

Curriculum Vitae (C.V.)

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Massoud BABAIE-ZADEH

Full Professor of Sharif University of Technology;
Senior Member of the IEEE;
Citations: 3910;
h-index: 27;
i10-index: 59



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Education

1/1997–9/2002 **Ph.D. on Signal Processing (SIPT=Signal, Image, Parole, Télécom)**, *Institut National Polytechnique de Grenoble (INPG)*, Grenoble, France and *Sharif University of Technology*, Tehran, IRAN.

Comment 1: My PhD thesis was accepted with the grade “Très honorable avec félicitations du Jury” (highest grade in France), and won INPG “Best PhD thesis” award in 2005.

Comment 2: My PhD thesis was a collaborative work between the universities Sharif in Iran and INPG in France. From January 1997 to October 1999, I was busy with PhD courses in Iran (which is obligatory in Iran’s PhD program) and the qualification exam and defending my proposal for the PhD thesis in Iran. From November 1999 to September 2002, I was working on my PhD thesis (mainly in France).

9/1994–12/1996 **M.Sc. on Digital Electronics**, *Sharif University of Technology*, Tehran, IRAN, GPA: **18.6/20** (Rank 1).

9/1990–9/1994 **B.Sc. on Electrical Engineering (Electronics)**, *Isfahan University of Technology*, Isfahan, IRAN, GPA: **19.05/20** (Rank 1).

My Master Thesis

Title *Separating two overlapping speech signals*
Supervisor Pr. Mahmoud TEBYANI, *Sharif University of Technology*
Description This master thesis was on separating two mixed speech signals from only one microphone. At that time, Blind Source Separation (BSS) was a relatively new tool, and we were not aware of it. Then I tried to use ideas based on properties of speech signals. In particular, I tried to apply the sinusoidal model of speech signals (which had been developed by Quatieri and McAulay in 1986) for solving this problem. However, while doing this thesis, I learned about BSS as a new tool (at that time) for signal separation based on multi-sensor measurements, which determined my direction for the PhD level.

My Ph.D. Thesis

Title	<i>On Blind Source Separation in Convolutional and Non-Linear mixtures</i>
Supervisors	Pr. Christian JUTTEN, <i>Institut National Polytechnique de Grenoble (INPG)</i> , and Dr. Kambiz NAYEBI <i>Sharif University of Technology</i>
Description	In my Ph.D thesis I was looking for a method for blind separating convolutional Post Non-Linear (PNL) mixtures. The main problem was that the methods already developed for separating PNL mixtures (as a special case of nonlinear mixtures which is theoretically separable) and the methods already developed for separating convolutional mixtures were based on too different ideas, and they could not be combined to separate convolutional PNL mixtures. Then I focused on Mutual Information as an exact measure of independence, and developed a general method for mutual information minimization, which can be used in almost any mutual information minimization problem. My method was based on a function that I called Score Function Difference (SFD), and I showed that it acts virtually as a 'gradient' for mutual information. Based on this approach, I developed a set of methods for separating linear, convolutional, PNL, and convolutional PNL mixtures.

Moreover, at that time, many experts in the field believed that general nonlinear mixtures might be separable if we assume that the mixing system is 'smooth'. However, in my PhD thesis, I constructed a counter-example to show that even a smooth nonlinear mixing system may be non-separable.

As mentioned earlier, my PhD was a collaboration ('co-tutelle' PhD) between Sharif University of Technology (Iran) and INP de Grenoble (France). I spent about two years in Iran taking the courses, and then three years working on my thesis, mainly in France, and under supervision of Pr. Christian JUTTEN (the inventor of BSS/ICA). More precisely, I passed 2 years in France and one year in Iran:

- November 1999 to September 2000 in France,
- September 2000 to October 2001 in Iran,
- October 2001 to October 2002 in France.

I defended my PhD thesis on 20 September 2002 in France, in front of the following jury:

1. Pr. Dinh-Tuan PHAM, INPG, *president of the jury*,
2. Pr. Christian JUTTEN, INPG, *thesis' supervisor*,
3. Dr. Kambiz NAYEBI, Sharif University of Technology, *thesis' supervisor*,
4. Pr. Pierre COMON, University of Nice, *reviewer ('rapporteur')*,
5. Pr. Jean-François CARDOSO, ENST Paris, *reviewer ('rapporteur')*,
6. Pr. Masoomeh NASIRI, Sharif University of Technology, *examiner*.

