

# Mohsen Ghafoorian

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## Research Interests

Machine Learning, Deep Neural Networks, Generative Adversarial Nets, Computer Vision, Autonomous Driving, Medical Image Analysis.

## Education

**Ph.D. in *Machine Learning***, Oct. 2013 – June. 2017  
Radboud University, Computer Science Department, Nijmegen, the Netherlands

**M.Sc. in *Artificial Intelligence***, Sept. 2010 – Sept. 2012  
Sharif University of Technology, Tehran, Iran

**B.Sc. in *Software Engineering***, Sept. 2005 – Sept. 2010  
University of Tehran, ECE Department, Tehran, Iran

## Work Experience

**Autonomous Driving R&D engineer, *TomTom***, (July 2017 – present)

working as a senior deep learning expert on automated generation of HD maps.

**Visiting Researcher, *Harvard Medical School***, (Nov. 2016 – Apr. 2017)

Applying deep neural networks for medical image understanding.

**Computer Group Manager and Lecturer, *Allameh Helli 3, National Organization for Exceptional Talents***, (Feb. 2010 – Sept. 2013)

Teaching C++, data structures, algorithms, supervising AI projects and managing a team of ~10 computer programming teachers.

**Software Engineering Intern, *Farakam Software Group*** (May 2009 – Oct. 2009)

Domain model designer and developer.

## Honors and Awards

- **Top 0.2% rank**: 27<sup>th</sup> rank in the national Artificial Intelligence graduate program entrance exam, among nearly 20,000 participants, 2010
- **Top 0.1% rank**: 448<sup>th</sup> rank in the national bachelor program entrance exam, among nearly 500,000 participants, 2005
- **2<sup>nd</sup> team rank** in University of Tehran qualification contest for Asia regional ACM Programming contest Tehran site, 2007
- **Annual travel grant of the Dutch MS Research Foundation**  
For a research visit to Harvard Medical School, 2016
- **MICCAI Society Travel Award**  
Paper accepted in MICCAI 2017 was selected for granting the travel award, 2017.

## Selected Publications

1. **M. Ghafoorian**, Cedric Nugteren, Nora Baka, Olaf Booij, Michael Hofmann, *EL-GAN: Embedding Loss Driven Generative Adversarial Networks for Lane Detection*, under review.
2. **M. Ghafoorian**, N. Karssemeijer, T. Heskes, M. Bergkamp, J. Wissink, J. Obels, K. Keizer, F.E. de Leeuw, B. van Ginneken, E. Marchiori and B. Platel, *Deep multi-scale location-aware 3D convolutional neural networks for automated detection of lacunes of presumed vascular origin*, *NeuroImage Clin.* 2017,
3. **M. Ghafoorian**, N. Karssemeijer, T. Heskes, I. van Uden, F.E. de Leeuw, B. van Ginneken and B. Platel, *Non-uniform patch sampling with deep convolutional neural networks for white matter hyperintensity segmentation*. *IEEE International Symposium on Biomedical Imaging*, 2016
4. **M. Ghafoorian**, N. Karssemeijer, T. Heskes, I. van Uden, C. Sanchez, G. Litjens, F.E. de Leeuw, B. van Ginneken, E. Marchiori and B. Platel, *Location-sensitive deep convolutional neural networks for segmentation of white matter hyperintensities*, *Nature Scientific Reports* 2017.
5. **M. Ghafoorian\***, A. Mehrtash\*, T. Kapur, N. Karssemeijer, E. Marchiori, M. Pesteie, C. Guttman, F-E de Leeuw, C. Tempny, B. van Ginneken, A. Fedorov, P. Abolmaesumi, B. Platel, W. Wells III, *Transfer Learning for Domain Adaptation in MRI: Application in Brain Lesion Segmentation*, *MICCAI* 2017.

