
Raheleh Kafieh

Personal Info.

- Date of Birth: 21/09/1982
- Current mission: Assistant Professor
- Address: Department of Advanced Medical Technologies, Isfahan University of Medical Science, Isfahan, Iran.
- Email: rkafieh@gmail.com
- Phone number: +98-913-369-8941

Education

- Post-doc at Faculty of Engineering and Natural Sciences, Sabanci University, Istanbul, Turkey (from Mar.- Sep. 2015).
- PhD in Biomedical Eng. (Bioelectric), Group of Biomedical engineering, Department of Advanced Medical Technologies, Isfahan University of Medical Science, Isfahan, Iran. (GPA: [18.61](#) /20 (3.72/4), thesis grade [20](#) / 20 (4/4))
- M.Sc. in Biomedical Eng. (Bioelectric), Group of Physics and Biomedical Engineering, Department of Medicine, Biomedical Engineering, Isfahan University of Medical Science, Isfahan, Iran, 2008. (GPA: [18.91](#) / 20 (3.78/4), [ranked first](#))
- B.Sc. in Electrical Engineering (Bioelectric- Biomedical Eng.), Department of Electrical Engineering, Sahand University of Technology, Tabriz, Iran, 2005. (GPA: [17.71](#) / 20 (3.54/4), [ranked first](#))

Areas of Interest

- Image and signal Processing
 - Computer Vision, Image enhancement methods, Noise reduction methods, Medical or Biological data Acquisition, Graph based image processing
- Time-frequency methods
 - Sparse representations, dictionary learning, X-lets
- Pattern recognition
 - Classification methods, Clustering methods, Feature extraction

Publications

Journal Papers

1. [ISI, IF = 1.97] R **Kafieh**, H Rabbani, F Hajizadeh, M D. Abramoff, M Sonka, "Thickness mapping of eleven retinal layers segmented using the diffusion maps method in normal eyes", *Accepted in Journal of Ophthalmology*.
2. [ISI, IF = 4.57] R **Kafieh**, H Rabbani, I Selesnick, "Three Dimensional Data-Driven Multi Scale Atomic Representation on Optical Coherence Tomography," *IEEE Transaction on medical Imaging*, 2015; 34(5):1042-62.
3. [ISI, IF = 1.018] H Danesh, R **Kafieh**, H Rabbani, and F Hajizadeh, , "Segmentation of Choroidal Boundary in Enhanced Depth Imaging OCTs Using a Multiresolution Texture Based Modeling in Graph Cuts," *Computational and Mathematical Methods in Medicine*, vol. 20, p. 1-9, 2014.
4. [ISC] M Kazemian Jahromi, R **Kafieh**, H Rabbani, A Mehri Dehnavi, A Peyman, F Hajizadeh, M Ommani, "An Automatic Algorithm for Segmentation of the Boundaries of Corneal Layers in Optical Coherence Tomography Images using Gaussian Mixture Model," *Journal of Medical Signals and Sensors*, vol. 4, No.3, p. 181-193, 2013.
5. [ISI, IF = 4.777] R **Kafieh**, H Rabbani, M D. Abramoff, M Sonka, "Intra-Retinal Layer Segmentation of 3D Optical Coherence Tomography Using Coarse Grained Diffusion Map", *Elsevier Journal of Medical Image Analysis*, Vol. 17, No. 8, p. 907-928 2013.
6. [ISI, IF = 2.53] R **Kafieh**, H Rabbani, F Hajizadeh, M Ommani, S Kermani, "An Accurate Multimodal 3D Vessel Segmentation Method Based on Brightness Variations on OCT Layers and Curvelet Domain Fundus Image Analysis", *IEEE Transaction on Biomedical Engineering*, Vol. 60, No. 10, p. 2815 - 2823, 2013.
7. [ISI, IF = 2.922] R **Kafieh**, H. Rabbani, M. D. Abramoff, and M. Sonka, "Curvature correction of retinal OCTs using graph-based geometry detection," *Physics in medicine and biology*, vol. 58, No, 9, p. 2925-2933, 2013
8. [ISI, IF = 2.732] M. EtehadTavakol, V. Chandran, E. Ng, and R. **Kafieh**, "Breast cancer detection from thermal images using bispectral invariant features," *International Journal of Thermal Sciences*, Vol. 69, P. 21-36, 2013.
9. [ISC] R. **Kafieh**, H. Rabbani, and S. Kermani, "A Review of Algorithms for Segmentation of Optical Coherence Tomography from Retina," *Journal of Medical Signals and Sensors*, vol. 3, No. 1, P. 45-67, 2013.
10. Farid Jafarian, Rahele **Kafieh**, "New Algorithm to detect moving target in the image with variable and complex background using wavelet transform and detect the type of target motion", *International Journal of Computer Theory and Engineering*, Vol. 5, No. 1, 2013.
11. [ISC] R. **Kafieh** and A Mehridehnavi, "A comprehensive comparison of different clustering methods for reliability analysis of microarray data," *journal of medical signals and sensors*, vol. 3, No. 1, p. 22-34, 2013.
12. Tahereh Mahmudi, Raheleh **Kafieh**, Hossein Rabbani, Alireza Mehri Dehnavi, Mohammad Reza Akhlaghi, Khatereh Arababian, Mohammad Ahmadi, " Evaluation of Asymmetry of Retinal Nerve Fiber Layer and Total Retina in Right and Left Eyes of Normal Subjects Using Extracted Features from Optical Coherence Tomography", *Journal of Isfahan Medical School*, vol. 31, No. 247, p. 13-21, 2013.
13. Hajar Danesh, Raheleh **Kafieh**, Hossein Rabbani, "Automated Choroidal Segmentation in Enhanced Depth Imaging Optical Coherence Tomography Images," *Journal of Isfahan Medical School*, vol. 31, No. 230, p. 60-73, 2013.
14. [ISC] R. **Kafieh** , M. Shahmoradi, E. Hekmatian, M. Foroohandeh, and M. Emamidoost, "Removing Distortion of

