

Moustafa Youssef's Résumé

Nile University, Egypt
and
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CONTACT INFORMATION

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RESEARCH INTERESTS

Mobile and wireless networks, sensor networks, ad-hoc networks, pervasive computing, location determination systems, protocol modelling and analysis, energy efficient protocols, peer-to-peer systems, and computer security.

EDUCATION

Ph.D., Computer Science (May 2004)
University of Maryland, College Park
GPA: 4.0
- *Horus*: An RF-Based Location Determination System (**Invention of the year award**)

M.Sc., Computer Science (May 2002)
University of Maryland, College Park
GPA: 4.0

M.Sc., Computer Science (1999)
Alexandria University, Egypt
GPA: 4.0
- Performance Enhancement Techniques of a Banyan Network Based Interconnection Structure

B.Sc., Computer Science and Automatic Control (June 1997)
Alexandria University, Egypt (Ranked First on Faculty of Engineering)

General Secondary School Certificate (July 1992)
Egypt (Ranked Third Nationwide)

SELECTED RESEARCH PROJECTS

PinPoint: An Asynchronous Time-Based Location Determination System (Invention of the year award 2000, UMD)

PinPoint is a distributed algorithm that enables a set of n nodes to determine the RF propagation delays between every pair of nodes, from which the inter-node distances and hence the spatial topology can be readily determined. PinPoint does not require any calibration of the area of interest and thus is rapidly deployable. Unlike existing time-of-arrival techniques, PinPoint does not require an infrastructure of accurate clocks (e.g., GPS) nor does it incur the $o(n^2)$ message exchanges of echoing techniques. PinPoint can work with nodes having inexpensive crystal oscillator clocks, and incurs a constant number of message exchanges per node to determine the location of n nodes. Each nodes clock is assumed to run reliably but asynchronously with respect to the other nodes, i.e., they can run at slightly different rates because of hardware (oscillator) inaccuracies. PinPoint provides a mathematical way to compensate for these clock differences in order to arrive at a very precise timestamp recovery that in turn leads to a precise distance determination. Moreover, each node is able to determine the clock characteristics of other nodes in its neighborhood allowing network synchronization. Evaluation of the prototype in typical indoor and outdoor environments shows that PinPoint gives an average accuracy of four to six feet, in different environments, allowing PinPoint to support accurate rapidly deployable localization scenarios.

Horus: A WLAN-based Location Determination System (Invention of the year award 2003, UMD)

My thesis work defines Horus, a location determination system based on the 802.11 networks. My research focuses on identifying the noisy characteristics of the wireless channel and developing techniques to overcome them to obtain accurate positioning. Since the devices running the Horus system are usually energy constrained, like PDAs, it is important to reduce the computation requirements

for location determination algorithms. I have developed location-clustering techniques based on the signal strength received from the access points to reduce the computational requirements of the location determination algorithm and allow the system to scale to large areas. The Horus system has been used in other research projects such as the Rover system. The Horus system has been tested in areas as large as 20,000 square feet and the accuracy is 2.5 feet on the average for different testbeds. As part of my work, I developed device drivers to query the wireless card and API's to make the Horus system independent of the underlying device driver/card. The software has been used by other wireless researchers around the world.

The Cyclone Time Technology

Cyclone Time Technology enables heterogeneous systems that include clocks of various inherent precision, resolution and stability to synchronize. Cyclone offers several advantages over the current master-slave based techniques by avoiding a single point of failure and achieving accuracy that does not depend on the actual local clock drift rates. Further, the use of only local information makes the scheme highly scalable. The proposed scheme works by first assuming a local clock model at each node that takes the clock offset and drift rate into account. Timestamps are exchanged between neighboring nodes which permit each node to derive a common time base using only its local information. The mathematical basis of the approach comes from linear algebra, in which the principal eigenvector of a stochastic matrix can be calculated by repeated multiplications of matrices. Cyclone also defines the notion of a common Virtual Clock. Cyclone allows all nodes to calculate the parameters, drift rate and offset, for a virtual clock such that any node can convert its clock readings to the reading of the common virtual clock at any time instant, even through different nodes local clock reading may be widely different.

Rover: Location-Aware Mobile Computing

Rover enables location, time and context-aware applications for wireless devices that scale to very large user populations. In our current systems, we have implemented the Rover clients on Compaq IPAQ handheld PDAs running Windows CE and PocketLinux, with the location service being provided to these devices using GPS in the outdoor environment, and using the *Horus* system in the indoor environment. In this project, I have been involved in detailed design of the Rover system and have participated in implementing different system modules.

