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- RESEARCH INTERESTS Mobile sensor networks
Robot Networks
Networked Embedded Systems
Mobile Computing
Wireless Networks
Embedded Operating Systems
- EDUCATION **University of Southern California** Los Angeles, California USA
Department of Computer Science
Ph.D., Computer Science, (expected) Fall 2009
 - Dissertation: Reconfigurable Sensor Networks
 - Advisor: Prof. Gaurav S. SukhatmeM.S., Computer Science
 - Dissertation: Power-awareness in next generation embedded systems
 - Advisor: Prof. Massoud Pedram**Sri Jayachamarajendra College of Engg.** Mysore, IN
Department of Computer Science and Engg
B.E., Computer Science and Engg., 1999
 - Dissertation: Implementing SACK and T/TCP in Linux 2.0.36
 - Advisor: Prof. Kumar Sivarajan
 - Graduated first class with distinction
- RESEARCH EXPERIENCE **Robotic Embedded Systems Lab** Los Angeles, California, USA
University of Southern California *Jan 2003—current*
Graduate Research Assistant
Reconfigurable Sensor Networks - PhD Thesis
Spatial Reconfiguration
 - Developed algorithm to use mobility to construct a biconnected robot network from a connected robot network using coarse relative bearing
 - Algorithm shown to be optimal in the number of moves
 - Used received signal strength from mote radio to compute coarse relative bearing**Functional Reconfiguration**
 - Developed algorithm to reconfigure data-fusion based services in a tiered sensor network by trading off communication for computation
 - Working on cycle-accurate resource accounting on LEAP-2 nodes
 - Ported TinyOS-2.x to the μ LEAP-2 nodes**Robotic Sensor Networks**
 - Wrote system software for a custom built robot - [Robomote](#) (with Mohammad Rahimi, Hardik Shah and Sandeep Babel)
 - Built a testbed for experiments with robotic sensor networks (with Rohit Mediratta, Mohammad Rahimi, Hardik Shah and Sandeep Babel)

- Designed, implemented and evaluated a distributed control law to detect and track level sets of a scalar field

System Power Optimization Lab
University of Southern California
Graduate Research Assistant

Los Angeles, California, USA
Jan 2001—Jan 2003

Power-awareness in the next generation embedded systems

- Project leader on APOLLO project to build system level power optimization in the next generation of Land Warrior systems
- Demonstrated 2.5X energy reduction in a situation run specified by DARPA
- Designed and evaluated new algorithms for power-aware routing in mobile adhoc networks (with Morteza Maleki)
- Implemented novel application level QoS-aware dynamic voltage frequency scaling algorithm for MPEG decoding (with Kihwan Choi and Wei-Chung)
- Helped port 2.4 linux kernel to custom Xscale platform built completely in our lab (with SungWoo)

TEACHING
EXPERIENCE

University of Southern California
Department of Computer Science

Los Angeles, California USA

CS 546: Intelligent Embedded Systems

Spring 2009

- Co-designed the course centered around smartphones, the Android programming framework and body area networks
- Designed the assignments in Android
- Worked with teams on projects on HTC G-1 and the android framework
- Held office hours and weekly meetings with project teams
- Resulted in one conference publication and two workshop publications

CS 546: Intelligent Embedded Systems

Spring 2006

- Co-designed the term projects for the course
- Interfaced with a local startup and used their embedded node (ENSBox) for the course
- Designed assignments, projects and helped students use the uCos-II realtime OS on the ENSBoxes
- Lectured on TinyOS and helped students do one of the assignments on motes
- Held office hours and maintained the lab

Department of Mathematics

Math 118: Introduction to Calculus

Fall 2000

- Held recitations for 6 hrs/week for 75 students
- Prepared, administered and evaluated weekly quizzes
- Evaluated midterm and final examinations (alongwith Instructor and co-TA)
- Held extra recitation sessions before exams

WORK EXPERIENCE

Research Intern

May 2005 — Aug 2005

UC Berkeley Earthquake Engineering Research Center

- Studied local patterns of atmosphere within forest fires using motes
- Deployed motes in black diamond mines and studied wireless characteristics in such environments

Software Engineer

Aug 1999 — July 2000

Tektronix Engineering Development India

- Wrote embedded java software for the high end oscilloscopes of Tektronix
- Organized and ran special interest group meetings on Design Patterns

JOURNAL PAPERS

1. **Karthik Dantu** and Gaurav S. Sukhatme, “Robust Connectivity in Robot Networks”, under submission to IEEE Transactions of Robotics, October 2009.
2. **Karthik Dantu** and Gaurav S. Sukhatme, “Reconfiguring Services in Tiered Sensor Networks”, In preparation.
3. **Karthik Dantu** and Gaurav S. Sukhatme, “Stabilizing Routing in Robot Networks”, In preparation.