Periapical Radiographs in Dental Digital Radiography using Embedded Markers in an External Frame," *Journal of Medical Signals and Sensors*, vol. 2, 2012.

15. [ISC] D. H. Rabbani, R. **Kafieh**, and M. Foroohandeh, "Circular symmetric Laplacian mixture model in wavelet diffusion for dental image denoising," *Journal of Medical Signals and Sensors*, vol. 2, 2012.

16. [ISI, IF = 1.492] Rahele **Kafieh**, Tayebe Lotfi Mahyari, "Automatic Detection of Defects on Polyethylene Pipe Welding Using Thermal Infrared Imaging", *Elsevier Journal of Infrared Physics & Technology*, vol. 54(4), p. 317-32, 2011.

17. [Elmi Pajuheshi] Rahele **Kafieh**, Alireza mehri, Saeed sadri, Hamid raji, "Automatic Detection of Cephalometric Landmarks on Cephalograms of Patients Referring to Isfahan University of Medical Sciences", *Iranian Journal of Biomedical Engineering, published by Society of Iranian Biomedical Engineering*, 2009.

Proceedings

1. Raheleh **Kafieh**, Hossein Rabbani, Saeed Gazor, "Combination of graph theoretic grouping and time-frequency analysis for image segmentation" in *IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP'14*, Florence, Italy, 2014, p. 5115-5119.

2. T. Mahmudi, R. **Kafieh** and H. Rabbani, "Comparison of macular OCTs in right and left eyes of normal people" in *SPIE Proceedings on Applications of Digital Image Processing XXXVI*, San Diego, California United States, 2013, p. 90381-90381.

3. R. **Kafieh**, H. Danesh, H. Rabbani, M. D. Abramoff, and M. Sonka, " Vessel segmentation in images of optical coherence tomography using shadow information and thickening of retinal nerve fiber layer," in *IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP'13*, Vancouver, Canada, 2013, p. 1075-1079.

4. R. **Kafieh**, H. Rabbani, M. D. Abramoff, and M. Sonka, " Intra-retinal layer segmentation of optical coherence tomography using diffusion map," in *IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP'13*, Vancouver, Canada, 2013, p. 1080-1084.

5. R. **Kafieh** and H. Rabbani, "Optical coherence tomography noise reduction over learned dictionaries with introduction of complex wavelet for start dictionary" in *SPIE Proceedings on Wavelets and Sparsity XV*, San Diego, California United States, 2013, p. 885826-885834.

6. J Jalili, H Rabbani, M Akhlaghi, R **Kafieh**, A Mehridehnavi, "Forming Projection Images From Each Layer of Retina Using Diffusion Map Based OCT Segmentation", *The 11th International Conference on Information Sciences, Signal Processing and their Applications, (ISSPA2012)*, Montreal, Canada, 2012, p. 930-934.

