Navid Nourani-Vatani
Schumannstraße 19 | DE-10117 Berlin | Germany
+49 (0) 1731685913 | navid@nourani.dk | www.robotics.nourani.dk

PROFILE

I am the senior ADAS architect and requirements engineer working in the R&D department of the **Siemens Mobility AG**, where I am responsible for the design and development of ADAS systems and algorithms.Prior to this, I was a sensor fusion scientist at **MAN Truck & Bus AG** (Germany) responsible for the development of reliable perception, localization and fusion algorithms for Advanced Driver Assistance Systems (ADAS) onboard a large range of trucks, and passenger vehicles as part of **Volkswagen Group Research**. In 2011, I received an Australian Government SIEF Postdoctoral fellowship award to conduct research in image-based classification of underwater species at the **Australian Centre for Field Robotics** (Australia). Same year, I finished my PhD at the **University of Queensland** (Australia). This work was carried out at the CSIRO ICT Centre, researching biologically inspired vision-based localization. I was also shortly at the **ETH Autonomous Systems Lab** (Switzerland). I received a B.E.E. and a M.Sc. in electronics engineering from the **Technical University of Denmark** (DTU) in 2004 and 2007, respectively, majoring in Robotics and Control. In February 2006 I joined the Autonomous Systems Laboratory at the **CSIRO ICT Centre** (Australia). There, I developed coverage, localization, and navigation technologies for various autonomous ground vehicles. Before joining CSIRO, I was at **Alfred Kärcher GmbH** (Germany) developing coverage and localization algorithms for their vacuum cleaning robots, which has been patented.

My chief interest is the research and development of autonomous and semi-autonomous vehicles operating in the real world. Providing the vehicle with the ability to gain awareness of its surroundings, to localize itself and navigate reliably, and provide assistance to the operator and make safety decisions. My strengths include a broad technological knowledge, in particular in the robotics and autonomous domain, the abilities to elaborate ideas and conceptualize solutions, coordination of tasks and collaboration with my team members to achieve exceptional outcomes.

SCIENTIFIC APPOINTMENTS

Jan 2016 - now **Siemens Mobility AG, Germany**
ADAS Expert

- Responsible for the design and development of a new system architecture for the development of ADAS prototypes.
- Responsible for the definition of requirements together with customers and in-house engineers.
- Responsible for the coordination and development of sensor fusion algorithms.
- Responsible for evaluation of sensors and hardwares for deployment in rail environments.

Aug 2014 - Dec 2015 **MAN Truck & Bus AG, Germany**
Principal Perception Scientist

- Part of the Sensor Fusion and Driver Assist System department of Volkswagen Group Research.
- Coordinator of Sensor, Localization, Perception and Fusion algorithms across multi-brand projects.
- Responsible for the development of reliable algorithms for a large range of Advanced Driver Assistant Systems (ADAS) for trucks and cars.

Oct 2011 - Jul 2014 **ACFR @ University of Sydney, Australia**
SIEF John Stocker Postdoctoral Fellow

- Visual object recognition for the automated analysis of marine seafloor imagery
- Development of algorithms and methods for automatic counting and sizing of specific benthic organisms in large repositories of seafloor imagery collected by Autonomous Underwater Vehicle (AUV) systems.
- Coordinator and lecturer of Digital Components subject for 1st year mechatronics students.

Feb 2011 - Aug 2011 **QIBT @ Griffith University, Australia**
Tutoring and Lecturing

- Teaching Java and MATLAB programming to first year IT and engineering students. The classes are small, it is hands-on and personal.

Dec 2009 - February 2010 **Eidgenössische Technische Hochschule Zürich (ETHZ), Switzerland**
Visiting Research Scientist

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- Collaborated with Dr. Cedric Pradalier and the ASL UAV team to developed a Topological mapping and localization algorithm for quad-rotor UAVs.
- The method uses the induced Optical Flow to detect robust scene changes in outdoor light variant environments and a visual appearance method to close the loop.

