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RESEARCH INTERESTS

Wireless networks, distributed systems, mobile computing, and data management.

EDUCATION

PhD, Computer Science
Brown University, Providence, RI, USA
Advisor: Assistant Prof. Rodrigo Fonseca

Master of Science, Information Science and Technology, March 2009
University of Tokyo, Tokyo, Japan
Advisor: Assoc. Prof. Kaoru Sezaki
Thesis title: “*A Study on Localization Algorithms for Mobile Sensor Networks*”

Bachelor of Science, Computer Science, August 2005
Federal University of Minas Gerais, Belo Horizonte, MG, Brazil

RESEARCH EXPERIENCE

Brown University, Providence, RI, USA
Advisor(s): Assistant Prof. Rodrigo Fonseca
PhD Student

September 2009 – now

Energy profiling and management for networked embedded systems and smartphones

- We try to understand how embedded applications spend energy in two fronts: wireless sensor nodes and smartphones. In the former front, we use the Quanto framework to determine the breakdown of energy among hardware components over time. By associating energy consumption with high-level activities, we intend to create a framework that enables energy management for operations between nodes and internal scheduling. In the latter front, we use a similar approach by instrumenting the Linux kernel to collect energy-relevant events and associate them with the overall energy expenditure and process owners to enable application-level energy profiling.

University of Tokyo, Tokyo, Japan
Advisor(s): Assoc. Prof. Kaoru Sezaki

Research Student, Master’s Student

April 2006 – July 2009

Localization Techniques for Mobile Ad-hoc Networks

- *Monte Carlo-based Localization in Mobile Sensor Networks*: Based on the idea of representing location estimate as a probability distribution over the deployment area, we investigated the usage of probabilistic methods on the localization problem in mobile, error-prone communication networks. In special, we verified the effectiveness of particle filtering technology applied to range-free localization.
- *An RFID-based Positioning System for Mobile Ad-hoc Networks*: In this research, we proposed, designed and built the software component for an envisioned national infrastructure in Japan, which aims at enabling ubiquitous safety-enhancing services by deploying RFID tags across the nation, developing novel positioning mechanisms, and providing key application services.

Federal University of Minas Gerais, Belo Horizonte, MG, Brazil
Advisor(s): Assoc. Prof. Linnyer B. Ruiz, Assoc. Prof. Diógenes da Silva Jr.

Research Student

September 2005 – March 2006

Energy Consumption Optimization in Wireless Sensor Networks

- Development of an effective solution that allows for the reduction of power consumption in sensor nodes. Our proposal leverages radio transmission power adjustment and Quality of Information in a dynamic mechanism, named “Maximum Survival Algorithm”. As a consequence, besides obtaining the maximal probability of a node’s survival, we can estimate how much energy can be saved through our technique.

Federal University of Minas Gerais, Belo Horizonte, MG, Brazil

Assoc. Prof. Linnyer B. Ruiz, and Prof. Antonio A. F. Loureiro

Undergraduate Student

January 2005 – August 2005

Intrusion Detection for Wireless Sensor Networks

- An intrusion detection system (IDS) acquires information related to attack techniques from malicious nodes inside the network and uses it to discern regular nodes from infringing ones. We modeled and implemented a simulator for intrusion detection in WSNs considering its hardware and energy restrictions, and also evaluated our model using a real testbed.

Federal University of Minas Gerais, Belo Horizonte, MG, Brazil

Advisor(s): Assoc. Prof. Linnyer B. Ruiz, and Prof. Jose M. Nogueira

Undergraduate Student

August 2004 – December 2004

Applications for Wireless Sensor Networks (WSNs)

- *Vehicle Detection and Classification Using Wireless Sensor Networks*: Development of a framework for vehicle detection using wireless sensor nodes. We proposed a distributed system used for discovery and categorization of automobiles. We could infer this output based on the variance of the Earth’s magnetic field induced by the ferrous mass of moving vehicles.

TEACHING EXPERIENCE

Brown University

Providence, RI, USA

Head Teaching Assistant

Spring 2011

CS160: Introduction to Embedded and Real-Time Software. Professor Steven P. Reiss.

PROFESSIONAL EXPERIENCE**Intel Research**, Seattle, WA, USA

Supervisor: Benjamin Greenstein

Research Intern

June 2010 – August 2010

Research and initial development of techniques for assessing the energy consumption of mobile platforms using application as apportioning containers. Performed power measurements on the next-generation Intel platform for embedded devices, named Moorestown.

Synergia, Belo Horizonte, MG, Brazil

Supervisor: Ana Paula Ribeiro Atayde

Software Development Internship

April 2004 – July 2004

Modeling of functional processes using UML and development of software systems according to the company’s expectations. Research and development of interactive user tools for the State Lottery Agency, giving special attention to usability issues.

