Alireza Ghasemi

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Research Interests

Computer Vision and Image Processing: Image Retrieval and Localization, Multi-Camera Reconstruction, Tracking, Video Processing, Computational Photography, Augmented Reality.

Machine Learning and Pattern Recognition: Semi-Supervised and Active Learning, One-Class Learning, Multi-view Learning, Human Computation.

Information Retrieval, Data Mining and Big Data: Text Classification, Rank and Metric Learning, Sentiment Analysis.

Education

École Polytechnique Fédérale de Lausanne   **Lausanne, Switzerland**
PhD, Computer and Communication Sciences   *September 2011 – Present*
Granted doctoral fellowship by the school of computer and communication sciences. Supervised by Professor Martin Vetterli and Dr. Adam James Scholefield.

Sharif Univeristy of Technology   **Tehran, Iran**
M.Sc., Artificial Intelligence   *September 2009 – August 2011*
Ranked 1st by GPA $(19.52/20)$ among the class of 2011. Supervised by Professor M.T. Manzuri.

Sharif Univeristy of Technology   **Tehran, Iran**
B.Sc., Software Engineering   *September 2005 – September 2009*

Professional Experience

École Polytechnique Fédérale de Lausanne   **Lausanne, Switzerland**
Doctoral Researcher   *January 2012 – Present*
In charge for cutting-edge research in the areas of computational photography, multi-camera systems and image-based indoor localization. I develop mainly in MATLAB and Java with JavaScript for visualization and Python for scripting.

- Developed a patent and a track record of publications in light-field image retrieval and video analysis.
- Proposed the first publicly-available dataset for light-field object recognition.
- Participating as an R&D engineer in the development of an outdoor urban localization system.
- Developed a novel online game (using Play! and RESTful services) to exploit human computation paradigms in sentiment analysis.

AI Lab - École Polytechnique Fédérale de Lausanne   **Lausanne, Switzerland**
Doctoral Assistant   *September 2011 – January 2012*
I was in charge for investigating novel solutions to incorporate the active learning framework into the recently proposed human computation paradigm. I developed a novel online game in Java (using the Play! framework and RESTful services) to exploit human computation paradigms in sentiment analysis.

DSP Lab - Sharif University of Technology   **Tehran, Iran**
Research Assistant   *March 2010 – August 2011*
In charge for development of innovative approaches for exploiting user feedback to improve the underlying machine learning model in an image retrieval system. I used MATLAB and Java to develop the system.

- Developed a novel robust one-class classification framework and added active and semi-supervised learning capability to the well-known Support Vector Data Description (SVDD) model.

Intelligent Information Systems (IIS) Laboratory   **Tehran, Iran**
Web Developer   *October 2009 – March 2010*
Database and web developer (PHP/Java) for a national-level enterprise project management system.

Peykasa Messageware Group   **Tehran, Iran**
Backend Service Developer   *May 2009 – October 2009*
Backend developer in an integrated messaging platform. I developed in JavaEE, GWT and AJAX.

Semantic Web Research Lab - Sharif University of Technology **Tehran, Iran**
R&D Assistant   *January 2009 – May 2009*
Developer of an intelligent system (in Java) to categorise websites exploiting their internal link structure.

Mabna Software   **Tehran, Iran**
Software Engineering Intern   *June 2008 – September 2008*
R&D engineer and analyst for the Pars statistical machine translation in Java and C#.

Teaching Experience

Digital Signal Processing   **Lausanne, Switzerland**
Teaching Assistant for the online course offered on the Coursera platform.   *Spring 2014*
Instructed by Dr. Paolo Prandoni and Professor Martin Vetterli.

Mathematical Foundations of Signal Processing   **Lausanne, Switzerland**
Teaching Assistant at École Polytechnique Fédérale de Lausanne   *Fall 2013*
Instructed by Dr. Jayakrishnan Unnikrishnan, Dr. Mihailo Kolundzija and Professor Martin Vetterli.

