

Devin Lane

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Summary: I am a software architect with a focus on Visual SLAM algorithms and implementation. I have experience applying real-time computer vision algorithms for precision pose reconstruction and subsequent georectification of video from military unmanned aerial systems. I have specific experience in designing systems and engineering processes to produce robust, testable solutions to state estimation problems.

Software Development Experience

General: Highly proficient in C/C++/MATLAB using the GCC toolchain on Linux. 14 years of programming experience. Experience with on- and off-site software development as an individual contributor and team lead. Other tools include Javascript, Python and other scripting languages, Node.js, Jenkins, git, git-annex, Qt Creator, gdb, valgrind, gDEDebugger, and CMake. Prior experience with graphic design, layout, and user interface design.

Machine Vision: Six years experience with sparse and dense visual SLAM theory, algorithms, and implementation. Frequent use of real-time bundle adjustment, nonlinear optimization, sparsification, robust statistics, sensor fusion, camera calibration, and coordinate system transformations. Experience with system design for repeatable, automated testing across simulated and real data scenarios. Experience with performance profiling and optimization including algorithm design and implementation for CUDA GPUs.

Professional Experience

Lead Software Systems Engineer.

The MITRE Corporation, Bedford, MA. 06/10-Present

Architect of multiple systems supporting the development of computer vision algorithms to aid UAS video exploitation, coordinate generation, mensuration, 3D model creation, visualization, and multi-camera calibration.

FMV ON-Target: Lead team of 6 for development of a real-time GPS-integrated Visual SLAM system for precision coordinate generation from military UAS. Designed an end-to-end system including low-level libraries for fundamentals, simulation, and testing as well as a graphical front end for intelligence analysis. Designed distributed framework for tracking system performance on several data sets across software revisions in a manner suitable for NGA validation. Responsible for software delivery to NRO, NGA, RRTO, CBP, Army, and USMC customers. Organized and performed on-site data collection of video and telemetry from ScanEagle, Shadow, Raven, and RQ21 Blackjack UAS, then integrated data into Visual SLAM testing suite. Managed collaboration with computer vision researchers at George Washington University for work on dense 3D reconstruction. Oversaw additional MITRE work on dense 3D reconstruction.

Scalable Constraint Graph Optimization (Research): Received full year internal research grant to investigate reducing computational complexity of nonlinear optimization algorithms through data pruning, marginalization, sparsification and approximation techniques. Achieved up to 72X performance increase on mission scenarios from FMV ON-Target.

CUDA Bundle Adjust (Research): Received three month internal research grant to implement bundle adjust algorithm using nVidia's CUDA API and language. Achieved ~10X performance increase.

Multi-camera Calibration: Developed MATLAB software package for intrinsic and extrinsic calibration of a multi-camera system using a Theodolite laser surveyor.

Software Engineer (Contractor). Cultured Code, Stuttgart, Germany. 12/08–05/10

Feature development on the task manager “Things” for Mac OS X. Other internal development including performance optimization and a license key generation and validation module.

Software Engineer (Intern). Apple Inc., Cupertino, California. 05/07–11/08

Expanded profiling capabilities and enhanced functionality in Quartz Debug. Gained experience solving issues with a large, collaboratively-developed codebase (Core Graphics/Window Server).

Software Engineer (Contractor). 05/06–03/07

Developed a video editing application using a wide variety of Macintosh technologies including OpenGL, Core Image, Core Video, Quartz 2D, and QuickTime. Application allowed visual effects to be applied to individual frames and subsequently exported.

Education: Rochester Institute of Technology
Bachelor of Science in **Software Engineering (Honors, Dean's List)**
GPA: 3.63/4.0 Major GPA: 3.82/4.0

Personal: Enjoys solving problems and developing creative solutions to engineering challenges. Enjoys discussions about software, development, and programming. Would rather spend a day creating a tool to solve a problem than an hour to solve the problem manually. Interested in building up system capability rather than performing throw-away analysis or prototyping.

Activities: Backcountry skiing, road cycling, hiking, climbing mountains.