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RESEARCH INTERESTS Hybrid, distributed, and real-time systems.

DESIGN AND ANALYSIS OF SOFTWARE FOR EMBEDDED SYSTEMS.

- EDUCATION
- ◇ **Massachusetts Institute of Technology**, Cambridge, MA, USA.
PhD in Computer Science, September 2007.
Thesis: *A verification framework for ordinary and probabilistic hybrid systems*
 - ◇ **Indian Institute of Science**, Bangalore, India.
MSc in Computer Science and Automation, 2001.
Thesis: *A specification language for hybrid input/output automata.*
 - ◇ **Jadavpur University**, Kolkata, India.
BE in Electrical Engineering, 1999.
Project: *Controller design for an inverted pendulum using unsupervised learning.*

- AWARDS AND FELLOWSHIPS
- CMI Fellowship (California Institute of Technology 2007)
 - NTT Fellowship (MIT 2001)
 - Barindra Memorial Medal and Subodh K. Basu Medal, Sandeep Tandon Memorial Prize (Jadavpur University 1999)

- APPOINTMENTS
- ◇ **Assistant Professor.** Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, 2008-present.
 - ◇ **Postdoctoral Scholar.** Center for Mathematics of Information, California Institute of Technology, 2007-2008.
 - ◇ **Graduate Research Assistant.** Computer Science and AI Lab., Massachusetts Institute of Technology, 2001-2007.
 - ◇ **Summer Intern.** Naval Research Laboratory, May-August 2003.
 - ◇ **Summer Intern.** Indian Statistical Institute, June-August 1998.

- TEACHING
1. Fall 2009: ECE190 Introduction to Computing Systems
 2. Spring 2009: ECE428/CS425 Distributed Systems
 3. Fall 2008: ECE598 Modelling and Verification of Real-time and Hybrid Systems
 4. Spring 2008: Mini lecture series on *Deductive Verification* as part of *CS141: Distributed Systems Laboratory (CalTech)*.

PUBLICATIONS

- JOURNAL ARTICLES
1. Seth Gilbert, Nancy Lynch, Sayan Mitra, and Tina Nolte. Self-stabilizing robot formations over unreliable networks In *Special Issue on Self-Adaptive and Self-Organising Wireless Networking Systems of ACM Transactions on Autonomous and Adaptive Systems (TAAS)*, 4(3), July 2009.
 2. Sayan Mitra, Daniel Liberzon and Nancy Lynch. Verifying average dwell time of hybrid systems. *ACM Transaction in Embedded Computing Systems (TECS)*, 8(1),1–37, December 2008.
 3. Myla Archer, Hongping Lim, Nancy Lynch, Sayan Mitra, and Shinya Umeno. Specifying and proving properties of timed I/O automata in the TIOA toolkit. In *Special issue of the Journal on Design Automation for Embedded Systems*, volume 2, numbers 1–2, June 2008, Springer 2008.
 4. Sayan Mitra and Nancy Lynch. Proving approximate implementations for probabilistic I/O automata. *Electronic Notes in Theoretical Computer Science*, 174(8):71-93, June 2007.
 5. Sayan Mitra and Myla Archer. PVS strategies for proving abstraction properties of automata. *Electronic Notes in Theoretical Computer Science*, 125(2):45–65, 2005.
 6. Sayan Mitra and L. M. Patnaik Specification language design for hybrid systems. *Computational Mathematics, Modeling and Algorithms*, edited by J. C. Misra. Alpha Science Int'l, January 2003.
- CONFERENCE PUBLICATIONS
1. R. Lee DeVille and Sayan Mitra Stability of Distributed Algorithms in the face of Incessant Faults. In Proceedings of 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'09), LNCS 5873, pages 224-237. Lyon, France. November 2009.
 2. Pavithra Prabhakar, Sayan Mitra, and Mahesh Viswanathan On Convergence of Concurrent Systems under Regular Interactions In Proceedings of 20th International Conference on Concurrency Theory (CONCUR 2009).
 3. Tichakorn Wongpiromsarn, Sayan Mitra, Richard Murray and Andrew Lamperski. Periodically Controlled Hybrid Systems: Verifying A Controller for An Autonomous Vehicle. In Proceedings of 12th International Conference on Hybrid Systems: Computation and Control (HSCC 2009), San Francisco, CA. LNCS 5469, pages 396–410, March 2009.
 4. Seth Gilbert, Nancy Lynch, Sayan Mitra, Tina Nolte. Self-stabilizing Mobile Robot Formations with Virtual Nodes. In Proceedings of 10th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'08), Detroit, MI. LNCS 5340, pages 188–202. November 2008.
 5. K. Mani Chandy, Sayan Mitra, Concetta Pilotto. Convergence Verification: From Shared Memory to Partially Synchronous Systems. In Proceedings of 6th International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS'08), Saint Malo, France. LNCS 5215, pages 218-232, September 2008.
 6. Sayan Mitra and K. Mani Chandy. A Formalized theory for Stability and Convergence of Automata in PVS. In Proceedings of 21st International Conference on *Theorem Proving in High Order Logics (TPHOLs'08)*, Montreal, Canada. LNCS 5170, pages 230 – 245. August 2008.