Rover II: An Information Dynamics-Based Context Aware Platform

The Rover II Technology uses the Information Dynamics paradigm developed at the MIND Lab to provide a context-aware integration platform that is platform independent. The Rover infrastructure focuses on two major tasks: to expose as much contextual information as possible and to create services which need to communicate with each other and external sources, such as the Internet. We provide an easy to use application programming interface (API) that allows developers to create Rover-enabled applications with communication and messaging in mind. This project is an extension to the Rover project.

Energy Efficient Wireless (Sensor) Networks

Honeywell Advanced Systems Group, Columbia, MD (May 2001 - August 2001)

Battery power is a scarce resource in wireless devices in general and in sensor nodes in particular. Therefore, this power needs to be conserved. In this project, we have defined energy efficient link layer and network layer protocols for sensor networks. Existing protocols for minimum energy routing chooses end-to-end paths depending on the battery capacity and transmission costs of the nodes on the path. However, they ignore other performance metrics such as end-to-end delay and throughput which are crucial to some applications. Our work focuses on balancing different performance metrics. By changing system parameters, different systems can achieve different performance objectives depending on the mission assigned to the sensor network. We showed that our routing protocol achieve significant improvement in performance over the current energy efficient protocols without sacrificing energy efficiency. We also experimented with different energy-efficient TDMA MAC layer protocols and designed techniques for assigning slots to obtain better throughput and

less changes in the state of the wireless card circuitry.

802.11-based Research

In this project, we explore different aspects of the 802.11 protocol ranging from characterizing the wireless traffic, enhancing the security model of 802.11 based networks, and building new applications that makes use of the widespread of 802.11 networks. Many studies on measurement and characterization of wireless LANs have been performed recently. Most of these measurements have been conducted from the wired portion of the network based on wired monitoring or SNMP statistics. In the wireless traffic characterization project, we argue that traffic measurements from a wireless vantage point in the network are more appropriate for exposing the wireless medium characteristics and their impact on the traffic patterns. Our analysis reveals rich information about the PHY/MAC layers of the IEEE 802.11 protocol such as the typical traffic mix of different frame types, their temporal characteristics, correlation with the user activities and the error characteristics of the wireless medium. Moreover, we identify anomalies in the operation of the IEEE 802.11 MAC protocol.

Another technology that we implemented to enhance the 802.11 security model is Koolspan. In Koolspan, user authentication is performed through smartcard-based physical tokens. The Koolspan Client Key secures wireless traffic by connecting to Koolspan SecurEdge Unilock installed behind the access point. A major goal for Koolspan is to be transparent to the standard 802.11 access points and clients, allowing easy integration with the current installed networks.

Instance-Based Network

In this work we consider the design principles of the Instance-Based Network (IBN), an extended version of a generic Content-Based Network (CBN). IBN acts as an overlay communication platform over which end-point entities, called contents, communicate independently from their physical locations while providing the flexibility of having different instances of the same content. The semantics of different instances are assigned by the application using the IBN. Routing in the IBN is instance-based; the IBN can route a message to a specific content instance or to the closest instance, if no exact match is found for the destination content instance. Moreover, the IBN replicates the stored contents in order to provide fault tolerance.

Autonomous Transport Protocol

The basic service provided by the Autonomous Transport Protocol (ATP) is a reliable transport connection between two endpoints, identified by content identifiers, independent of their physical location. Autonomy allows dynamic endpoints relocation on different end hosts without disrupting the transport connection between them. ATP depends on the existence of an underlying Instance Based Network (IBN) to achieve its goals. ATP layers at the intermediate nodes can actively participate in the connection. Data is transferred by a combination of active and passive operations, where the ATP layer of a node can decide whether to actively push the data to the destination or to passively wait for the destination endpoint to pull the data. The decision to whether to use the active or passive modes can be taken by a local policy on the node running the ATP protocol.

Location-Based Authentication

The idea behind location-based authentication is how to authenticate a user based on his position. Once the user position has been authenticated, the user is authorized to access resources based on his position. We solve the location determination and authentication problem using the Horus system. Results from actual wireless experiments show the feasibility of this scheme.