Experiences before becoming a faculty member

Before becoming a faculty member of Sharif University (in October 2003), during my MS and PhD studies in Iran, I was working part-time for Iranian companies. When I was in France for my PhD thesis (11/1999–9/2000 and 10/2001–10/2002), I had a scholarship from the French government. The detailed list is given below.

Industrial experiences during my M.S and Ph.D. studies

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|-----------|---|
| 1995 | Part-time digital circuit designer, Pardazesh-Iran company, Tehran, Iran. It was a small design company (with about 10 employees), active on design and implementation of Voice Mail systems. |
| 1996–1998 | Part-time digital circuit designer, Fara-Pardaz company, Tehran, Iran. It was a small design company (with about 10 employees), active on design and implementation of Voice Mail systems. |

- 10/1998–10/1999 Part-time member of R&D group of Informatics Services Corporation (ISC), Tehran, Iran. It is a big company (with more than 1000 employees) active on VSAT satellite networking, used to interconnect the banks of Iran.
- 11/1999–9/2000 Full-time researcher/PhD student in LIS (Laboratory of Images and Signals), INPG, Grenoble, France.
- 10/2000–10/2001 Again, part-time member of R&D group of Informatics Services Corporation (ISC), Tehran, Iran.
- 10/2001–10/2002 Full-time researcher/PhD student in LIS (Laboratory of Images and Signals), INPG, Grenoble, France.

Academic experiences during my M.S and Ph.D. studies

- 1994–2002 **Student academic works**, Teacher Assistant (TA) of courses: “Signals&Systems” (34 hours, 1994), “Electromagnetic” (17 hours, 1995), “DSP” (17 hours, 1996), “Image Processing” (17 hours, 2000); and Teaching “Digital Design” (51 hours, 1997).
- 1998 **Organizing a tutorial**, titled “Electromagnetic Interference (EMI) control in digital circuits” at the 1st Student Conference on Electrical Engineering, Tehran, Iran.

Experiences after my PhD but before becoming a faculty member

- 2/2002–4/2003 Three months work in “Tecteon” company. It was a small company (with about 20 employees) active on design and implementation of “Echo Canceller” to be used in digital telephone switches.
- 4/2003–10/2003 My national services in Iran (teaching in Sharif university, but without a complete salary). At that time, the duration of national service in Iran was 21 months, however, after 7 months of service, thanks to a new law, I obtained an exemption of service because of my 3rd rank in MSc national concours in Iran.
- 10/2003–present Faculty member of Sharif University of Technology, Tehran, IRAN.

Faculty membership at Sharif University of Technology

I became a faculty member of the Electrical Engineering Department of *Sharif University of Technology* on October 2003:

- 2003-2008 Assistant Professor,
 2008-2015 Associate Professor.
 Since Dec. 2015 Professor.

Moreover:

- I got “tenure” in July 2010.
- I became a “Senior Member” of the IEEE in July 2009.

Visiting professor experiences

- June to August 2006 (3 months) **Invited assistant professor (Maître de Conférence Invité)**, *INP de Grenoble*, Grenoble, France.
 Working with Professor Christian Jutten.

- July 2008 (one month) **Invited assistant professor (Maître de Conférence Invité)**, *Université d'EVRY Val d'Esonne*, Paris, France.
Working with Dr. Vincent Vigneron.
- October 2010 to October 2011 (1 year) **Visiting faculty**, *University of Minnesota*, Minneapolis, USA.
Working with Professor Georgios Giannakis.
- July 2016 (one month) **Invited visiting professor**, *GIPSA-Lab*, Grenoble, France.
Working with Professor Christian Jutten.
- June 2017 (two weeks) **Invited visiting professor**, *GIPSA-Lab*, Grenoble, France.
Working with Professor Christian Jutten.
- July 2018 (three weeks) **Invited visiting professor**, *GIPSA-Lab*, Grenoble, France.
Working with Professor Christian Jutten.

Teaching

I have thought the following courses in Sharif University of Technology since 2003.

