

MICHAEL HOFMANN

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PROFILE

Director, Engineering

- Engineering manager and research engineer with 10 years of industry experience.
- Strong experience in leading, managing and building up research & engineering teams.
- In-depth expertise in machine learning (deep learning) and computer vision.
- PhD in computer science from the University of Amsterdam.
- Excellent software engineering skills, with emphasis on modern C++ and Python.

WORK EXPERIENCE

Qualcomm

Director, Engineering

from Aug 2020

Amsterdam, NL

TomTom

Senior Manager Software Engineering (since Nov '19)

Manager Software Engineering

Jul 2016 — Jul 2020

Amsterdam, NL

- Leading five teams of R&D and software engineers on HD map making for automated vehicles. Hiring manager for these teams, resulting in >30 direct and indirect (hired) reports. Reporting to VP Engineering (Autonomous Driving).
 - Development of internal products for large-scale extraction of detailed semantics & geometry for HD mapping purposes at global scale, from LiDAR and camera data.
 - R&D on using and advancing the latest deep learning & computer vision techniques for above purposes. Co-author of several scientific papers (see *Publications*). Co-supervisor of multiple interns writing their master's thesis with TomTom.
 - Responsible for engineering activities of the teams, and aligning with business cases & company strategy. Interacting with engineers, product owners, engineering management, product management & process owners on regular basis. Further interactions with talent acquisition, marketing, legal, upper management, and other departments.
 - Instrumental in negotiations to set up research lab 'ATLAS Lab' (5 PhD students, 1 asst. prof.) as part of Innovation Center for Artificial Intelligence (<https://icai.ai/atlas-lab>), in collaboration with University of Amsterdam. Scientific directors: [Theo Gevers](#), [Cees Snoek](#).
 - Main technologies used (by teams) include Python, TensorFlow, C++, Azure, AWS, Kubernetes. Agile issue & project management using JIRA, Confluence.

Blippar

Head of Computer Vision R&D

Jul 2014 — Jun 2016

Amsterdam, NL

- Hired and led a team of 8 (7 Computer Vision R&D Engineers, 1 CPU/GPU Performance Engineer), based in Amsterdam and London. Responsible for creating the computer vision roadmap and its delivery.

- Supervision of computer vision R&D, and development of various key parts of the mobile application (Android, iOS) and back-end, including:
 - Real-time planar and non-planar object detection and tracking (~ 12 ms/frame on mobile);
 - Real-time landmark-based face detection and alignment (~ 5 ms/frame on mobile);
 - Large-scale image instance retrieval on server-side;
 - NEON and SSE based SIMD optimizations.
- Development of libraries used by R&D and application teams, for image representation, processing, and I/O, feature detection and matching, task-based thread pool, logging, etc.

Layar

Nov 2010 — Jun 2014

Lead Computer Vision R&D Engineer

Amsterdam, NL

- Enabling vision-based augmented reality for Layar, a mobile AR platform. Layar was acquired by Blippar in June 2014.
- Lead engineer and developer of the visual recognition and tracking technology used in the mobile Layar client application (iOS, Android). Implementation of robust large-scale image retrieval technology in the back-end. Work on internal rendering engine as part of core technology team.
- (Co-)Inventor of [several patents](#) in the AR domain.

Siemens Corporate Research

Mar 2003 — Sep 2003

Internship

Princeton, NJ, USA

Internship in the Interventional Imaging Group.

EDUCATION

University of Amsterdam

Jul 2005 — Oct 2010

PhD

Amsterdam, NL

- Graduate student at the Intelligent Autonomous Systems (IAS) Group, Informatics Institute, University of Amsterdam, NL.
PhD Thesis: Multi-view 3D Human Pose Recovery in Complex Environment. (see *Publications*)
Topic: Visual recognition of humans and their movements in real-world environments; in particular, 3D human pose tracking and 3D shape model estimation.
Advisor: [Prof. Dr. Darius M. Gavrila](#).