Analysis of Network Protocols

For this branch of my networking research, I have been working on formally modelling different networking protocols and analyzing their properties. We modelled the IEEE 802.11 protocol using the systems of communicating machine approach. We also analyzed the model and confirmed that it is free from deadlocks, unspecified receptions, non-executable transitions. Moreover, we showed that the model have some desirable liveness properties. We are currently working on the passive

testing problem where a system can be tested passively in order to detect, identify and locate faults.

RESEARCH
INTERNSHIPS

Energy-aware Architecture for Sensor Networks

Advanced Systems Group, Honeywell International Inc.

(May 2001 - August 2001)

In this work, I participated in the design and implementation of an energy-aware architecture for sensor networks. The proposed architecture introduces a novel approach for balancing the QoS requirements of the end-to-end applications with the energy-efficiency requirements of the sensor network. We also implemented a general multithreaded GUI simulator for sensor networks. The publications and the related patent details are given below.

SELECTED
PUBLICATIONS –
JOURNALS /
MAGAZINES

1. Overlapping Multi-hop Clustering for Wireless Sensor Networks
Moustafa Youssef, Adel Youssef, and Mohammed Younis
IEEE Transactions on Parallel and Distributed Systems, to appear.
2. Establishing Overlapped Multi-hop Clusters in Wireless Sensor Networks
Adel Youssef, Mohammed Younis, Moustafa Youssef, and Ashok Agrawala
International Journal of Sensor Networks (IJSNET), to appear. [**Invited Paper**]
3. Formal Specification And Analysis Of PCF Protocol in the 802.11 Standard Using Systems of Communicating Machines
Moustafa Youssef and Raymond Miller
International Journal of Modelling and Simulation, Vol. 28, Issue 3, 2008.
4. The Horus Location Determination System
Moustafa Youssef and Ashok Agrawala
Journal of Wireless Networks (WINET), 14:3 June 2007.
5. Calibration-Free RF-Based Localization Algorithm for Actuator/Sensor Networks using Particle Filters
Aly El-Osery, Wael Abd-Almageed and Moustafa Youssef
IEEE Antennas and Propagation Magazine, August, 2006.
6. Towards an Optimal Strategy For WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala
In the International Journal of Modelling and Simulation, Vol. 27, Issue 1, 2007.
7. Location-Clustering Techniques for Energy-Efficient WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala
In the International Journal of Computers and Applications, Vol. 28, Issue 3, 2006. (to appear)
8. Energy-Aware Management for Cluster-Based Sensor Networks
Mohamed Younis, Moustafa Youssef and Khaled Arisha
Journal of Computer Networks, Vol. 43, No. 5, pp. 539-694 (5 December 2003).
9. Instance-Based Networking: A Communication Paradigm for Mobile Applications
Moustafa Youssef, Liviu Iftode, et. al.
Mobile Computing and Communications Review, Vol. 7, No. 4, pp. 66-67, October 2003.
Also presented as a research poster at *ACM MobiCom*, September 2003.
10. The ABC..I of 802.11 WLANs
Moustafa Youssef and Arunchandar Vasan
ACM Crossroads, Summer 2003 - 9.4.
11. Rover: Scalable Location-Aware Computing
Moustafa Youssef, Ron Larsen, A. Udaya Shankar, Ashok Agrawala, et. al.
IEEE Computer, October 2002.
12. Performance Enhancement Techniques of a Banyan Network Based Interconnection Structure
Moustafa Youssef, Mohammed El-Derini, and Hussien Aly
Alexandria Engineering Journal (AEJ), September 1999.

Under Submission

13. Draco: A First Responders Support System
Moustafa Youssef, Bao Trinh, A. Udaya Shankar, Ashok Agrawala
14. On the Reliability of Banyan Network-Based Switches
Moustafa Youssef, Mohammed El-Derini, and Hussien Aly
15. Handling Samples Correlation for WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala (in preparation).
16. The PinPoint Technology for Wireless Networks
Moustafa Youssef, et al (in preparation).