- “Adaptive Filters theory” (15 × 45 hours), *graduate*.
- “Numerical Optimization” (12 × 45 hours), *graduate*. Designed by myself and thought for the first time in fall 2007.
- “Blind Source Separation (BSS) and Sparse Signal Processing” (10 × 45 hours), *graduate*. Designed by myself and thought for the first time in spring 2009.
- “Multimedia Signal Processing” (4 × 45 hours), *undergraduate/graduate*. Designed by myself and thought for the first time in spring 2006.
- “Signals&Systems” (11 × 45 hours), *undergraduate*.
- “Digital Signal Processing” (10 × 45 hours), *undergraduate/graduate*.
- “Probability and Statistics” (once, 45 hours), *undergraduate*.
- “Digital Design” (once, 45 hours), *undergraduate*.

Laboratory directorship

Signal Processing research laboratory: Since 2004, I have been the director of the Signal Processing research laboratory in Sharif University of Technology. This is a small laboratory composed of about 15 students in PhD, MS and BS levels, and since then it has been very active specially in theoretical research on Blind Source Separation (BSS) and Sparsity-aware Signal Processing.

Educational laboratory on digital signal processing: I, with the help of 4 B.Sc. students, established in 2007 an 'educational' laboratory to teach working with Digital Signal Processors (based on TMS320C6416). As far as I know, this was the first time that such a lab was established in an Iranian university. This is a 1 unit course, in which students learn to work with TMS320C6416 DSP's by doing practical experiments. After designing the instruction manual and buying a set of boards, the course was first presented in 2007 in the location of our signal processing 'research' lab. After 6 consecutive presentations of the course and correcting the instruction manual several times, since fall 2010, this educational laboratory was moved to its own and separate location called "DSP educational lab".

The lab was modified in 2017, with the help of 3 students, to include experiments with Raspberry-Pi boards and software-defined radio (SDR) modules using MATLAB.

Supervised Theses

In summary, I have supervised/co-supervised:

- 6 finished Ph.D thesis,
- 38 finished M.Sc. theses,
- 3 running M.Sc. theses,
- 2 running Ph.D. theses.

The details are given below.

Finished Ph.D thesis

- 2010 1. Mr. Hadi Zayyani, "SCA and its applications".
- 2015 2. Mr. Mohammad-Reza Malek-Mohammadi, "Sparse representation and its applications in multi-sensor problems."
- 2017 3. Mr. Alireza Hariri, "Signal processing in compressed sensing domain without signal representation."
- 2018 4. Ms. Farnaz Sedighin, "Multimodal blind source separation."
- 2018 5. Mr. Mostafa Sadeghi, "Dictionary learning for high dimensional data."
- 2018 6. Ms. Bahram Ehsandoust, "Blind source separation in nonlinear mixtures." This was a joint PhD thesis, co-supervised with Professor Christian Jutten and Professor Bertrand Rivet in University of Grenoble-Alpes (UGA) in Grenoble, France.

Finished M.Sc. theses

- 2003 1. Ms. Samareh Samadi, "Adaptive techniques for estimating Score Function Difference (SFD) and its application to Blind Source Separation." In reality, I was the first supervisor of this thesis, but since at that time I was doing my national services in the university and I was not yet a faculty member, officially, I was only a consultant (and the official supervisor was Dr Kambiz Nayebi).
- 2004 2. Mr. Mahmoud Ferdosi-Zadeh, "Blind Separation of Speech Signals." In reality I was the first supervisor, but officially, with reasons similar to above, I was the second supervisor (not consultant however as above). The first supervisor was officially Dr Farokh A. Marvasti.
- 2004 3. Mr. Hamed Moti-ian, "Blind separation of speech signals in the frequency domain." Co-supervised with Dr. Farokh A. Marvasti. I was the first supervisor.