7. M Nain Abadi, P Rabbani, A Mehri, R **Kafieh**, "An Automatic Solution for Unwanted Black Area Elimination in Photocopy Machines", *7th Iranian conference on Machine vision and Image Processing (MVIP2011)* Tehran, Iran, 2011.

8. R **Kafieh**, H Rabbani, "Wavelet-Based Medical Infrared Image Noise Reduction Using Local Model For Signal and Noise", *IEEE Statistical Signal Processing Workshop (SSP'11)*, Nice, France, 2011, pp. 549-552.

9. R **Kafieh**, T Lotfi Mahyari, M Shahmoradi, E Hekmatian, "Removing Distortion of periapical Images in Dental Digital Radiography Using Embedded Markers", *3rd Congress of Oral and Maxillofacial Radiology*, Tehran, Iran, 2011.

10. R **Kafieh**, S Sadri, A Mehri, H Raji, " Discrimination of Bony Structures in Cephalograms for Automatic Landmark Detection," *13th International CSI Computer Science (CSICC)*, Kish, Iran, 2008.

11. R **Kafieh**, S Sadri, A Mehri, H Raji, " Automatic landmark detection in cephalometry using modified ASM with sub image matching," *IEEE Conference on Machine vision (ICMV)*, Pakistan, 2007, pp. 73-78.

12. R **Kafieh**, M Etehad tavakol, " A new Algorithm for segmentation of Anatomical Structures in Medical Images," *IEEE Conference on Innovations in Information Technology (IIT)*, Dubai, UAE, 2007.

13. R **Kafieh**, S Sadri, A Mehri, H Raji, " Using a combination of intelligent and model based methods for Automatic landmark detection in cephalometry," in *Proc. of IEEE Conference on Innovations in Information Technology (IIT)*, Dubai, UAE, 2007, pp. 173-177.

14. R **Kafieh**, R Amirfattahi, A Mehri, "Detection of Ventricular Arrhythmias Using Roots Location in AR-Modeling," in *Proc. of IEEE Conference on Information, Communication and Signal processing (ICICS)*, Singapore, 2007, pp. 1-4.

15. R **Kafieh**, R Amirfattahi, A Mehri, " LVQ Neural Networks for Detection of Ventricular Arrhythmias," in *Proc. of Iranian Student Conference on Electrical Engineering (ISCEE)*, Isfahan, Iran, 2007, pp. 645-651.

Other publications

1. [book chapter] R **Kafieh**, S Sadri, A Mehri, H Raji, " Discrimination of Bony Structures in Cephalograms for Automatic Landmark Detection," *book chapter part of Springer Series, communications in Computer and Information Sciences*.

2. [master's thesis] R **Kafieh**, "Digital Cephalogram Analysis for Automatic Detection of Important Landmarks," Master's Dissertation, 2008.

3. [B.Sc. thesis] R **Kafieh**, "Gender Discrimination of Speakers Using Neural Networks," B.Sc. Dissertation, 2005.

Research Experience

RESEARCHS AND PROJECTS:

Supported by TUBITAK

1. Design and application of Bandlet on Graph for image denoising

Supported by Medical Image and Signal Processing (MISP):

1. Mean shift algorithms for Segmentation of Boundaries of Corneal Layers in Optical Coherence Tomography Images in presence of artificial rings, started in June, 2014.

2. Mosaicing of OCTs taken from ONH and Macula, started in April, 2013.

3. Sparse representation for classification of blood vessels on Fundus images, started in May, 2013.

4. Removing Distortion of Periapical Images in Dental Digital Radiography using Embedded Markers, 2010-2012.

5. Estimation of features from Higher Order Spectra (HOS) in right and left breast of thermograms, 2011-2013.
6. Automatic Off line Diagnostic of Cervical Cancer through processing of Pap smear slides (or Thin Prep slides), 2008.

Funded by National Iranian Gas Company (NIGC), 2009.