SELECTED PUBLICATIONS – CONFERENCES

1. On the Delay Limited Secrecy Capacity of Fading Channels
Karim Khalil, Moustafa Youssef, Onur Ozan Koyluoglu, and Hesham El Gamal
IEEE International Symposium on Information Theory, 2009.
2. Distributed Efficient Storage Algorithms for Large-Scale Wireless Sensor Networks
Salah A. Aly, Mahmoud Zidan, and Moustafa Youssef
IEEE ICC 2009 - Ad-Hoc and Sensor Networking Symposium.
3. Smart Devices for Smart Environments: Device-free Passive Detection in Real Environments
May Moussa and M. Youssef
The Second IEEE International Workshop on Intelligent Pervasive Devices (PerDev09), co-located with Percom 2009.
4. Towards Evolving Sensor Actor Networks
R. Eltaras, M. Eltoweissy, and M. Youssef
The Second IEEE Workshop on Mission Critical Networking, in conjunction with IEEE Infocom 2008.
5. Federated Protocol Design
H. Mamdouh, M. Eltoweissy, and M. Youssef
Infocom 2008 - Students' Workshop.
6. Challenges: Device-free Passive Localization for Wireless Environments
Moustafa Youssef, Matthew Mah, and Ashok Agrawala
The Thirteenth Annual International Conference on *Mobile Computing and Networking* (MobiCom 07), Montreal, QC, Canada, September 9-14, 2007. [**Most popular challenge paper award**]
7. On the Accuracy of Multi-hop Relative Location Estimation in Wireless Sensor Networks
Adel Youssef, Mohamed Younis, Moustafa Youssef, and Ashok Agrawala
The 2007 ACM International Wireless Communications and Mobile Computing Conference (IWCMC 2007), August 12-16, 2007, Honolulu, Hawaii.
8. A Taxonomy of Localization Schemes for Wireless Sensor Networks
Adel Youssef and Moustafa Youssef
The 2007 International Conference on Wireless Networks (ICWN'07), Las Vegas, Nevada, June 25-28, 2007.
9. Rover: An Integration and Fusion Platform to Enhance Situational Awareness
Christian B Almazan, Moustafa Youssef, and Ashok Agrawala
The First International Workshop on Research Challenges in Next Generation Networks for First Responders and Critical Infrastructures (NetCri07), April 13th, 2007, New Orleans, Louisiana, April 13.
10. PinPoint: An Asynchronous Time-Based Location Determination System
Moustafa Youssef, Adel Youssef, Chuck Rieger, Udaya Shankar, and Ashok Agrawala
Fourth International Conference on Mobile Systems, Applications, and Services (*MobiSys 2006*), Uppsala, Sweden, June 19-22, 2006.

11. Distributed Formation of Overlapping Multi-hop Clusters in Wireless Sensor Networks
Mohammed Younis, Adel Youssef, Moustafa Youssef, and Ashok Agrawala
the 2006 IEEE GLOBECOM Conference, San Francisco, California, November 27– December 1, 2006. [**Best paper runner-up**]
12. Deriving Consistent Time Base Using Local Clock Information
Moustafa Youssef and Ashok Agrawala
the 2006 IEEE 1588 Conference, Gaithersburg, MD, October 2-4, 2006.
13. The Horus WLAN Location determination System
Moustafa Youssef and Ashok Agrawala
Third International Conference on Mobile Systems, Applications, and Services (*MobiSys 2005*), Seattle, WA, USA, June 2005.
14. Multivariate Analysis for WLAN Location Determination Systems
Moustafa Youssef, Mohamed Abdallah, and Ashok Agrawala
The Second Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (*Mobiquitous 2005*) July 17-21, 2005, San Diego, California.
15. A Location-Determination System for Enabling M-Commerce Applications
Moustafa Youssef and Ashok Agrawala
International Business Information Management Conference (5th IBIMA), December 13-16, 2005, Cairo, Egypt.
16. IEEE 802.11 Active Probing Mechanism: Analysis and Enhancements
Moustafa Youssef, Layla Shahamat, and Ashok Agrawala
International Conference on Wireless Networks, Communications, and Mobile Computing Sponsors (*Wirelesscom 2005*), June 13-16, 2005, Hawaii, USA.
17. Characterizing IEEE 802.11 Traffic: The Wireless Side
Jihwang Yeo, Moustafa Youssef, Tristan Henderson, and Ashok Agrawala
International Workshop on Wireless Traffic Measurements and Modeling (*WiTMeMo '05*), In conjunction with *Mobisys 2005*, Seattle, WA, USA, June 2005.
18. Handling Samples Correlation in the Horus System
Moustafa Youssef and Ashok Agrawala
IEEE Infocom, Hong Kong, March 2004.
19. A Framework for Wireless LAN Monitoring and Its Applications
Jihwang Yeo, Moustafa Youssef, and Ashok Agrawala
ACM Workshop on Wireless Security (WiSe'04) in conjunction with *ACM MobiCom 2004*, Philadelphia, PA, US, October 2004.
20. On the Optimality of WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala
Communication Networks and Distributed Systems Modelling and Simulation (CNDS'04) Conference, January 18-24 2004, San Diego, California.
21. Continuous Space Estimation for WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala
IEEE Thirteenth International Conference on Computer Communications and Networks (IC3N'04), Chicago, IL USA, October 11-13, 2004.
22. WLAN Location Determination via Clustering and Probability Distributions
Moustafa Youssef, Ashok Agrawala, A. Udaya Shankar
IEEE International Conference on Pervasive Computing and Communications (PerCom'03), Fort Worth, Texas, March 23-26, 2003.
23. Implementation of a Scalable Context-Aware Computing System
Moustafa Youssef, A. Udaya Shankar, Ashok Agrawala et al.
Personal Wireless Communications (PWC'03), September 23-25, 2003 - Venice, Italy.

