

Dr. rer. nat. Reza Bahmanyar

CURRENT TASKS

I am involved in VABENE++, a project for traffic management in large scale events and disasters.

EDUCATION

- 2012--2016** PhD., Electronics and Information Technology, at Technical University Munich, Munich, Germany; and German Aerospace Center (DLR), Weßling, Germany
- Topic: Conception and Assessment of Semantic Feature Descriptors for Earth Observation Images
 - Advisors: Prof. Dr. Mihai Datcu, Prof. Dr. Gerhard Rigoll
 - Scholarship provider: Munich Aerospace Faculty, Munich, Germany
- 2009--2012** M.Sc., Computer Science, at Saarland University, Saarbruecken, Germany
- Topic: Semi-Supervised Discovery of Visual Attributes
 - Advisors: Prof. Dr. Bernt Schiele, Dr. Mario Fritz, Dr. Marcus Rohrbach
- 2005--2009** B.Sc., Electrical Engineering (Electronics), at University of Mazandaran, Babol, Iran
- Topic: Applying Modified Ant Colony Algorithm to Task Scheduling Problem
 - Advisor: Prof. Hossein Miare Naimi

EMPLOYMENT RECORD

- 2017--Present** Researcher and Developer, at Remote Sensing Technology Institute, German Aerospace Center (DLR), Wessling, Germany
- I am involved in VABENE++ project in which I am responsible for designing and developing methods and algorithms for automatic traffic monitoring using aerial and in-situ image data.
- 2016--2017** Postdoctoral Researcher and Developer, at Remote Sensing Technology Institute, German Aerospace Center (DLR), Wessling, Germany
- I develop algorithms based on machine learning (e.g., generative Bayesian models and Deep learning) for extracting meaningful information from Earth Observation image time series. These algorithms will be used in an ecosystem monitoring system.
- 2012--2016** Doctoral Candidate, at Remote Sensing Technology Institute, German Aerospace Center (DLR), Wessling, Germany
- I developed new approaches based on machine learning and statistics to extract meaningful information from Earth Observation images. I employed various methods such as Support Vector Machines (SVM), logistic regression, and latent Dirichlet allocation (LDA) for supervised and unsupervised data mining and classification. My developed approaches will be used for exploiting large-scale image archives.
- Additionally, I conducted user experiments to assess the issues affecting the user acceptance of the data mining results. The results will help designing user-friendly

systems being able to provide satisfactory results to users.

- 2014--2016** Research Assistant, at GAF AG, Munich, Germany
- I conducted research in semi-supervised and model-based building extraction by integrating earth observation optical images and height information.
- 2011--2012** Student Researcher, at Computer Vision and Multimodal Computing Department, Max Planck Institute for Informatics, Saarbruecken, Germany
- I developed multimodal methods in order to discover image semantics using text data. Moreover, I developed a web-based user interface for crowdsourcing-based annotations of large-scale image datasets on Amazon Mechanical Turk platform. I also assisted in installing and calibrating video cameras in the human activity recognition lab. Moreover, I operated Point Grey's Bumblebee cameras for stereo vision tasks.
- 2011--2012** Teaching Assistant, at Department of Computer Science, Computer Graphics Lab Saarland University, Saarbruecken, Germany
- I assisted Prof. Philipp Slusallek in teaching "Computer Graphics" course by holding tutorials and providing the students with theoretical and practical exercises. As a practical exercise, the students were supposed to build a ray tracing system or hardware-based visualization application using C++ programming language.

RESEARCH TOPICS

Computer vision, Pattern recognition, Image and signal processing, Machine learning, Deep learning, Semantic data analysis, User acceptance of data mining results

PUBLICATIONS

Reviewed Journals

- Reza Bahmanyar et al., "Earth Observation Image Semantic Bias: A Collaborative User Annotation Approach," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 10, pp. 2462 -2477, June 2017.
- Reza Bahmanyar et al., "Building Outline Extraction Using a Heuristic Approach Based on Generalization of Line Segments," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 10, pp. 933-947, March 2017.
- Reza Bahmanyar et al., "Discovery of Semantic Relationships in PolSAR Images Using Latent Dirichlet Allocation," *IEEE Geoscience and Remote Sensing Letters*, vol. 14, pp. 237-241, February 2017.
- Reza Bahmanyar et al., "The Semantic Gap: An Exploration of User and Computer Perspectives in Earth Observation Images," *IEEE Geoscience and Remote Sensing Letters*, vol. 12, pp. 2046-2050, October 2015.
- Reza Bahmanyar et al., "A Comparative Study of Bag-of-Words and Bag-of-Topics Models of EO Image Patches," *IEEE Geoscience and Remote Sensing Letters*, vol. 12, pp. 1357-1361, September 2015.