CONFERENCE AND
WORKSHOP PAPERS

1. Mi Zhang, Anand Joshi, Ritesh Kadmwala, **Karthik Dantu**, Sameera Poduri and Gaurav S. Sukhatme, “OCRdroid: A Framework to Digitize Text using Mobile Phones”, to appear in ICST International Conference on Mobile Computing, Applications and Services (MobiCASE '09), October 2009, San Diego, USA.
2. Avinash Parnandi, Ken Le, Pradeep Vaghela, Aalaya Kolli, **Karthik Dantu**, Sameera Poduri and Gaurav S. Sukhatme, “Coarse In-Building Localization with Smartphones”, to appear in ICST International Workshop on Innovative Mobile User Interactivity (IMUI '09) alongwith MobiCASE 2009, October 2009, San Diego, USA.
3. Dheeraj Kota, Neha Laumas, Urmila Shinde, Saurabh Sonalkar, **Karthik Dantu**, Sameera Poduri and Gaurav S. Sukhatme, “deSCribe: A Personalized Tour Guide and Navigational Assistant”, to appear in ICST International Workshop on Innovative Mobile User Interactivity (IMUI '09) alongwith MobiCASE 2009, October 2009, San Diego, USA.
4. **Karthik Dantu**, Prakhar Goyal and Gaurav S. Sukhatme, “Relative Bearing Estimation from Commodity Radios”, to appear in IEEE International Conference on Robotics and Automation (ICRA '09), pp 3871–3877, May 2009, Kobe, Japan.
5. **Karthik Dantu**, Gaurav S. Sukhatme, “Connectivity vs. Control: Using Directional and Positional Cues to Stabilize Routing in Robot Networks”, in Proceedings of International Conference on Robot Communication and Coordination (ROBOCOMM '09), pp 1–7, March 2009, Odense, Denmark.
6. Jesse Butterfield, **Karthik Dantu**, Brian P. Gerkey, Odest C. Jenkins and Gaurav S. Sukhatme, “Autonomous biconnected networks of mobile robots”, in IEEE Workshop on Wireless Multihop Communications in Networked Robotics (WMCNR '08), pp 640–646, April 2008, Germany.
7. **Karthik Dantu** and Gaurav S. Sukhatme, “Detecting and Tracking Level Sets of Scalar Fields using a Robotic Sensor Network”, in IEEE International Conference on Robotics and Automation (ICRA '07), pp 3665–3672, April 2007, Rome, Italy.
8. **Karthik Dantu** and Gaurav S. Sukhatme, “Rethinking data-fusion based services in sensor networks”, in Third Workshop on Embedded Networked Sensors (Emnets '06), pp 1–6, April 2006, Boston, USA.
9. Krishna Chintalapudi, Jeongyeup Paek, Omprakash Gnawali, Tat Fu, **Karthik Dantu**, John Caffrey, Ramesh Govindan, Erik Johnson, “Structural Damage Detection and Localization Using NetSHM”, In Proceedings of Fifth International Conference on Information Processing in Sensor Networks (IPSN-SPOTS'06), pp 475–482, April 2006, Nashville, TN.
10. **Karthik Dantu**, Mohammad H. Rahimi, Hardik Shah, Sandeep Babel, Amit Dhariwal and Gaurav S. Sukhatme, “Robomote: Enabling mobility in sensor networks”, in Fourth IEEE/ACM International Conference on Information Processing in Sensor Networks (IPSN-SPOTS '05), pp 404–409, April 2005, Los Angeles, USA.

11. John Caffrey, Ramesh Govindan, Erik Johnson, Bhaskar Krishnamachari, Sami Masri, Gaurav S. Sukhatme, Krishnakanth K. Chintalapudi, **Karthik Dantu**, Sumit Rangwala, Avinash Sridharan, Ning Xu and Marco Zuniga, “Networked Sensing for Structural Health Monitoring”, in Fourth International Workshop on Structural Control (IWSC ’04), June 2004, New York, USA.
12. Morteza Maleki, **Karthik Dantu** and Massoud Pedram, “Lifetime Prediction Routing in Mobile Adhoc Networks”, in International Wireless Communications and Networking Conference (WCNC ’02), pp 1185–1190, March 2003.
13. Kihwan Choi, **Karthik Dantu**, Wei-Chung Cheng and Massoud Pedram, “Frame-based Dynamic Voltage and Frequency Scaling for a MPEG Decoder”, in IEEE/ACM International Conference on Computer-Aided Design (ICCAD ’02), pp 732–737, September 2002, San Jose, USA.
14. Morteza Maleki, **Karthik Dantu** and Massoud Pedram, “Power-aware Source Routing Protocol for Mobile Adhoc Networks”, in International Symposium on Low Power Electronics and Design (ISLPED ’02), pp 72–75, May 2002, Monterey, USA.

TECHNICAL REPORTS

1. **Karthik Dantu**, Prakhar Goyal and Gaurav S. Sukhatme, “Biconnected Robot Networks”, Technical Report CRES-08-002, Center for Robotics and Embedded Systems, University of Southern California, September 2008.
2. Mohammad H. Rahimi, Rohit Mediratta, **Karthik Dantu** and Gaurav S. Sukhatme, “A Testbed for Experiments with Sensor/Actuator Networks”, Technical Report at the Institute of Robotics and Intelligent Systems (IRIS-02-417), 2002.