7. Sayan Mitra and Nancy Lynch. Trace-based semantics for probabilistic timed I/O automata. Extended abstract in *Hybrid Systems: Computation and Control (HSCC'07)*, volume 4416 of LNCS, Springer 2007, April 2007.
8. Radu Grosu, Sayan Mitra, Pei Ye, Scott Smolka, Emilia Entcheva, and I.V. Ramakrishnan. Learning Cycle-linear hybrid automata of excitable cell models. In *Hybrid Systems: Computation and Control (HSCC'07)*, April 2007.
9. Myla Archer, Hongping Lim, Nancy Lynch, Sayan Mitra, and Shinya Umeno. Specifying and proving properties of timed I/O automata in the TIOA toolkit. In *Fourth ACM-IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE'06)*. Napa, CA 2006. (selected for special issue of Journal on Design Automation of for Embedded Systems)
10. Sayan Mitra, Daniel Liberzon, and Nancy Lynch. Verifying average dwell time by solving optimization problems. In Ashish Tiwari and João P. Hespanha, editors, *Hybrid Systems: Computation and Control (HSCC'06)*, volume 3927 of LNCS, Santa Barbara, CA, March 2006.
11. Hongping Lim, Dilsun Kaynar, Nancy Lynch, and Sayan Mitra. Translating timed I/O automata specifications for theorem proving in PVS. In *Proceedings of Formal Modeling and Analysis of Timed Systems (FORMATS'05)*, volume 3829 of LNCS, Uppsala, Sweden, September 2005.
12. Gregory Chockler, Nancy Lynch, Sayan Mitra, and Joshua Tauber. Proving atomicity: an assertional approach. In Pierre Fraigniaud, editor, *Proceedings of 19th International Symposium on Distributed Computing (DISC'05)*, volume 3724 of LNCS, pages 152 – 168, Cracow, Poland, September 2005.
13. Ben Leong, Sayan Mitra and Barbara Liskov. Path vector face routing: Geographic routing with local face information. In *Proceedings of 13th IEEE International Conference on Network Protocols (ICNP'05)*, Boston, Massachusetts, November 2005.
14. Nancy Lynch, Sayan Mitra, and Tina Nolte. Motion coordination using virtual nodes. In *Proceedings of 44th IEEE Conference on Decision and Control (CDC'05)*, Seville, Spain, December 2005. Full version available as *Technical Report MIT-LCS-TR-986*.
15. Sayan Mitra and Daniel Liberzon. Stability of hybrid automata with average dwell time: an invariant approach. In *Proceedings of the 43rd IEEE Conference on Decision and Control*, Paradise Island, Bahamas, December 2004.
16. Sayan Mitra, Yong Wang, Nancy Lynch, and Eric Feron. Safety verification of model helicopter controller using hybrid Input/Output automata. In *Hybrid System: Computation and Control (HSCC'03)*, volume 2623 of LNCS, Prague, Czech Republic, 2003. Full version available as *Technical report MIT-LCS-TR-880*.

REFEREED
WORKSHOP
PUBLICATIONS

1. Sayan Mitra and Nancy Lynch. Approximate simulations for task-structured probabilistic I/O automata. In *LICS workshop on Probabilistic Automata and Logics (PAuL'06)*, Seattle, WA, August 2006.
2. Sayan Mitra and Myla Archer. Reusable PVS proof strategies for proving abstraction properties of I/O automata. In *STRATEGIES 2004, IJCAR Affiliated Workshop on strategies in automated deduction*, Cork, Ireland, July 2004.
3. Sayan Mitra and Jesse Rabek. Energy efficient connected clusters for mobile ad hoc networks. In *Proceedings of 3rd Annual Mediterranean Ad Hoc Networking Workshop (MED-HOC-NET'04)*, Bodrum, Turkey, 2004.
4. Dilsun Kaynar, Nancy Lynch, and Sayan Mitra. Specifying and proving timing properties with TIOA tools. In *Work in progress session of the 25th IEEE International Real-Time Systems Symposium (RTSS-WIP)*, Lisbon, Portugal, December 2004.