Conferences

- Reza Bahmanyar et al., “Land-Cover Change Detection Using Local Feature Descriptors Extracted from Spectral Incidescences.” In *proc. International Geoscience and Remote Sensing Symposium (IGARSS)*, July 2017, Texas, USA.
- Reza Bahmanyar et al., “Land-Cover Evolution Class Analysis in Image Time Series of Landsat and Sentinel-2 Based on Latent Dirichlet Allocation,” in *proc. Analysis of Multitemporal Remote Sensing Images (MultiTemp)*, pp. 1-4, Jun 2017, Bruges, Belgium.
- Reza Bahmanyar et al., “Evaluating the Sensory Gap for Earth Observation Images Using Human Perception and an LDA-Based Computational Model,” in *Proc. IEEE International Conference on Image Processing (ICIP)*, pp. 566-570, September 2015, Quebec City, Canada.
- Reza Bahmanyar et al., “Automatic Road Extraction Based on Integration of High Resolution LiDAR and Aerial Imagery,” in *Proc. International Conference on Geoinformation Modeling and Environmental Monitoring (SMPR)*, November 2015, Kish Island, Iran.
- Reza Bahmanyar et al., “Farness Preserving Non-Negative Matrix Factorization.” In *Proc. IEEE International Conference on Image Processing (ICIP)*, pp. 3023-3027, October 2014, Paris, France.
- Reza Bahmanyar et al., Thomas Krauß, and Peter Reinartz, “Building Roof Component Extraction from Panchromatic Satellite Images Using a Clustering-Based Method,” *ISPRS Archives - ISPRS Technical Commission III Symposium XL-3*, pp. 247-252, PCV 2014, September 2014, Zurich, Switzerland.
- Reza Bahmanyar et al., “Comparing the information extracted by feature descriptors from EO images using Huffman coding,” in *Proc. International Workshop on Content-Based Multimedia Indexing (CBMI)*, pp. 1-6, June 2014, Klagenfurt, Austria.
- Reza Bahmanyar et al., “Locally Linear Salient Coding for image classification,” in *Proc. International Workshop on Content-Based Multimedia Indexing (CBMI)*, pp. 1-4., June 2014, Klagenfurt, Austria.
- Reza Bahmanyar et al., Mihai Datcu, and Gerhard Rigoll, “Interactive clustering for SAR image understanding,” in *Proc. European Conference on Synthetic Aperture Radar (EUSAR)*, pp. 634-637, June 2014, Berlin, Germany.
- Reza Bahmanyar et al., “Exploring high Resolution Satellite Image Collections Using their High-Level Features,” in *Proc. Conference on Image Information Mining*, pp. 77-80, March 2014, Bucharest, Romania.
- Reza Bahmanyar et al., “Immersive Visual Information Mining for Exploring the Content of EO Archives,” in *Proc. ESA Big Data from Space*, pp. 30, June 2013, Frascati, Italy.
- Reza Bahmanyar et al., “A Clustering-Based Approach for Evaluation of EO Image Indexing, Sensors and Models in Photogrammetry and Remote Sensing,” *ISPRS Archives XL-1 (W3)*, pp. 79-84, ISPRS. SMPR 2013, October 2013, Tehran, Iran.
- Reza Bahmanyar and Mihai Datcu, “Measuring the Semantic Gap Based on a Communication Channel Model,” in *Proc. IEEE International Conference on Image Processing (ICIP)*, pp. 4377-4381, September 2013, Melbourne, Australia.
- Reza Bahmanyar et al., “Immersive Visual Information Mining for Exploring the Content of EO Archives,” in *Proc. ESA Living Planet Symposium*, September 2013, Edinburgh, UK.
- Reza Bahmanyar et al., “Immersive Visual Information Mining for the TerraSAR-X/TanDEM-X Archive,” in *Proc. Conference on Image Information Mining*, October 2012, Oberpfaffenhofen, Germany.