- 2005 4. Mr. Mazda Hamdi, "Using Blind Source Separation techniques for beamforming." Co-supervised with Dr. Farokh A. Marvasti. I was the first and main supervisor.
- 2006 5. Mr. Arash Ali Amini, "Underdetermined Sparse Component Analysis (SCA)."
- 2007 6. Mr. Rahil Mahdyian, "Using SCA for underdetermined speech separation in frequency domain."
- 2008 7. Ms. Soodeh Ahani, "Optical Character Recognition (OCR) based on Sparse Decomposition."
- 2008 8. Mr. Farnoud Merrikh-Bayat, "Removing bleed-through effect of scanned documents using nonlinear BSS techniques."
- 2008 9. Mr. Seyyed-Ali HesamMohseni, "Coded Compressed Sensing."
- 2008 10. Mr. Aboozar Ghaffari, "Image denoising based on sparse decomposition."
- 2009 11. Ms. Armin Eftekhari, "Identification based on Retinal Images." He was an MS student of Khajeh-Nasir University (working with Dr Hamid Abrishami-Moghaddam), and I was a consultant of this MS thesis.
- 2009 12. Ms. Zahra Sadeghipour, "Image denoising based on sparse decomposition."
- 2009 13. Mr. Hamid Palangi, "Image compression based on sparse decomposition and Mixed-Transform techniques."
- 2009 14. Ms. Fatemeh Mokhtari, "Removing show-through effect of scanned documents using nonlinear BSS techniques."
- 2010 15. Ms. Mahsa Akhbari, "Activation detection in fMRI images based source separation." Co-supervised with Dr. Emad Fatemizadeh. I was the second supervisor.
- 2010 16. Mr. Rad Nia-Zadeh, "Sparse Channel Estimation."
- 2010 17. Mr. Sina Hamidi, "Application of Sparse Decomposition to Optical Character Recognition (OCR)."
- 2010 18. Mr. Kian Hajisami, "Application of Blind Source Separation in Information Hiding."
- 2011 19. Ms. Sara Nayyer, "Applications of Sparse representation in image processing."
- 2011 20. Ms. Azar Zandifar, "Applications of Blind Source Separation and Nonnegative Matrix Factorization in unmixing hyperspectral data."
- 2012 21. Mr. Hooshang Ghasemi, "Applications of Matrix Completion in Image Processing."
- 2012 22. Mr. Mohammad-Mehdi Mojahedian, "Applications of Matrix Completion in Telecom."
- 2012 23. Mr. Mohsen Amid-Zadeh, "Source localization and tracking".
- 2012 24. Mr. Mostafa Sadeghi, "Dictionary Learning for Sparse Representation".
- 2013 25. Mr. Mojtaba Sahraee, "Applications of Sparse Representation in Image Superresolution."
- 2013 26. Mr. Ali Hashemi, "Compressed Spectrum Sensing in Cognitive Radio Networks." Co-supervised with Pr. Masoumeh Nasiri-Kenari. I was the second supervisor.
- 2013 27. Mr. Majid Ghassimi, "Blind separation of underdetermined mixtures of speech signals based on sparse representation."
- 2014 28. Mr. Mohsen Ghassimi, "Distributed Compressed Sensing and its applications in Distributed Sensor Networks."
- 2014 29. Mr. Sajjad Daei, "Algorithms for sparse channel estimation."
- 2014 30. Mr. Sajjad Amini, "Dictionary learning and its application in image denoising."
- 2014 31. Ms. Sepideh Azarian, "Digital Image Forensics."

- 2014 32. Mr. Mehdi Ghamchili, "Classification of different mental activities based on Riemannian geometry."
- 2015 33. Ms. Elaheh Sobhani, "Pupil Detection and Eye Tracking."
- 2015 34. Mr. Ali Mehrpooya, "Sparse Representation Based Image Inpainting."
- 2015 35. Mr. Milad Nazari, "Sparse Representation-based Classification and Application to Image and Speech Processing."
- 2016 36. Ms. Maryam Tavakkol Elahy, "Design and implementation of a hand gesture recognition system."
- 2016 37. Mr. Ali Shahin Shamsabadi, "Automatic Learning of Image Features by Using Deep Sparse Networks."
- 2019 38. Mr. Javad Parsa, "Dictionary learning for sparse representation."
- 2019 39. Mr. Mohammad Sabaghi, "Graph Signal Processing (GSP) and its applications in image compression."
- 2019 40. Mr. Zahra Dehghani-Tafti, "Image inpainting using sparse representation."

Current Ph.D. theses

- 2018 1. Ms. Elaheh Sobhani, "Tensor decomposition." This is a joint PhD thesis, under co-supervision with Professor Pierre Comon, from GIPSA-lab, Grenoble, France.
- 2019 2. Mr. Hesam Araghi, "Graph Signal Processing."