DaimlerChrysler Research

Nov 2004 — Apr 2005

Master thesis

Ulm, Germany

- *Thesis:* Shape Representations for Pedestrian Detection.
Grade: 1.0 (best possible: 1.0, range: 1.0 — 5.0)

University of Mannheim

Oct 1999 — Apr 2005

Bachelor & Master studies

Mannheim, Germany

- Master degree in computer science (German: Dipl.-Inf. Technische Informatik). Passed with distinction; overall grade: 1.3 (best possible: 1.0, range: 1.0 — 5.0). Various teaching assistant activities.

SKILLS

Programming Languages

C++17, Python, Bash; some L^AT_EX, HTML, CSS.

Software, Libraries

vim, tmux, git, PyTorch, TensorFlow, Eigen, Catch2, Boost, etc.

Operating systems

GNU/Linux, macOS, Microsoft Windows.

Languages

English (fluent), German (native), some Dutch.

ACTIVITIES

Developer & maintainer of *Selene*, a C++17 image representation, processing and I/O library.

<https://selene.dev>

Author & maintainer of C++ style guide. <https://github.com/kmhofmann/cpp-coding-guidelines>

Invited talk at “2nd international tutorial on Vision Meets Mapping” (VMM2) at CVPR 2020, 19 June 2020. (<https://youtu.be/mQpckcEUzMI>)

Keynote “HD Maps: How AI gives eyes to self-driving cars“, TomTom Data & AI Summit (internal), 8 May 2019.

Keynote at [ICT.OPEN2019](#) (Artificial Intelligence track): “AI for Map Making: Embedding Loss Generative Adversarial Networks for Lane Detection“, 19 March 2019.

Guest lecture “AI for Map Making“, University of Amsterdam, Applied Machine Learning course, 5 Dec 2018.

Invited talk “Deep Learning for HD Mapping“, TomTom Data & AI Summit (internal), 10 Apr 2018.

Invited talk “Deep learning based semantic HD mapping for autonomous vehicles“, Bits&Chips Smart Systems conference, 2 Nov 2017.

(Co-)Supervision of Master’s students at both University of Amsterdam (2007—2008) and TomTom (2017—2020).

Reviewer for CVPR (’20), ECCV (’20), NeurIPS (’16, ’17, ’18 (top 30%), ’19 (top 50%), ’20), ICLR (’18, ’19, ’20), ICML (’18), BMVC (’18, ’19).

PUBLICATIONS

L. Samson, N. van Noord, O. Booi, **M. Hofmann**, E. Gavves, M. Ghafoorian. *I Bet You Are Wrong: Gambling Adversarial Networks for Structured Semantic Segmentation*. CVRSUAD 2019 workshop, ICCV 2019. (<https://arxiv.org/abs/1908.02711>)

S. Shkodrani, **M. Hofmann**, E. Gavves. *Dynamic Adaptation on Non-Stationary Visual Domains*. TASKCV-2018 workshop, ECCV 2018. **Best paper award**. (<https://arxiv.org/abs/1808.00736>)

M. Ghafoorian, C. Nugteren, N. Baka, O. Booi, **M. Hofmann**. *EL-GAN: Embedding Loss Driven Generative Adversarial Networks for Lane Detection*. CVRSUAD 2018 workshop, ECCV 2018. (<https://arxiv.org/abs/1806.05525>)

M. Hofmann. *Multi-view 3D Human Pose Recovery in Complex Environment*. PhD thesis, 11/2011. (<http://dare.uva.nl/record/396515>)

M. Hofmann, D.M. Gavrilă. *Multi-view 3D Human Pose Estimation in Complex Environment*. International Journal of Computer Vision, 01/2012. (<http://dx.doi.org/10.1007/s11263-011-0451-1>)

M. Hofmann, D.M. Gavrilă. *3D Human Model Adaptation by Frame Selection and Shape-Texture Optimization*. Computer Vision and Image Understanding, 11/2011. (<http://dx.doi.org/10.1016/j.cviu.2011.08.002>)

M. Hofmann, D.M. Gavrilă. *Single-frame 3D Human Pose Recovery from Multiple Views*. DAGM, 2009. (http://dx.doi.org/10.1007/978-3-642-03798-6_8)

M. Hofmann, D.M. Gavrilă. *Multi-view 3D human pose estimation combining single-frame recovery, temporal integration and model adaptation*. IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2009. (<http://dx.doi.org/10.1109/CVPRW.2009.5206508>)