5. Sayan Mitra and Myla Archer Developing strategies for specialized theorem proving about untimed, timed, and hybrid I/O Automata. In *STRATA 2003, Workshop on Design and Application of Strategies/Tactics in Higher Order Logics*, Rome, Italy, September, 2003.

PRESENTATIONS

- INVITED TALKS
- ◇ Replication-based fault-tolerance of wireless distributed control systems. *CalTech Verification and Validation Workshop*, Pasadena, CA, September 2009.
 - ◇ Virtual Infrastructure for Programming Mobile Robots. *Workshop on Formal methods for Robotics and Automation Workshop* at the *2009 IEEE International Conference on Robotics and Automation (ICRA)*, in Kobe, Japan, May 2009.
- CONFERENCE AND SEMINAR TALKS
- ◇ Stability of Distributed Algorithms in the face of Incessant Faults. *International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS'09)*, Lyon, France, November 2008.
 - ◇ Proving Convergence: From Synchronous to Partially Synchronous Systems. *Computer Engineering Seminar Series at UIUC*, Urbana, IL, October 2008.
 - ◇ Proving Convergence: From Synchronous to Partially Synchronous Systems. *Computer Engineering Seminar Series at UIUC*, Urbana, IL, October 2008.
 - ◇ Verifying Hybrid Systems. *CMI Seminar Series at Caltech*, Pasadena, CA, February 2008.
 - ◇ Proving approximate implementations. *CMI Retreat'07*, Los Angeles, CA, October 2007.
 - ◇ Learning Cycle-Linear Hybrid Automata for Excitable Cells. *HSCC'07*, Pisa, Italy, April 2007.
 - ◇ Verifying Hybrid Systems: Stability and Implementations. *Self-Organizing Systems group seminar*, University of Washington, Seattle, WA, January 2007.
 - ◇ Approximate Simulations for Task-PIOAs. *Workshop on Probabilistic Automata and Logics (PAuL'06) (Affiliated with LICS'06)*, Seattle, WA, August 2006.
 - ◇ Verifying Average Dwell Time through Optimization. *Hybrid Systems: Computation and Control (HSCC'06)*, Santa Barbara, CA, March 2006.
 - ◇ Translating TIOA specs for theorem proving in PVS. *Formal Modelling and Analysis of Timed Systems (FORMATS'05)*, Uppsala, Sweden, September 2005.
 - ◇ Motion coordination with virtual nodes. *Theory of Distributed Systems Seminar*, MIT, Cambridge, MA, March 2005.
 - ◇ Stability Verification of TIOA. *Timed I/O Automata Workshop*, MIT, Cambridge, MA, December, 2005.
 - ◇ Modeling and Analysis of Complex Computational Systems. *MURI Meeting*, University of Illinois Urbana-Champaign, IL, June 2004.
 - ◇ Reusable PVS proof strategies for proving abstraction properties of I/O automata. *STRATEGIES Workshop (Affiliated with IJCAR'04)*, Cork, Ireland, July 2004.
 - ◇ On building PVS Interfaces for Abstraction Proofs. *CHACS Seminar*, Naval Research Lab, Washington D.C., August 2003.
 - ◇ Safety Verification of Model Helicopter Controller. *Hybrid Systems: Computation and Control (HSCC'03)*, Prague, Czech Republic, April 2003.
- GRADUATE STUDENT SUPERVISING
- ◇ Taylor Johnson, ECE, University of Illinois.
 - ◇ Parasara Sridhar Duggirala, CS, University of Illinois.

- ◇ M. S. Karthikeyan, ECE, University of Illinois.
 - ◇ Informally supervised MIT MEng student Hongping Lim.
- CONFERENCE ORGANIZATION Program Vice Chair for 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS 2009).
- Program Committee member for 13th International Conference on Hybrid Systems: Computation and Control (HSCC 2010).
- REVIEWING IEEE Transactions on Automatic Control, Theoretical Computer Science, IEEE Systems, Man and Cybernetics, IEEE Transactions on Computers, ACM Transactions on Embedded Computing Systems, Journal of Discrete Algorithms, Journal of Logic and Algebraic Programming, Journal of Aerospace, Computing, Information, and Communication.
- IEEE CDC (2005-2009), DISC (2005-06), EMSOFT (2009), FOSSACS (2007), FSTTCS (2008), HSCC (2004-09).
- GRANT PROPOSALS ◇ Contributed research ideas and wrote key sections of a recently funded NSF grant proposal on stability analysis of probabilistic hybrid systems (PIs: Daniel Liberzon and Nancy Lynch).
- ◇ Contributed to several other grant proposals for NSF, AFOSR, MURI; presented research results for funding agency meetings.
- LANGUAGES English, Bangla, Hindi
- CITIZENSHIP Citizen of India. H1B Visa.