REFEREED POSTERS

1. Dustin McCintire, Timothy Chow, **Karthik Dantu**, Mansi Shah, Thanos Stathopoulos, Gaurav S. Sukhatme and William Kaiser, “The Low Power Energy-Aware Processing (LEAP) - Software Applications”, Poster in IEEE/ACM Fourth International Conference on Information Processing in Sensor Networks (IPSN-SPOTS), April 2007, Boston, USA.
2. **Karthik Dantu**, Shyam Kapadia, Rishi Sinha and Ahmed Helmy, “Modeling of Mobility-Induced Losses in Mobile Adhoc Networks (MILMAN)”, Poster at ACM SIGCOMM Symposium on Network Architectures and Protocols (SIGCOMM ’02), Pittsburgh, USA.

PROPOSAL WRITING

NeTS-NOSS: Mobility-assisted Network Deployment and maintenance

Part of a successful proposal team alongwith Prof. Daniela Rus, Prof. Deborah Estrin and Prof. Miodrag Potkonjak on using mobility to deploy and maintain network connectivity

Landroids BAA

Part of a team alongwith NASA Jet Propulsion Labs, Telcordia and iRobot Corporation jointly wrote a proposal to write the software for a team of robots to dynamically form an adhoc network and improve the connectivity between two static nodes. The static nodes are in a cluttered environment.

LEADERSHIP AND MENTORING

University of Southern California

Los Angeles, California USA

Robotic Embedded Systems Lab

One of the more rewarding experiences during my PhD tenure was the opportunity to mentor students.

- **Sebastian Goodman** (MS student in Computer Science) (Summer 2009 –)
Accurate resource accounting in operating systems.

- **Andrei Kamalov** (sophomore from University of Florida under the Research Experience for Undergrads (REU) program) (Summer 2009)
Data dissemination in robot networks.
- **Prakhar Goyal** (Senior from IIT-Bombay) (Summer 2008)
Studying wireless signal strength to obtain coarse relative bearing. This resulted in a publication with Prakhar in ICRA 2009.
- **Mansi Shah** (MS student) (Fall 2006 - Spring 2007)
Porting TinyOS to the ENSBoxes. Resulted in a poster in IPSN-SPOTS 2007.
- **Hardik Shah** and **Sandeep Babel** (MS students) (Spring 03-Spring 04)
Together, we built the Robomote, the robomote testbed and tested various networked robot algorithms. This resulted in publications in IPSN-SPOTS 2005 and a tech report.

Over the course of my graduate life, I have served on various graduate committees and clubs.

- **Secretary - Trojan Cricket Club** Jan 2009–current
Help organize the Cromwell Premiere League games on campus. The league has about 120 players and games go on every friday throughout the semester.
- **Temporary Accommodation Coordinator** 2001–2005
I helped new incoming students from India find temporary accommodation when they first land in Los Angeles. Every fall, about 300-350 students come in and a major fraction availed of this facility as they did not any of the senior students coming in.
- **Advisor - Association of Indian Students** 2005–2006
Helped the board in various roles mainly advising on finance and programming.
- **Representative - International Student Assembly** 2003–2005
Represented the Association of Indian Students in the International Studenty Assembly. This involved interacting with members from other international clubs, voting on financial proposals (annual budget about \$30k) and participating in various international themed events
- **Finance Secretary - Association of Indian Students** 2002–2005
Helped apply and secure funding for the events round the year for Association of Indian Students. Annual budget is about \$14k. Also assisted in programming, booking etc for the events.

AWARDS

- Outstanding service award from the Office of International Services for work with the Association of Indian Students 2005
- NSF Travel Grant SenSys 2005
- Conference Travel Grant, SIGCOMM 2002

PROFESSIONAL MEMBERSHIPS

- Institute of Electrical and Electronics Engineers (IEEE)
- Association for Computing Machinery (ACM)

REVIEWING

Journals

ACM Transactions on Sensor Networks (frequently)

IEEE Transactions on Wireless Communications, IEEE Journal on Selected Areas in Communications (JSAC), IEEE Transactions on Mobile Computing, Autonomous Robots (occasionally)

Conferences

IEEE International Conference on Robotics and Automation (ICRA) (frequently)

IEEE/RSJ International Conference on Robots and Systems (IROS), Workshop on the Algorithmic Foundations of Robotics (WAFR), IEEE Workshop on Embedded Network Sensors (Emnets), IEEE/ACM International Conference on Information Processing in Sensor Networks (IPSN), IEEE International Conference in Distributed Computing in Sensor Systems

(DCOSS), International Conference on Design Automation and Testing in Europe (DATE), International Design Automation Conference (DAC) (occasionally)

SKILLS**Programming**

C, C++, L^AT_EX, Linux kernel, TinyOS, uCos-II, Java, Android programming framework, Matlab, Perl, python, ns-2 (network simulator), Player/Stage (robot simulation package)

PERSONAL

Nationality

Indian

Visa Status

On F-1 (student) Visa

REFERENCES

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