January 2007 - February 2008 **CSIRO ICT Centre, Australia**
Research Engineer - Robotics and Sensor Networks

- Managed the deployment of a 6 month trial at a collaborating company's aluminium smelter factory. As part of the trial, performed the necessary development, update and maintenance of our localization system.
- Developed a module for automatic camera exposure control for robotic applications.
- Developed back-end software modules for Wireless Sensor Networks (WSN).

February 2006 - January 2007 **CSIRO ICT Centre, Australia**
Research Engineer Occupational Training

- Developed coverage algorithms for an under-actuated ride-on mower which is capable of covering up to 99% of uncertain environments. Precise localization was achieved using on-board laser sensors only without any GPS information.
- Implemented a practical path planning and obstacle avoidance for a ride-on mower.
- Designed and implemented a robot architecture which facilitates administration and validation of control command.

August 2005 - December 2005 **Technical University of Denmark**
Teaching Assistant

- Teaching assistant in the course Motor Controls at the department of Automation and Control.

June 2003 - January 2004 **Alfred Kärcher GmbH, Germany**
Internship

- Developed new algorithms to optimize the cleaning coverage ability of the RC3000, embedded software in C and Java code for their 3D simulator and stand-alone applications.
- Developed a SLAM algorithm for low-cost mobile robots. The result of my thesis work resulted in the registration of a patent with the European Patent Office.

Education

Mar 2008 - Aug 2011 **University of Queensland, Australia**
Doctor of Philosophy

- Developed a robust vision-based method to detect and describe scene changes at key locations in the environment using optical flow information.
- Developed a visual odometer for ground vehicles traversing at high velocities. Demonstrated world first >30km/h traversal using a downward looking camera.

Feb 2004 - Jan 2007 **Technical University of Denmark**
Master of Science Engineering

- Developed path planning algorithms for ride-on movers to cover large areas with obstacles without using GPS.

Aug 2000 - Feb 2004 **Technical University of Denmark**
Bachelor of Engineering

- Developed a cheap mapping and localization algorithm for indoor vacuum cleaners.

Patents & Selected Publications

N Nourani-Vatani, P V K Borges, J Roberts and M V Srinivasan, *On the use of Optical Flow for Scene Change Detection and Description*, May 2013, Journal of Intelligent & Robotic Systems

B Douillard, N Nourani-Vatani, et al., *Frequency-based Underwater Terrain Segmentation*, Nov 2013, Autonomous Robots

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N Nourani-Vatani and P V K Borges, *Correlation-based Visual Odometry for Ground Vehicles*, Sep/Oct 2011, Journal of Field Robotics

M Dünne, H Mayer and N Nourani-Vatani, *Floor cleaning apparatus and method of control therefore*, European Patent Office Patent Number: EP1557730, Publication date: 2005-07-27

Skills

I am familiar with these programming language: C, C++ & Java, MATLAB/Octave, HTML (Expert), Javascript, PHP, Python (Skilled), Abel & VHDL, Assembler, CLIPS, Shell/Bash scripts (Competent).

I am skilled under Windows and Unix environments and have a strong knowledge and understanding, of development tools, including gdb, cmake and revision control tools such as git and svn. I also have a strong knowledge of the OpenCV and the CImg computer vision libraries and good experience developing using robotics and automotive middlewares, such as ROS, DDX, LCM, and ADTF.

I am good experience in both the classical V-model development process as well as agile methods, such as Scrum, and able in using task tracking systems.

I am fluent in English, Danish & Farsi, competent in German and can also speak and understand Spanish.

Other

Administrative Responsibilities

- Supervision of Master and PhD students

Community Commitments

- Assosiate editor and peer-reviewing for IEEE Trans. on Robotics, Journal of Field Robotics, Springer Journal of Visual Communication and Image Representation, IROS, ICRA, IV, ACRA.