Current M.Sc theses

- 2019 1. Mr. Firooz Shahriari-Mehr, "Two dimensional dictionary learning."
- 2020 2. Mr. Amir-Ehsan Khorashadi-Zadeh, "Compressive Machine Learning."
- 2020 3. Mr. Amir-Hossein Daghestani, "Graph signals with multiple edge types and their applications."

B.Sc. projects

2003–present I have supervised a lot of B.Sc. projects, many of which have been resulted in scientific papers (see for examples my papers with Mr. Hossein Mohimani, Mr. Farid Movahhedi, Mr. Bahman Bahmani, and Mr Nima Noorshams).

Journal and conference activities

Journal Editorial Board

2016–present Since 2016, I am an Associate Editor of "Signal Processing" journal. This is a publication of the European Association for Signal Processing (EURASIP) and is published by Elsevier.

Conference or session chairs

- ICEE2015 **Program chair** of 23'th Iranian Conference on Electrical Engineering (ICEE). I was the program chair ("DABIR"), meaning the responsible for everything. It was a very big conference (with around 1300 submitted papers), and was held in Sharif University of Technology, on May 2015.
- LVA/ICA2017 **Technical Program co-chair** of 13th International Conference on Latent Variable Analysis and Signal Separation. I and Dr. Petr Tichavsky were the technical program chairs of this conference, which was held in Grenoble, France, on February 2017.
- EUSIPCO2005 **Organizer and session chair** of a special session in 13th European Signal Processing Conference (EUSIPCO), 2005, Turkey. Done with Prof. Christian Jutten.
Special session title: "Novel Directions in Information Theoretic Approaches to Source Separation and Estimation".
URL: http://www.eusipco2005.org/special_sess.html .
- ESANN2006 **Organizer and session chair** of a special session in 14th European Symposium on Artificial Neural Networks (ESANN), 2006, Belgium. Done with Prof. Christian Jutten.
Session title: "Semi-Blind Approaches for Source Separation and Independent component Analysis".
URL: <http://www.dice.ucl.ac.be/esann/proceedings/papers.php?ann=2006> .
- ICEE2007 **Organizer of a workshop** in Iranian Conference on Electrical Engineering (ICEE; the largest Iranian conference on EE) in ICEE2007 (held in Iran Telecom Research Center). The workshop was titled "Blind Source Separation (BSS) and Independent Component Analysis (ICA): theory, applications and perspectives".
- ICEE **Session chair** of several sessions in several Iranian Conferences on Electrical Engineering (ICEE); namely in ICEE2008 (held in Tarbiat-e-Modarres University), ICEE2009 (held in Iran University of Science and Technology) and ICEE2010 (held in Isfahan University of Technology).

Technical Program Committee of conferences

I was a member of Technical Program Committee of the following conferences:

- MLSP2008 IEEE International Workshop on Machine Learning For Signal Processing (MLSP), 2008, Mexico (<http://mlsp2008.conwiz.dk/index.php?id=45>).
- MLSP2010 IEEE International Workshop on Machine Learning For Signal Processing (MLSP), 2010, Finland (<http://mlsp2010.conwiz.dk/index.php?id=45>).
- ICA2009 8'th International Conference on Independent Component Analysis and Signal Separation (ICA), 2009, Brazil (<http://www.ica2009.org/>).
- ICA2010 9'th International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA), 2010, France (<http://lva2010.inria.fr/committees>).

ICEE Several Iranian Conferences on Electrical Engineering (ICEE); namely ICEE2006, ICEE2008, ICEE2009, and ICEE2010.
Moreover, in 2009 and 2010, I was the representative of Sharif University of Technology in the “Permanent Committee” of this conference.

Reviewer

I was a reviewer of several journals, including IEEE Transactions on Signal Processing, IEEE Signal Processing letters, Signal Processing (Elsevier), and IEEE Transactions on Neural Networks. I have also been a reviewer of many conferences including IEEE International Symposium on Circuits and Systems (ISCAS), Independent Component Analysis and Signal Separation (ICA), European Symposium on Artificial Neural Networks (ESANN), European Signal Processing Conference (EUSIPCO), IEEE Workshop on Machine Learning for Signal Processing (MLSP), IEEE Digital Signal Processing Workshop (DSP), Iranian Conference on Electrical Engineering (ICEE).