Statistical Signal Processing   **Lausanne, Switzerland**
Teaching Assistant at École Polytechnique Fédérale de Lausanne   *Spring 2013*
Instructed by Dr. Andrea Ridolfi, Dr. Mihailo Kolundzija and Dr. Ivana Jovanovic.

Introduction to Programming (Informatiue I)   **Lausanne, Switzerland**
Teaching Assistant at École Polytechnique Fédérale de Lausanne   *Fall 2012*
Instructed by Dr. Jean-Philippe Pellet

Statistical Pattern Recognition   **Tehran, Iran**
Teaching Assistant at Sharif University of Technology   *Fall 2011*

Introduction to Database Design   **Tehran, Iran**
Teaching Assistant at Sharif University of Technology   *Spring 2009 - Spring 2010*

Introduction to Database Design   **Tehran, Iran**
Teaching Assistant at Shahid Beheshti University   *Spring 2009 - Spring 2010*

Advanced Programming   **Qeshm, Iran**
Lecturer at Payam-e-Noor University of Qeshm   *Fall 2009*

Introduction to Programming   **Tehran, Iran**
Teaching Assistant at Sharif University of Technology   *Fall 2006*

Patents

Method and Apparatus for Identifying Local Features: *Alireza Ghasemi*; Laurent Rime; Martin Vetterli, Swiss Patent No. 2013CH-1102, Filed June 2013.

Distinguishing Real Scenes from Printed Photos Using a Light-Field Camera: *Alireza Ghasemi*; Laurent Rime; Martin Vetterli, US-61898739, Provisional Patent Filed November 2013.

Publications

On the Accuracy of Point Localisation in a Circular Camera Array: *Alireza Ghasemi*; Adam Scholefield and Martin Vetterli, IEEE ICIP 2015. Quebec City, Canada (*Selected as Top 10 %*)

Detecting Planar Surface Using a Light-Field Camera with Applications to Distinguishing Real Scenes From Printed Photos: *Alireza Ghasemi* and Martin Vetterli, ICASSP 2014, Florence, Italy.

Scale-Invariant Representation of Light Field Images for Object Recognition and Tracking: *Alireza Ghasemi* and Martin Vetterli, IS&T/SPIE Electronic Imaging 2014, San Francisco, USA.

Computationally Efficient Background Subtraction in the Light Field Domain: *Alireza Ghasemi*; Mahdad Hosseini Kamal and Martin Vetterli, IS&T/SPIE Electronic Imaging 2014, San Francisco, California, USA, February 2-6, 2014.

LCAV-31: A Dataset for Light Field Object Recognition: *Alireza Ghasemi*; Nelly Afonso and Martin Vetterli, IS&T/SPIE Electronic Imaging 2014, San Francisco, California, USA, February 2-6, 2014.

Sentiment Analysis Using a Novel Human Computation Game: Claudiu Cristian Musat; *Alireza Ghasemi* and Boi Faltings, ACL 2012 People's Web Meets NLP Workshop, 2012.

A Bayesian Approach to the Data Description Problem: *Alireza Ghasemi* et. al., AAAI Twenty-Sixth Conference on Artificial Intelligence (AAAI-12), 2012

Support Vector Data Description for Spoken Digit Recognition: Amirhossein Tavanaei; *Alireza Ghasemi*; Mohammad Tavanaei; Hossein Sameti and Mohammad T. Manzuri, International Conference on Bio-inspired Systems and Signal Processing (BIOSIGNALS 2012), 2012:32-37.

Active Learning from Positive and Unlabeled Data: *Alireza Ghasemi*; Hamid R. Rabiee; Mohsen Fadaee; Mohammad T. Manzuri; Mohammad H. Rohban, IEEE ICDM 2011 Workshop on

Optimization Based Methods for Emerging Data Mining Problems (OEDM'11), 2011:244-250.

Active One-Class Learning by Kernel Density Estimation: *Alireza Ghasemi*; Mohammad T. Manzuri; Hamid R. Rabiee; Mohammad H. Rohban and Siavash Haghiri, IEEE International Workshop on Machine Learning for Signal Processing (MLSP'11), 2011:1-6.

