. Homayounpour and S.M. Ahadi, "Modified Fuzzy Possibilistic C-Means Clustering for Large and Noisy Databases," in *Proceedings The Joint Congress on Fuzzy and Intelligent Systems (ISFS 2007)*, Aug. 2007, Mashad, Iran (in Persian).
- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Improved Autocorrelation-based Noise Robust Speech Recognition Using Kernel-based Cross Correlation and Overestimation Parameters," in *Proceedings European Signal Processing Conference (EUSIPCO)*, Sep. 2007, Poznan, Poland.
- A. Esmaeili, S.M. Ahadi and M.A. Fassihi, "A Non-Causal Approach to Voice Activity Detection in Adverse Environments Using A Novel Noise Estimator," in *Proceedings European Signal Processing Conference (EUSIPCO)*, Sep. 2007, Poznan, Poland.
- S.S. Shariati, S.M. Ahadi, K. Mohammadi, "Front-End Post-Processing Using Histogram Equalization Combined With ARMA Filtering for Noise Robust Speech Recognition," in *Proceedings European Signal Processing Conference (EUSIPCO)*, Sep. 2007, Poznan, Poland.
- L. Ardakanian and S.M. Ahadi, "A Hybrid Speaker Segmentation and Clustering System in a Multi-Speaker Environment," in *Proc. 15th Iranian Conference on Electrical Engineering*, May 2007, Tehran (in Persian).
- A.H. Hajahmadi, M.M. Homayounpour, G. Farahani and S.M. Ahadi, "Noise-robust speaker identification using speech autocorrelation spectral peaks," in *Proc. 12th Computer Society of Iran Annual Conference*, February 2007, Tehran (in Persian).
- F. Golshan, S.M. Ahadi and S.S. Shariati, "Adaptive ARMA Filtering and Energy Normalization for Robust Speech Recognition," in *Proc. International Symposium on Signal Processing and its Applications (ISSPA)*, February 2007, Sharjah.
- G. Farahani, S.M. Ahadi, M.M. Homayounpour and A. Kashi, "Consideration of Correlation Between Noise and Clean Speech Signals in Autocorrelation-based Robust Speech Recognition," in *Proc. International Symposium on Signal Processing and its Applications (ISSPA)*, February 2007, Sharjah.
- D. Gharavian and S.M. Ahadi, "Recognition of Emotional Speech and Speech Emotion in Farsi", in *Proc. International Symposium on Chinese Spoken Language Processing*, December 2006, Singapore.
- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Robust Feature Extraction based on Spectral Peaks of Group Delay and Autocorrelation Function and Phase Domain Analysis", in *Proc. ICSLP-06*, Pittsburgh, Pennsylvania.
- G. Farahani, S.M. Ahadi, M.M. Homayounpour and A. Kashi, "Robust Feature Extraction Using Spectral Peaks of the Filtered Higher Lag Autocorrelation Sequence of the Speech Signal", in *Proc. IEEE International Symposium on Signal Processing and Information Technology (ISSPIT) 2006*, Vancouver.

- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Use of Spectral Peaks in Autocorrelation and Group Delay Domains for Robust Speech Recognition," in *Proc. ICASSP-06*, May 14-19, Toulouse, France.
- A. Esmaeili, S.M. Ahadi and M.A. Fassihi, "Using Long-Term Speech Information to Improve a Voice Activity Detector based on the Statistical Likelihood Ratio Test," in *Proc. 14th Iranian Conference on Electrical Engineering*, May16-18, 2006, Tehran, Iran.
- G. Farahani, S.M. Ahadi and M.M. Homayounpour, "Using Autocorrelation and Group Delay Spectral Peaks for Robustness in Noisy Speech Recognition," in *Proc. 14th Iranian Conference on Electrical Engineering*, May16-18, 2006, Tehran, Iran (In Persian).
- E. Shokri and S.M. Ahadi, "Robust Speech Recognition Using Viterbi Path Accuracy Probability," in *Proc. IEEE Benelux/DSP Valley Signal Processing Symposium (SPS-DARTS) 2006*, March 28-29, Antwerp, Belgium.
- A. Esmaeili, S.M. Ahadi and M.A.Fassihi, "Voice Activity Detection based on Speech Enhancement and Long-term Spectral Divergence", in *Proc. 11th Computer Society of Iran Annual Conference*, January 24-26, 2006, Tehran, Iran (In Persian).