24. Specification and Analysis of the DCF and PCF Protocols in the 802.11 Standard Using Systems of Communicating Machines
Moustafa Youssef, Arunchandar Vasam, and Raymond Miller
The 10th *IEEE International Conference on Network Protocols* (ICNP'02), Paris, France, November 12-15, 2002.
25. Efficient Aggregation of Delay-Constrained Data in Wireless Sensor Networks
Kemal Akkaya, Mohamed Younis, and Moustafa Youssef
The *ACS/IEEE workshop on Internet Compatible QoS in Ad hoc Wireless Networks* (ICQAWN'05), Cairo, Egypt, January 2005.
26. Energy-Aware Routing in Cluster-Based Sensor Networks
Mohamed Younis, Moustafa Youssef, and Khaled Arisha
The 10th *IEEE/ACM International Symposium on Modelling, Analysis and Simulation of Computer and Telecommunication Systems* (MASCOTS'02), Fort Worth, Texas, October 2002.
27. ATP: Autonomous Transport Protocol
Moustafa Youssef, Liviu Iftode, et. al.
IEEE Midwest Symposium on Circuits and Systems, December 2003, Cairo, Egypt.
28. Small-Scale Compensation for WLAN Location Determination Systems
Moustafa Youssef, Ashok Agrawala
IEEE Wireless Communications and Networking Conference (WCNC'03) New Orleans, Louisiana, March 16-20, 2003.
29. Performance Evaluation of an Energy-Aware Routing Protocol for Sensor Networks
Moustafa Youssef, Mohamed Younis, and Khaled Arisha
The *International Conference on Wireless Networks* (ICWN'02), Las Vegas, Nevada, June 2002.
30. Energy-Aware TDMA-Based MAC for Sensor Networks
Khaled Arisha, Moustafa Youssef, and Mohamed Younis
The *IEEE Integrated Management of Power Aware Communications, Computing and Networking* (IMPACCT'02) New York City, New York, May 2002.
31. A Constrained Shortest-Path Energy-Aware Routing Algorithm for Wireless Sensor Networks
Moustafa Youssef, Mohamed Younis, and Khaled Arisha
The *IEEE Wireless Communications and Networking Conference* (WCNC), Orlando, Florida, March 2002.
32. Cross-Language Information Retrieval: Layout Strategies for Gloss Translation
Eiman Elnahrawy, Nagia Ghanem, Moustafa Youssef
Workshop on Evaluation of Interactive Cross-Language Information Retrieval, University of Maryland, College Park, May 2001.
33. Structure and Performance Evaluation of a Replicated Banyan Network based ATM Switch
Moustafa Youssef, Mohammed El-Derini, and Hussien Aly
The *IEEE ISCC'99*, Sharm El-Sheikh, Egypt, June 1999.

Refereed Posters

34. Autonomous Transport Protocol
Moustafa Youssef, Liviu Iftode et. al.
The Eleventh Annual *International Conference on Network Protocols*, (ICNP'03), Atlanta, GA, USA, November 4-7, 2003.
35. IBN: A Communication Paradigm for Mobile Applications
Moustafa Youssef, Liviu Iftode et. al.
The Ninth Annual *International Conference on Mobile Computing and Networking* (MobiCom'03), San Diego, CA, USA, September 14-19, 2003.

