

Kristopher R. Beevers

Current address

138 Cecil Street
Cecil Court #12-02
Singapore 069538
+65 9776 2956

email: beevek@cs.rpi.edu

web: www.cs.rpi.edu/~beevek

Permanent address

115 East Church Street
Adams, New York 13605
USA
(315) 232-3105

Education

- Rensselaer Polytechnic Institute: Ph.D. in Computer Science, March 2007
Thesis: *Mapping with limited sensing*
- Rensselaer Polytechnic Institute: M.S. in Computer Science, May 2004
Thesis: *Topological mapping and map merging with sensing-limited robots*
- Rensselaer Polytechnic Institute: B.S. in Computer Science, May 2003, Cum Laude

Research and Professional Experience

- Principal Software Architect, Voxel dot Net, New York, NY and Singapore, 2008–present.
Leading architecture and development of VoxCAST, a large-scale content delivery network; VoxSTRUCTURE, a next-gen hybrid cloud solution; hAPI, a comprehensive hosting API; and a variety of other infrastructure projects and administrative tools at a premier managed hosting provider.
- Co-founder and Chief Scientist, SolidJoint Research, Inc., Cambridge, MA, 2007–2008.
Led the business and technical development of a startup company in the green building industry.
- Research Assistant, RPI Algorithmic Robotics Laboratory (ARL), 2003–2007.
Designed mapping and exploration algorithms for robots with limited sensing capabilities.
- Undergraduate Research, RPI Algorithmic Robotics Laboratory (ARL), Summer 2002.
Developed software for use in robotics laboratory research activities and performed broad readings in the robotics literature.
- Lead Developer, Aimster, Albany, NY, 2000–2001.
Led development on Aimster, a large-scale file-sharing network encompassing more than 3 million users. Supervised other programmers, designed a scalable network architecture capable of handling millions of concurrent users, and developed several highly optimized in-house server programs.
- Software Designer and Programmer, Intranaut, Inc., Troy, NY, 1999–2000.
Designed and developed web-based applications and frontends for an Internet venture.

- Internet Technician and Programmer, Imc-net/Gisco, Watertown, NY, 1997–1999.
Provided technical assistance to subscribers of a regional ISP, designed customer web sites and CGI backends, and performed network maintenance activities.

Publications

- K. Beevers and W. Huang. Fixed-lag sampling strategies for particle filtering SLAM. *2007 International Conference on Robotics and Automation (ICRA 2007)*, April 2007, Rome, Italy.
- Kristopher R. Beevers. Mapping with limited sensing. Ph.D. thesis, Rensselaer Polytechnic Institute, Troy, NY, January 2007.
- K. Beevers. Sampling strategies for particle filtering SLAM. Technical Report 06-11, Department of Computer Science, Rensselaer Polytechnic Institute, Troy, NY, September 2006.
- K. Beevers and W. Huang. Inferring and enforcing relative constraints in SLAM. *2006 Workshop on the Algorithmic Foundations of Robotics (WAFR 2006)*, July 2006, New York.
- K. Beevers and W. Huang. SLAM with sparse sensing. *2006 International Conference on Robotics and Automation (ICRA 2006)*, May 2006, Orlando.
- W. Huang and K. Beevers. Topological map merging. *International Journal of Robotics Research*, August 2005.
- K. Beevers and W. Huang. Loop closing in topological maps. *2005 International Conference on Robotics and Automation (ICRA 2005)*, April 2005, Barcelona, Spain.
- W. Huang and K. Beevers. Complete topological mapping with sparse sensing. Technical Report 05-06, Department of Computer Science, Rensselaer Polytechnic Institute, Troy, NY, March 2005.
- W. Huang and K. Beevers. Topological mapping with sensing-limited robots. In M. Erdman et al., editors, *Algorithmic Foundations of Robotics VI*, Springer, 2005.
- K. Beevers and J. Peng. A* graph search within the BGL framework. In *Boost Graph Library 1.33.0*, October 2004.
- W. Huang and K. Beevers. Topological map merging. In R. Alami, R. Chatila, and H. Asama, editors, *Distributed Autonomous Robotic Systems 6*, Springer, 2007.
- Kristopher R. Beevers. Topological mapping and map merging with sensing-limited robots. Master's thesis, Rensselaer Polytechnic Institute, Troy, NY, April 2004.

Projects

- SLAM on an embedded processor, 2007.
Developed world's first working implementation of a modern simultaneous localization and mapping (SLAM) algorithm for an embedded processor.
- MPRO middleware for RWI MagellanPro, Spring 2006.
Developed libraries and applications for network-based control and simulation of an RWI Magellan-Pro research robot. Deployed for an introductory robotics course in Spring 2006.

- Algorithmic Robotics Laboratory mobile robot development, Summer 2003.
Helped design a new mobile robot platform for use in ARL research activities. Developed low-level software (e.g., drivers, libraries) and a high-level hybrid (reactive/deliberative) software architecture.
- DOLT, the drawableObject Library, 2002–2006.
Implemented and maintained the drawableObject Library, a simple, portable, representation-independent 2D C++ graphics library capable of drawing graphics to both the screen and postscript. Deployed throughout ARL and in several classes at RPI.
- Robot motion planners, Summer 2002.
Implemented several robot motion planners for planar robots with two and three degrees of freedom. Planners include: uniform grid, quadtree, triangulation, visibility graph, probabilistic roadmap, non-holonomic grid, holonomic refinement, and nonholonomic probabilistic roadmap planners.

Peer reviews

- IEEE Transactions on Robotics, Journal of Intelligent and Robotic Systems, Journal of Robotics and Autonomous Systems, IEEE/RSJ IROS (2003-2005), IEEE ICRA (2005-2009), RSS (2005), WAFR (2006), IEEE IAS (2006)

Teaching Experience

- Lecturer, CSCI-6971 Mathematics for Mobile Robotics, RPI, 2006.
Covered topics from probability and statistics in the context of mobile robotics, including: basic probability theory, limit theorems, stochastic processes, Monte Carlo methods, sequential Monte Carlo, Markov chain Monte Carlo, graphical models, and belief propagation.
- Guest Lecturer, CSCI-4150 Introduction to Artificial Intelligence (5 lectures), RPI, 2003-2005.
Covered search-related topics, including blind search methods (BFS, DFS, etc.), heuristic search (properties of heuristics, A*, memory bounded A*), and iterative improvement search (hill-climbing search, simulated annealing, genetic algorithms).
- Guest Lecturer, CSCI-4190 Introduction to Robotic Algorithms (5 lectures), RPI, 2003, 2006.
Covered robot motion planning, probabilistic mapping, EKF SLAM, and particle filtering SLAM.
- Graduate TA, CSCI-4190 Introduction to Robotic Algorithms, RPI, 2003, 2006.
- Graduate TA, CSCI-4150 Introduction to Artificial Intelligence, RPI, 2002, 2005.

Technical Skills

- Software: Linux, UNIX, DOS/Windows, X, Microsoft Visual Studio, gcc/g++, gdb, lex and yacc, make, autoconf, Emacs, Microsoft Office, STL, BGL, OpenGL
- Languages (in order of proficiency): C/C++, \LaTeX , Perl, PHP, HTML, Matlab, SQL, Java, Scheme, Lisp, Bash, Assembly, Pascal