Content-Based Image Retrieval Using Relevance Feedback and Semi-Supervised Learning: *Alireza Ghasemi* and M. T. Manzuri (Dir.), M. Sc. Thesis, Summer 2011.

A Survey on Website Classification Methods with Introduction to a New Method Based on Internal PageRanks: *Alireza Ghasemi*, Hassan Abolhassani (Dir.), B.Sc. Thesis, Summer 2009.

Honors and Awards

IEEE Signal Processing Society Travel Grant **Lausanne, Switzerland**
Granted the IEEE SPS Travel Grant to attend the conference ICIP 2015. *Spring 2015*

Qualcomm Innovation Fellowship 2015 **Lausanne, Switzerland**
Winner of the prestigious Qualcomm Innovation Fellowship (QInF'15). *Spring 2015*

Doctoral Fellowship from the I&C School of EPFL **Lausanne, Switzerland**
Granted full one-year fellowship to start PhD. *Fall 2011*

Ranked 1st in the Artificial Intelligence section of the Sharif University **Tehran, Iran**
Ranked by GPA. *Summer 2011*

Ranked 1st in the nationwide graduate entrance exam in IT engineering **Tehran, Iran**
Among more than 13,000 students. *Summer 2009*

Ranked 1st in the national graduate entrance exam in computer engineering **Tehran, Iran**
Among more than 17,000 students. Computer Architecture and AI sections. *Summer 2009*

Ranked 183rd (top 0.06%) in the nationwide university entrance exam **Tehran, Iran**
Among more than 300,000 students in the Mathematics branch. *Summer 2005*

Ranked 33rd (top 0.006%) in the nationwide university entrance exam **Tehran, Iran**
Among more than 500,000 students in the Foreign Languages branch. *Summer 2005*

Selected Courses

Doctoral School: Foundations of Imaging Sciences ($6/6$), Convex Optimization ($5.5/6$), Statistical Signal Processing ($5.5/6$).

Graduate School: Image Processing ($19.2/20$), Speech Processing ($19/20$), Machine Learning ($19.2/20$), Pattern Recognition ($19.5/20$), Human and Computer Vision ($20/20$).

Undergraduate: Database Systems ($18.5/20$), Object-Oriented Design ($18.8/20$), System Analysis and Design ($20/20$), Software Engineering ($19/20$), Information Retrieval ($20/20$), Computer Networks ($19.2/20$), Compiler Design ($20/20$), Programming Languages ($20/20$).

Skills

Java Development: Expert. In-depth knowledge of JavaSE, JavaFX, Swing, JDBC, Weka, etc. Working knowledge in Android development

JavaScript: Experienced in Node.js, Chrome extensions, frameworks, client-side scripting, etc.

MATLAB: Proficient in Signal and Image Processing, Computer Vision and Pattern Recognition toolboxes.

Python: Experiences in Blender scripting, NumPy and SciPy, IPython Notebooks.

C: Experiences with OpenCV and Win32 API.

Web Development: Experiences in REST, Symfony, Spring MVC, Play!, GWT, Grails, etc.

Operating Systems: Linux (Debian, Fedora, Ubuntu), Windows.

Software Engineering: OOD, UML, Agile methodologies, Scrum, Design Patterns.

Typesetting: Fluent in LATEX.

Database Design: Experiences in SQL, ERD, NoSQL (MongoDB, Firebase).

Cloud Development: Google App Engine, Heroku, IaaS, Meteor.

Other Programming Languages: Experiences in Clojure, R and Scala.

Languages

Persian: Native

English: Full professional proficiency *Used extensively in study and work. C1 level.*

French: Limited working proficiency *Learning since 2012. Currently in B1 level.*

German: Limited working proficiency *Learning since 2013. Currently in A2 level.*

Arabic: Elementary proficiency *Learned basics in high school.*

Interests

Reading: Literature, History, Technology. Gaining general knowledge through studying novel topics.

References

Available upon request