6. **M. Ghafoorian\***, J. Teuwen\*, R. Manniesing, F.E. de Leeuw, B. van Ginneken, N. Karssemeijer and B. Platel, *Student Beats the Teacher: Deep Neural Networks for Lateral Ventricles Segmentation in Brain MR*, To appear in SPIE Medical Imaging, 2018.
7. **M. Ghafoorian**, N. Karssemeijer, I. van Uden, F.E. de Leeuw, T. Heskes, E. Marchiori and B. Platel, *Automated detection of white matter hyperintensities of all sizes in cerebral small vessel disease*, Medical Physics 2016.
8. **M. Ghafoorian**, N. Taghizadeh and H. Beigy, *Automatic abstraction in reinforcement learning using ant system algorithm*, AAAI Spring Symposium: Lifelong Machine Learning, 2013.
9. **M. Ghafoorian**, N. Karssemeijer, T. Heskes, I. van Uden, F.E. de Leeuw, E. Marchiori and B. Platel, *Small white matter lesion detection in cerebral small vessel disease*, Medical Imaging, in Proceedings of the SPIE Medical Imaging, 2015.
10. A. Mehrtash, A. Sedghi, **M. Ghafoorian**, M. Taghipour, C. Tempny, W. Wells III, T. Kapur, P. Mousavi, P. Abolmaesumib, and A. Fedorov, *Classification of Clinical Significance of MRI Prostate Findings Using 3D Convolutional Neural Networks*, SPIE Medical Imaging, 2017.
11. K. Vijverberg, **M. Ghafoorian**, I. van Uden, F.E. de Leeuw, B. Platel and T. Heskes, *A single-layer network unsupervised feature learning method for white matter hyperintensity segmentation*, Proceedings of the SPIE Medical Imaging, 2016.
12. T. van den Heuvel, **M. Ghafoorian**, A. van der Eerden, B. Goraj, T. Andriessen, B. ter Haar Romeny and B. Platel, *Computer aided detection of brain micro-bleeds in traumatic brain injury*, Proceedings of the SPIE Medical Imaging, 2015.
13. G. Litjens, T. Kooi, B. Ehteshami, A. Setio, F. Ciompi, **M. Ghafoorian**, J. van der Laak, B. van Ginneken, and C. Sánchez, *A Survey on Deep Learning in Medical Image Analysis*, Medical Image Analysis, 2017.
14. T. van den Heuvel, A. van der Eerden, R. Manniesing, **M. Ghafoorian**, T. Tan, T. Andriessen, T. Vande Vyvere, L. van den Hauwe, B. ter Haar Romeny, B. Goraj, B. Platel, *Automated detection of brain microbleeds in patients with traumatic brain injury*, NeuroImage Clin. 2016.
15. I. van Uden, E. van Leijssen, **M. Ghafoorian**, M. Bergkamp, V. Lohner, E. Kooijmans, H. van der Holst, A. Tuladhar, D. Norris, E. van Dijk, L. Rutten-Jacobs, B. Platel, C. Klijn and F.E. de Leeuw, *Nonlinear temporal dynamics of cerebral small vessel disease The RUN DMC study*, Neurology 2017.

## Teaching Experience

Lecturer, 24th NA-MIC Project Week open source hackathon, CSAIL, MIT

**Basic Concepts in Neural Networks and State-of-the-art Networks** (Winter 2017)  
(Rating: **4.3/5**, opted as the best DL lecture among others by Google and NVIDIA)

Lecturer, Diagnostic Image Analysis Group, Radboud University

**Deep Learning Workshop** (Spring 2016)

Lecturer, Radboud University

**Computer Aided Diagnosis** (Spring 2016, rated with a median of **9/10** by the students.)

Lecturer, Azad University

**Artificial Intelligence** (Spring 2013)

**Introduction to Programming in C** (Spring 2013, Summer 2013)

Teaching Assistant, Radboud University

**Machine Learning in Practice** (Spring 2015, Spring 2016)

**Computer Aided Diagnosis** (Spring 2015, Spring 2014)

**Bio-inspired Computing** (Spring 2014)

Teaching Assistant, Sharif University of Technology

**Artificial Intelligence** (Spring 2012)

**Introduction to Programming** (Spring 2012)

**Machine Learning** (Fall 2011)

Teaching Assistant, University of Tehran

**Data Structures and Algorithms** (Fall 2006, Fall 2007)

**Introduction to Programming in C** (Fall 2006, Spring 2007, Fall 2007)

## Other Related Experiences

### Scientific Peer Reviewer for:

Neural Information Processing Systems (NIPS) 2018  
IEEE Transactions on Medical Imaging (TMI), including the Deep Learning Special Issue  
IEEE Transactions on Computational Biology and Bioinformatics  
Nature Scientific Reports  
NeuroImage Clinical  
Medical Physics  
SPIE Journal of Medical Imaging (JMI)  
IEEE International Symposium on Biomedical Imaging (ISBI) 2016  
Medical Image Computing and Computer Assisted Intervention (MICCAI) 2015

## Skills

### Computer Skills

Programming Languages: *Python, C, C++, Java, Matlab, C#*  
Deep Learning Libraries: *Tensorflow, PyTorch, Theano, Lasagne, Pylearn2*  
Machine Learning/Image Processing Libraries: *OpenCV, sklearn, skimage*  
Medical Image Processing Tool: *Mevislab*

### Analytical Skills

Data Structures, Design and Analysis of Algorithms  
Object Oriented and Software Design Patterns

### Language Skills

Persian (Native)  
English (Fluent)  
Dutch (Basic)

## Contact Information

Phone: +31 615219061  
Email: [mohsenghafoorian@gmail.com](mailto:mohsenghafoorian@gmail.com)  
Home Page: <http://mohsenghafoorian.nl>

## References

Prof. [Tom Heskes](mailto:t.heskes@science.ru.nl): t.heskes@science.ru.nl  
Prof. [Nico Karssemeijer](mailto:nico.karssemeijer@radboudumc.nl): nico.karssemeijer@radboudumc.nl  
Prof. [Elena Marchiori](mailto:elenam@cs.ru.nl): elenam@cs.ru.nl  
Dr. [Bram Platel](mailto:bram.platel@radboudumc.nl): bram.platel@radboudumc.nl  
Prof. [Bram van Ginneken](mailto:bram.vanginneken@radboudumc.nl): bram.vanginneken@radboudumc.nl  
Prof. [William Wells III](mailto:SW@bwh.harvard.edu): SW@bwh.harvard.edu  
Dr. [Tina Kapur](mailto:tkapur@bwh.harvard.edu): tkapur@bwh.harvard.edu