36. Rover Technology: Implementation of a Scalable Context-Aware Computing System
Moustafa Youssef, A. Udaya Shankar, Ashok Agrawala et al.
The First *International Conference on Mobile Systems, Applications, and Services* (MobiSys'03),
San Francisco, CA, USA, May 5-8, 2003.

RESEARCH DEMOS

- Nuzzer-D: Demonstrating Device-free Passive Localization for Wireless Environments
Ahmed El-Roby, Mohamed Fahmy, May Moussa, and Moustafa Youssef
Research Demo: Mobicom 2008.
- HyberLoc: Demonstrating Secure Localization In Hybrid Sensor Networks
Mohamed Adel, Mohamed Ibrahim, Karim Abulmakarem, Moustafa Youssef, and Mohamed Eltoweissy
Research Demo: Mobicom 2008.

BOOKS AND BOOKS CHAPTERS

- Handling QoS Traffic in Wireless Sensor Networks
Kemal Akkaya, Mohamed Younis, and Moustafa Youssef
Encyclopedia on Ad Hoc and Ubiquitous Computing, World Scientific, to appear.
- A Survey of Indoor Location Determination Systems
Moustafa Youssef
Encyclopedia of Geographical Information Systems, Springer 2007.
- System-Level Power Optimization for Wireless Multimedia Communication: Power Aware Computing
Chapter 2: "Energy-Aware TDMA-Based MAC for Sensor Networks"
Khaled Arisha, Moustafa Youssef, and Mohamed Younis
Kluwer Academic Publishers, ISBN: 140207204X, December 2002.
- Implementation of a Scalable Context-Aware Computing System
Moustafa Youssef, A. Udaya Shankar, Ashok Agrawala, et al
Lecture notes in computer science ISSN 0302-9743 .

OTHER TECHNICAL REPORTS

1. On the Delay-Limited Secrecy Capacity
Karim Aboumakarem, Moustafa Youssef, and Hesham Elgamal
WINC TR-1006, Wireless Intelligent Networks Center, Nile University, Egypt, September 2008.
2. Overlapping Multihop Clustering for Wireless Sensor Networks
Moustafa Youssef, Adel Youssef, and Mohamed Younis
WINC TR-1001, Wireless Intelligent Networks Center, Nile University, Egypt, September 2008.
3. Secure Interactive Communication in Wireless Sensor Networks
ALy Elgamal, Moustafa Youssef, and Hesham Elgamal
WINC TR-1004, Wireless Intelligent Networks Center, Nile University, Egypt, September 2008.
Karim Abulmakarem, Moustafa Youssef, and Hesham Elgamal
WINC TR-1005, Wireless Intelligent Networks Center, Nile University, Egypt, December 2008.
4. The Overlapped K-hop (OK) Clustering Algorithm
Adel Youssef, Moustafa Youssef, Mohamed Younis, and Ashok Agrawala
CS-TR 4735, Department of Computer Science, University of Maryland, College Park, July 2005.
5. The IEEE 802.11 Active Probing Mechanism: Analysis and Enhancements
Moustafa Youssef, Layla Shahamat, and Ashok Agrawala
CS-TR, Department of Computer Science, University of Maryland, College Park, March 2004.
6. Characterizing the IEEE 802.11 Traffic: The Wireless Side
Jihwang Yeo, Moustafa Youssef, and Ashok Agrawala