AWARDS AND HONORS

- Brown University Fellowship, USA, September 2009 – August 2013
- Graduate studies scholarship, *Ministry of Education, Culture, Sports, Science and Technology (MEXT)*, Japan, Apr 2007 – Mar 2009
- Research scholarship, *MEXT*, Japan, Apr 2006 – Mar 2007
- Undergraduate research fellowship, *Brazilian National Council for the Scientific and Technological Development (CNPq)*, Brazil, Aug 2004 – Jul 2005

REFEREED PUBLICATIONS

- **Marcelo Martins**, Rodrigo Fonseca, Thomas Schmid, Pabral Dutta. *Network-Wide Energy Profiling of CTP*. In Proceedings of the 8th ACM Conference on Embedded Networked Sensor Systems (SenSys), Zurich, Switzerland, November 2010. (**Poster**.)
- **Marcelo H. T. Martins**, Hongyang Chen, and Kaoru Sezaki. *OTMCL: Orientation Tracking-based Localization for Mobile Sensor Networks*. In Proceedings of the 6th International Conference on Networked Sensing Systems (INSS), Pittsburgh, USA, June 2009, pp. 151–158.
- Hongyang Chen, **Marcelo H. T. Martins**, and Kaoru Sezaki. *Cooperative Node Localization for Mobile Sensor Networks*. In Proceedings of the IEEE/IFIP 2008 International Conference on Embedded and Ubiquitous Computing (EUC), Shanghai, China, December 2008, pp. 302–308.
- Hongyang Chen, Pei H. Huang, **Marcelo H. T. Martins**, Hing-Cheung So, and Kaoru Sezaki. *Novel Centroid Localization Algorithm for Three-Dimensional Wireless Sensor Networks*. In Proceedings of the 4th IEEE International Conference on Wireless Communications (WiCOM), Dailan, China, October 2008.
- Ryohei Suzuki, Yasuyuki Ishida, **Marcelo H. T. Martins**, Yoshito Tobe, Shin'ichi Konomi, Kaoru Sezaki. *Integrating Geospatial and Sensor Data in a Human Probe Environment*. In Proceedings of the 7th International Conference on Asia Geographical Information System (ASIA GIS), Busan, South Korea, September 2008.
- **Marcelo H. T. Martins**, and Kaoru Sezaki. *An Enhanced Monte Carlo Localization Algorithm for Mobile Sensor Networks*. In Proceedings of the 5th International Conference on Networked Systems (INSS), Kanazawa, Japan, June 2008, p. 232. (**Poster**.)
- Ryohei Suzuki, **Marcelo H. T. Martins**, Yasuyuki Ishida, Yoshito Tobe, Shin'ichi Konomi, and Kaoru Sezaki. *An RFID-Based Human-Probe Positioning System*. In Proceedings of the 5th International Conference on Networked Systems (INSS), Kanazawa, Japan, June 2008, p. 248. (**Demo**.)
- Ryohei Suzuki, Yasuyuki Ishida, **Marcelo H. T. Martins**, Yoshito Tobe, Shin'ichi Konomi, and Kaoru Sezaki. *A System for Extracting and Managing Geospatial Environmental Information Utilizing Human Probe*. In Information Processing Society of Japan (IPSI) Journal on Ubiquitous Computing Systems (UBI), May 2008, pp. 25-30. (*In Japanese*.)
- **Marcelo H. T. Martins**, and Kaoru Sezaki, *Improving Monte Carlo Localization for Mobile Sensor Networks*. In IEICE Communications Society Symposium, Session BS-10-2, Kitakyushu, Japan, March 2008.
- **Marcelo H. T. Martins**, Bruno P. S. Rocha, Ana P. R. da Silva, Linnyer B. Ruiz. *A Simulator for Intrusion Detection Systems on Wireless Sensor Networks*. In Electronic Magazine of Undergraduate Scientific Research (REIC). Brazilian Computer Society, 4(3), Sep. 2006. (*In Portuguese*.)
- Ana P. R. da Silva, **Marcelo H. T. Martins**, Bruno P. S. Rocha, Antonio A. F. Loureiro, Linnyer B. Ruiz, and Hao Chi Wong. *Decentralized Intrusion Detection in Wireless Sensor Networks*. In Proceedings of the 24th Brazilian Symposium on Computer Networks (SBRC), Curitiba, PR, Brazil, June 2006, Brazilian Computer Society. (*In Portuguese*.)
- Ana P. R. da Silva, **Marcelo H. T. Martins**, Bruno P. S. Rocha, Antonio A. F. Loureiro, Linnyer B. Ruiz, and Hao C. Wong. *Decentralized Intrusion Detection in Wireless Sensor Networks*. In Q2SWinet '05: Proceedings of the 1st ACM International Workshop on Quality of Service & Security in Wireless and Mobile Networks, Montreal, Quebec, Canada, October 2005, ACM Press, pp. 16–23.

TECHNICAL REPORTS

- **Marcelo H. T. Martins**, and Kaoru Sezaki. *Towards Robust Localization in Mobile Sensor Networks*. In IEICE Technical Committee on Information Networks (IN). IEICE Technical Report, vol. 108, no. 458, IN2008-154, Okinawa, Japan, March 2009, pp. 133–138.
- **Marcelo H. T. Martins**, Ana P. R. da Silva, Antonio A. F. Loureiro, and Linnyer B. Ruiz. *A Simulator for Intrusion Detection Systems in Wireless Network Sensors*. Technical Report RT.DCC.008/2005, Federal University of Minas Gerais, Brazil, May 2005. (*In Portuguese.*)

ACADEMIC SERVICE

- External reviewer: IEEE ISCC'07, IEEE WCNC'09
- Student Travel Grant: ACM SenSys'09, USENIX OSDI'10, ACM SenSys'10
- Membership to the ACM and IEEE Communication and Computer Societies

SKILLS

- Languages: Portuguese (native), English, Spanish (fluent), Japanese (advanced)
- Programming Languages: Java, C/C++, Python, Lisp, Awk
- Platforms: Linux, MS-Windows, FreeBSD, and TinyOS