1. Non-destructive quality testing of polyethylene pipe welding using thermal infrared imaging technique,

ADVISORY OF MSc PROJECTS:

1. Evaluation of asymmetry in right and left eyes of normal objects using features extracted from optical coherence tomography and fundus images.
2. Segmentation of the Boundaries of Corneal Layers in Optical Coherence Tomography Images.
3. Segmentation of choroidal boundary on EDI OCTs using a combination of wavelet descriptors and graph cuts.
4. Analysis of Digital Dental Anterior-Posterior images for Automatic Detection of Important Landmarks.
5. Three-dimensional segmentation of dental lesions in Cone-Beam CT images.
6. Application of Dictionary learning in separation of texture and cartoon for Optical Coherence Tomographic Images.

SUPERVISORY OF BSc PROJECTS:

1. Human Posture Detection in images with non uniform backgrounds.
2. Bioelectric Signal Modulation and transmission to computer.
3. Design and development of a Line Detector Robot Using infrared sensors.
4. Design and development of an Angle Simulator Robot.
5. Design and development of a Drug Delivery Timer and Alarm.
6. Design and development of a Remote Control for Model Aircrafts.
7. Design of a humidity and temperature control system for chicken transportation trailers.

Teaching Experience

Graduate teaching experiences

1. Lecturer of **Biomedical Signal Processing**, Isfahan University of Medical Sciences, Isfahan, Iran, 2015.
2. Lecturer of **Graph based theories for image segmentation**, Isfahan University of Medical Sciences, Isfahan, Iran, 2015.
3. Lecturer of **Digital Image Processing** course in Sepahan University, Isfahan, 2013.

Graduate Teaching assistance

1. TA of **Digital Signal Processing** course (4 semesters) in Isfahan University of Medical Sciences, Isfahan, 2009-12.
2. TA of **Digital Image Processing** course (2 semesters) in Isfahan University, Isfahan, 2012-2013.

Under-graduate teaching experiences

Lecturer of

1. **Technical English Language** (4 semesters)
2. **Engineering Mathematics** (2 semesters)
3. **Electrical Circuits** (5 semesters)
4. **Application of MATLAB in Electrical Engineering** (1 semesters)
5. **Digital circuits** (3 semesters)

in Jihad University, Branch of Isfahan University of Technology, Isfahan, 2007-2009.

Language Proficiency:

Toefl score (iBT) in 2009: 107 /120, listening: 27, reading: 29, speaking: 22, writing: 29.

Skills

- **Programming:** Matlab, C, Pascal, Visual Basic.
- **Electrical Eng. Softwares:** Proteus, PSPICE.
- **Mathematical Softwares:** Matlab (GUI and Simulink).
- **MPs and MCUs:** 8051, 8086, AVR.
- **Computer Applications:** Microsoft office (word, PowerPoint and excel).

Honors and Certificates

Ranked 1st in PhD Entrance Exam of Biomedical Engineering in Iran (in Health Ministry).

Ranked 1st in M.Sc. of Biomedical Engineering in Isfahan University of Medical Science.

Ranked 1st in B.Sc. of Biomedical Engineering in Sahand University of Technology.

Best researcher award among PhD students of Isfahan University of Medical Sciences, 2013.

Winner of Voluntary Contribution Fund (IEEE R8 VCF), 2014.

Winner of research Scholarship of TUBITAK 2216, 2014.

Reviewer of IEEE Transaction of Image Processing (IEEE TIP), Medical Image Analysis (MEDIA Elsevier), IEEE Transaction on Neural Networks (IEEE TNN), Digital Signal Processing (DSP Elsevier), Infrared Physics & Technology (INPHY Elsevier), Signal, Image and Video Processing (SIVP), Computer Methods and Programs in Biomedicine (CMPB), Journal of Medical Signals and Sensors (JMSS), Journal of Scientific Research and Essays, Journal of ZUS (Computer and Electronics).

Director of Student Committee of 17th Iranian Biomedical Engineering Conference (ICBME'17) in 2010.

Full-fund PhD acceptances from University of British Columbia (Electrical engineering- Biomedical engineering), Boston University, University de Montreal, and Ghent University in 2009.

Head of Biomedical engineering Section of Reviewers Committee and the Session Chair (Biomedical engineering) of 10th Iranian Student Conference on EE (ISCEE'07) in 2007.

Reviewer of Biomedical engineering section in 11th Iranian Student Conference in 2008.

Ranked 840th among 400,000 competitors in national universities attendance exam in 2001.

Best Paper Award for "LVQ Neural Networks for Detection of Ventricular Arrhythmias", ISCEE07, Isfahan, Iran, 2007.
