



# Alireza Ghasemi

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Born 18 April 1987, Iranian citizen, Swiss B permit holder.

## Research Interests

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**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

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**École Polytechnique Fédérale de Lausanne**

*PhD, Computer and Communication Sciences*

**Lausanne, Switzerland**

*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**

*M.Sc., Artificial Intelligence*

**Tehran, Iran**

*September 2009 – August 2011*

Ranked 1<sup>st</sup> by GPA (19.52/20) among the class of 2011. Supervised by Professor M.T. Manzuri.

**Sharif Univeristy of Technology**

*B.Sc., Software Engineering*

**Tehran, Iran**

*September 2005 – September 2009*

## Professional Experience

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### **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

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### **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.

<b>Introduction to Programming (Informatiue I)</b> <i>Teaching Assistant at École Polytechnique Fédérale de Lausanne</i> Instructed by Dr. Jean-Philippe Pellet	<b>Lausanne, Switzerland</b> <i>Fall 2012</i>
<b>Statistical Pattern Recognition</b> <i>Teaching Assistant at Sharif University of Technology</i>	<b>Tehran, Iran</b> <i>Fall 2011</i>
<b>Introduction to Database Design</b> <i>Teaching Assistant at Sharif University of Technology</i>	<b>Tehran, Iran</b> <i>Spring 2009 - Spring 2010</i>
<b>Introduction to Database Design</b> <i>Teaching Assistant at Shahid Beheshti University</i>	<b>Tehran, Iran</b> <i>Spring 2009 - Spring 2010</i>
<b>Advanced Programming</b> <i>Lecturer at Payam-e-Noor University of Qeshm</i>	<b>Qeshm, Iran</b> <i>Fall 2009</i>
<b>Introduction to Programming</b> <i>Teaching Assistant at Sharif University of Technology</i>	<b>Tehran, Iran</b> <i>Fall 2006</i>

## Patents

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**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

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**SHAPE: Linear-Time Camera Pose Estimation With Quadratic Error-Decay:** *Alireza Ghasemi*; Adam Scholefield and Martin Vetterli, IEEE ICASSP 2016. Shanghai, China

**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

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<b>EPFL Bonus for Exceptional Performance</b>	<b>Lausanne, Switzerland</b>
<i>Granted a bonus salary increase due to exceptional performance at EPFL.</i>	<i>Fall 2015</i>

<b>IEEE Signal Processing Society Travel Grant</b>	<b>Lausanne, Switzerland</b>
<i>Granted the IEEE SPS Travel Grant to attend the conference ICIP 2015.</i>	<i>Spring 2015</i>

<b>Qualcomm Innovation Fellowship 2015</b>	<b>Lausanne, Switzerland</b>
<i>Winner of the prestigious Qualcomm Innovation Fellowship (QInF'15).</i>	<i>Spring 2015</i>

<b>Doctoral Fellowship from the I&amp;C School of EPFL</b>	<b>Lausanne, Switzerland</b>
<i>Granted full one-year fellowship to start PhD.</i>	<i>Fall 2011</i>

<b>Ranked 1st in the Artificial Intelligence section of the Sharif University</b>	<b>Tehran, Iran</b>
<i>Ranked by GPA.</i>	<i>Summer 2011</i>

<b>Ranked 1st in the nationwide graduate entrance exam in IT engineering</b>	<b>Tehran, Iran</b>
<i>Among more than 13,000 students.</i>	<i>Summer 2009</i>

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

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

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

## Selected Courses

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**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

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**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.

**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.

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

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

**Typesetting:** Fluent in  $\text{\LaTeX}$ .

**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

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**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

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

## References

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Available upon request