Honors and Awards

- July 2009 Becoming a “Senior Member” of the IEEE.
- 2005 “The best PhD thesis award of 2002” for my PhD thesis from Institute National Polytechnique of Grenoble (INPG), France.
- 2008 Selected (by the votes of the students of the Electrical Engineering Department of Sharif University of Technology) as the best course lecturer of the department.
- 2002 The grade “Très honorable avec félicitations du Jury” (highest grade in France) for my PhD thesis.
- 1999 French government grant for preparing a Ph.D.
- 1994 Rank 3 (among more than 5000 persons) at the national exam (‘concours’) for entering M.Sc. studies in Iran. I obtained an exemption of my national service (which is obligatory in Iran) thanks to this rank.
- 1990 Rank 22 (non-regional; in the whole country) among more than 200,000 participants in the national exam (‘concours’) for university entrance in Iran.
- 1994 Rank 1 among all of the electrical engineering graduated students (about 120 persons) at Isfahan University of technology, Isfahan, Iran.
- 1996 Rank 1 among all 5 M.S. students of digital electronics at Sharif university of technology, Tehran, Iran.
- 1997 Rank 1 (among about 100 persons) in the Ph.D. entrance examination of Sharif university of technology.

Languages

- Persian native language
- English reading, writing, speaking
- French reading, writing, speaking

Publications

Book Chapter

- [1] C. Jutten, M. Babaie-Zadeh, and J. Karhunen, "Chapter 14: Nonlinear mixtures," in *Handbook of Blind Source Separation*, P. Comon and C. Jutten, Eds. Academic Press, February 2010, ISBN-13: 978-0-12-374726-6. [Online]. Available: http://www.elsevier.com/wps/find/bookdescription.cws_home/717222/description#description

Journals

- [1] M. Babaie-Zadeh, C. Jutten, and K. Nayebi, "Using multivariate score functions in source separation: Application to post non-linear mixtures," *Scientia-Iranica*, vol. 9, no. 4, pp. 409–418, 2002.
- [2] C. Jutten, M. Babaie-Zadeh, and S. Hosseini, "Three easy ways for separating nonlinear mixtures?" *Signal Processing (Elsevier)*, vol. 84, no. 2, pp. 217–229, 2004.
- [3] M. Babaie-Zadeh, C. Jutten, and K. Nayebi, "Differential of mutual information," *IEEE Signal Processing Letters*, vol. 11, no. 1, pp. 48–51, January 2004.
- [4] M. Babaie-Zadeh and C. Jutten, "A general approach for mutual information minimization and its application to blind source separation," *Signal Processing (Elsevier)*, vol. 85, no. 5, pp. 975–995, May 2005.
- [5] M. Babaie-Zadeh, C. Jutten, and A. Mansour, "Sparse ICA via cluster-wise PCA," *Neurocomputing (Elsevier)*, vol. 69, pp. 1458–1466, August 2006.
- [6] S. Samadi, M. Babaie-Zadeh, and C. Jutten, "Quasi-optimal EASI algorithm based on Score Function Difference (SFD)," *Neurocomputing (Elsevier)*, vol. 69, pp. 1415–1424, August 2006.
- [7] F. MovahediNaeni, H. Mohimani, M. Babaie-Zadeh, and C. Jutten, "Estimating the mixing matrix in sparse component analysis (SCA) based on partial k-dimensional subspace clustering," *Neurocomputing (Elsevier)*, vol. 71, pp. 2330–2343, June 2008.
- [8] H. Zayyani, M. Babaie-Zadeh, F. Haddadi, and C. Jutten, "On the Cramer-Rao bound for estimating the mixing matrix in noisy sparse component analysis," *IEEE Signal Processing Letters*, vol. 15, pp. 609–612, 2008.
- [9] H. Mohimani, M. Babaie-Zadeh, and C. Jutten, "A fast approach for overcomplete sparse decomposition based on smoothed L0 norm," *IEEE Transactions on Signal Processing*, vol. 57, no. 1, pp. 289–301, January 2009.
- [10] H. Zayyani, M. Babaie-Zadeh, and C. Jutten, "An iterative bayesian algorithm for sparse component analysis in presence of noise," *IEEE Transactions on Signal Processing*, vol. 57, no. 11, pp. 4378–4390, November 2009.
- [11] M. Babaie-Zadeh and C. Jutten, "On the stable recovery of the sparsest overcomplete representations in presence of noise," *IEEE Transactions on Signal Processing*, vol. 58, no. 10, pp. 5396–5400, October 2010.
- [12] F. Merrikh-Bayat, M. Babaie-Zadeh, and C. Jutten, "Linear-quadratic blind source separating structure for removing show-through in scanned documents," *International Journal on Document Analysis and Recognition (Springer-Verlag)*, vol. 14, no. 4, pp. 319–333, December 2011.
- [13] A. Eftekhari, M. Babaie-Zadeh, and H. A. Moghaddam, "Two-dimensional random projection," *Signal Processing*, vol. 91, no. 7, pp. 1589–1603, July 2011.
- [14] M. Babaie-Zadeh, C. Jutten, and H. Mohimani, "On the error of estimating the sparsest solution of underdetermined linear systems," *IEEE Transactions on Information Theory*, vol. 57, no. 12, pp. 7840–7855, December 2011.
- [15] R. Niazadeh, M. Babaie-Zadeh, and C. Jutten, "On the achievability of Cramèr-Rao bound in noisy compressed sensing," *IEEE Transactions on Signal Processing*, vol. 60, no. 1, pp. 518–526, January 2012.
- [16] R. Niazadeh, S. H. Ghalehjegh, M. Babaie-Zadeh, and C. Jutten, "ISI sparse channel estimation based on SL0 and its application in ML sequence-by-sequence equalization," *Signal Processing*, vol. 92, no. 8, pp. 1875–1885, August 2012.

