Daniel Martinec

dmoriarti3@gmail.com   (425) 522-3657

linkedin.com/in/dmartinec   http://dmartinec.altervista.org

Related Education

Ph.D. in Computer Vision, Czech Technical University, Prague - 2008.

Summary

Experienced software engineer with strong background in developing robust computer vision systems, including 3D reconstruction and machine learning.

Skilled in technical leadership across product design, manufacturing, and application development (firmware, cloud, and frontend).

Holds 5 patents, see LinkedIn.

Research Interests

3D reconstruction, robust estimation, bundle adjustment, machine learning

Experience

Principal Software Engineer, Glowforge

May 2016 - Dec 2023 (7 years 8 months) - Seattle, WA

- Led computer vision efforts in both app development and hardware manufacturing.
- Responsible for developing computer vision algorithms for a 3D laser printer.
- Involved in all aspects of the app stack, including firmware, services, and front-end development.
- Assisted the physics team with new product design and validation.
- Aided the manufacturing team in designing test fixtures and software to ensure that all products met the desired computer vision capabilities.
- Languages used: Python, C/C++, Ruby, JavaScript

Computer Vision Consultant

Sep 2015 - Apr 2016 (8 months) - Kirkland, WA

- Developed computer vision algorithms for a dense barcode reader, for startup SoundPaper.
- Languages used: C/C++, Objective C

Senior Researcher, Microsoft

Jul 2010 - Nov 2014 (4 years 5 months) - Redmond, WA

- Developed robotic and manual tools for calibrating various sensors on HoloLens.
- Assisted with designing optical and inertial systems on HoloLens.
- Developed 3D reconstruction algorithms for Streetside in Bing Maps.
- Responsible for ensuring that the team delivers state-of-the-art solutions to computer vision problems.
- Mentored the team in geometry and optimization techniques.

- Languages used: C/C++, C#, Matlab.

Senior Software Development Engineer, Microsoft

Jul 2008 - Jul 2010 (2 years 1 month) - Boulder, CO, and Prague, Czech Republic

- Assisted with development of a commercial derivative of Photosynth.
- Developed algorithms for automatic 3D reconstruction from visual and inertial sensors.
- Languages used: C/C++, Matlab.

Researcher, Czech Technical University

Sep 2004 - Dec 2007 (3 years 4 months) and Apr - Jun 2008 (3 months) - Prague, Czech Republic

- Research in 3D reconstruction, teaching.
- Provided mentorship to an undergraduate student through his Master's thesis and towards his Ph.D. program.
- Languages used: C/C++, Matlab, Maple, LaTeX.

Programmer, ICS Identifikacni systemy

Nov 1999 - Feb 2000 (4 months) - Prague, Czech Republic

- Developed control systems for barcode scanners.
- Languages used: Visual Basic.

Technical Skills and Competencies

- Seven years of developing computer vision software for the Glowforge 3D laser printer, encompassing firmware, cloud, and frontend.
- Three years of experience working on HoloLens, one of Microsoft's most technically challenging projects due to its high requirements for optical accuracy, low latency, and power consumption on a mobile device.
- Completed development of multiple HoloLens prototypes and devised methods for both robotic and manual calibration of camera lenses, accelerometers, and gyroscopes.
- Developed tools for detecting device alterations caused by temperature and mechanical changes.
- Designed optical and inertial systems, involving sensor characterization and collaboration with experts from other fields, such as optics and hardware design.
- Developed early-stage prototypes with rapidly changing requirements, which later evolved into fully-fledged products.
- Part of high-performance teams within a large organization, collaborating with numerous other teams to deliver multiple versions of target hardware and software.
- Assisted with building four 3D-reconstruction pipelines: HoloLens in Windows, Streetside in Bing Maps, GeoSynth (a derivative of PhotoSynth for military applications), and CMP (at Czech Technical University).
- Image processing, pattern recognition.
- Computer graphics: raytracing, radiance method, morphing, virtual scene walkthrough, animation.
- Proficient in C/C++, Python, Ruby, C#, Matlab.
- Familiar with JavaScript , Objective C, Java, Maple, Pascal, M-technology (original name MUMPS), Visual Basic, Prolog, Assembler, LaTeX/TeX, Lisp, SQL, Oracle, HTML, YAML, Python, Bash, awk, sed.

Education

Czech Technical University, Prague - Ph.D. in Computer Vision, 2008.
Charles University in Prague - M.Sc. in Computer Science, 2001.

Awards

Second place in ICCV2005 Computer Vision Contest.

Selected Publications

1. Robust Multiview Reconstruction.
   PhD Thesis, Center for Machine Perception, Czech Technical University, June 2008.
2. A convenient multi-camera self-calibration for virtual environments.
   PRESENCE: Teleoperators and Virtual Environments, 14(4):407-422, August 2005.
3. Robust rotation and translation estimation.
   Proc. Computer Vision and Pattern Recognition conference 2007.
4. 3D reconstruction by fitting low-rank matrices with missing data.
   Proc. Computer Vision and Pattern Recognition conference 2005, pp. 198-205.

Selected Invited Presentations

Department of Numerical Analysis and Computing Science, Royal Institute of Technology (KTH), Stockholm, Sweden, January 2004.

Forschungsinstitut für Optronik und Mustererkennung, FGAN Research Institute for Optronics and Pattern Recognition (FGAN-FOM), Ettlingen, Germany, October 2006.

School of Computer Science, McGill University, Montreal, Canada, March 2008.

General Robotics, Automation, Sensing and Perception Laboratory (GRASP), University of Pennsylvania, April 2008.

Reviewer for

IEEE Transactions on Pattern Analysis and Machine Intelligence

Computer Vision and Image Understanding

Image and Vision Computing Journal

Conference on Computer Vision and Pattern Recognition

International Conference on Computer Vision

Personal

U.S. citizen.