- [17] H. Zayyani and M. Babaie-Zadeh, "Approximated Cramèr-Rao bound for estimating the mixing matrix in the two-sensor noisy Sparse Component Analysis (SCA)," *Digital Signal Processing (Elsevier)*, vol. 23, no. 3, pp. 771–779, May 2013.
- [18] M. Sadeghi, M. Babaie-Zadeh, and C. Jutten, "Dictionary learning for sparse representation: A novel approach," *IEEE Signal Processing Letters*, vol. 20, no. 12, pp. 1195–1198, December 2013.
- [19] —, "Learning overcomplete dictionaries based on atom-by-atom updating," *IEEE Transactions on Signal Processing*, vol. 62, no. 4, pp. 883–891, February 2014.
- [20] M. Malek-Mohammadi, M. Babaie-Zadeh, A. Amini, and C. Jutten, "Recovery of low rank matrices under affine constraints via a smoothed rank function," *IEEE Transactions on Signal Processing*, vol. 62, no. 4, pp. 981–992, February 2014.
- [21] M. Malek-Mohammadi, M. Babaie-Zadeh, and M. Skoglund, "Iterative concave rank approximation for recovering low-rank matrices," *IEEE Transactions on Signal Processing*, vol. 62, no. 20, pp. 5213–5226, October 2014.
- [22] A. Saeb, F. Razzazi, and M. Babaie-Zadeh, "SR-NBS: A fast sparse representation based N-best class selector for robust phoneme classification," *Engineering Applications of Artificial Intelligence (Elsevier)*, vol. 28, pp. 155–164, February 2014.
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- [24] M. Malek-Mohammadi, M. Babaie-Zadeh, and M. Skoglund, "Performance guarantees for Schatten-p quasi-norm minimization in recovery of low-rank matrices," *Signal Processing*, vol. 114, pp. 225–230, September 2015.
- [25] A. Hariri and M. Babaie-Zadeh, "Joint compressive single target detection and parameter estimation in radar without signal reconstruction," *IET Radar, Sonar & Navigation*, vol. 9, no. 8, pp. 948–955, October 2015.
- [26] M. Niknejad, H. Rabbani, and M. Babaie-Zadeh, "Image restoration using gaussian mixture models with spatially constrained patch clustering," *IEEE Transactions on Image Processing*, vol. 24, no. 11, pp. 3624–3636, November 2015, (computer code is available in <https://sites.google.com/site/hosseinrabbanikhorasgani/research/image-restoration>).
- [27] A. Taimori, F. Razzazi, A. Behrad, A. Ahmadi, and M. Babaie-Zadeh, "Quantization-unaware double jpeg compression detection," *Journal of Mathematical Imaging and Vision*, vol. 54, no. 3, pp. 269–286, March 2016.
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