- CS-TR 4570, Department of Computer Science, University of Maryland, College Park, March 2004.
7. ATP: Autonomous Transport Protocol
Moustafa Youssef, Liviu Iftode, et. al.
CS-TR 4483, Department of Computer Science, University of Maryland, College Park, May 2003.
 8. Handling Samples Correlation in the Horus System
Moustafa Youssef and Ashok Agrawala
CS-TR 4506, Department of Computer Science, University of Maryland, College Park, June 2003.
 9. On the Optimality of WLAN Location Determination Systems
Moustafa Youssef and Ashok Agrawala
CS-TR 4459, Department of Computer Science, University of Maryland, College Park, March 2003.
 10. Horus: An RF-Based Location Determination System
Moustafa Youssef and Ashok Agrawala
Research Review Poster, University of Maryland, College Park, March 2003.
 11. Analyzing the Point Coordination Function of the IEEE 802.11 WLAN Protocol using a Systems of Communicating Machines Specification
Moustafa Youssef and Raymond Miller
CS-TR 4357, Department of Computer Science, University of Maryland, College Park, March 2002.
 12. A Probabilistic Clustering-Based Indoor Location Determination System
Moustafa Youssef, Ashok Agrawala, A. Udaya Shankar, and Sam H. Noh
CS-TR 4350, Department of Computer Science, University of Maryland, College Park, March 2002.
 13. Location Based Authentication for Wireless Networks
William Arbaugh, Moustafa A. Youssef, Narendar Shankar, Arunesh Mishra, Ashok Agrawala
Research Review Day 2002 poster, University of Maryland at College Park, March 2002.
 14. Rover Technology: Enabling a Location-Aware Computing Environment
Moustafa Youssef, Ron Larsen, A. Udaya Shankar, Ashok Agrawala, et. al.
CS-TR 4312, Department of Computer Science, University of Maryland, College Park, December 2001.
 15. Universal Usability: Cross-Language Information Retrieval
Moustafa Youssef
Department of Computer Science, University of Maryland, College Park, April 2001.
 16. Cross-Language Information Retrieval: Layout Strategies for Gloss Translation
Eiman M. Elnahrawy, Nagia M. Ghanem, and Moustafa Youssef
Department of Computer Science, University of Maryland, College Park, 2001.

INVITED TALKS

- Device-free Passive Localization for Wireless Environments. Ubiquitous Computing: Sensor and Wireless Sensor Networks Workshop, Cairo, Egypt, December 2008.
- Device-free Passive Localization for Wireless Environments. Google, San Francisco, September 2008.
- Device-free Passive Localization for Wireless Environments. Ohio State University, September 2008.
- Security for Ubiquitous Computing. Virginia Tech, March 2007.
- Security for Ubiquitous Computing. Virginia Tech, March 2007.

- Security in Location Determination Techniques: Are you where you say you are? Virginia Tech, April 2006.
- The Horus WLAN Location Determination System. Old Dominion University, December 2005.
- Location Determination Systems for Sensor Networks. University of Maryland, Baltimore County, November 2005.
- The Horus WLAN Location Determination System. Catholic University of America, March 2005.
- Horus: A WLAN-Based Indoor Location Determination System. Rutgers University, October 2004.
- Horus: A WLAN-Based Indoor Location Determination System. University of Maryland, Baltimore County, September 2004.
- Horus: A WLAN-Based Indoor Location Determination System. Alexandria University, Egypt, January 2004.
- A Tutorial for the 802.11 Standard. Alexandria University, Egypt, January 2003.
- A Tutorial for the 802.11 Standard. Syschat, University of Maryland at College Park, October 2001.

HONORS AND AWARDS

- The Thirteenth ACM Annual International Conference on *Mobile Computing and Networking* (Mobicom'07): Most popular challenge paper award, September 2007.
- The 2006 IEEE GLOBECOM Conference: Best paper runner-up, December 2006.
- Washington Times Newspaper: "Technology of Tracking," Horus work cited, March 10, 2005.
- Scientific American Magazine: "Seeking Better Web Searches," Rover work cited, February 2005.
- Marquis Who's Who in America: Listed with Biography in "Who is Who in America 2005".
- Office of Technology Commercialization, University of Maryland: Invention of the year award for the Horus work, April 2004.
- National Science Foundation: InfoCom 2004 Travel Grant.
- New York Times Newspaper: "Where Is Everybody? The Wireless Network Might Know," Horus work cited, June 19 2003.
- University of Maryland, College Park: Elected member for the honor society Phi Kappa Phi, March 2002.
- ACM SigComm: Travel grant, 2002.
- University of Maryland, College Park: Graduate Fellow, Computer Science Department, 2000-2004.
- Egyptian Ministry of Education: Taha Hussien Medal of Honor, August 1999.
- Alexandria University, Egypt: Prof. Abdelsamie Moustafa award, and Prof. Naim Aboutaleb award, June 1997. (for being ranked first on the Faculty of Engineering and the Computer Science Department respectively)
- General Egyptian Society For the Talented: Society Certificate of Honor, August 1997.
- PC-World Middle East Magazine: First prize in the annual contest of the Magazine, June 1994-1996.
- Alexandria University, Egypt: Faculty Certificate of Honor, 1993-1997.
- Egyptian Ministry of Education: Ministry Certificate of Honor, August 1992. (For being ranked Third Nationwide in the General Secondary School Certificate exam)

INVENTIONS AND
PATENTS

1. Method and System for Determining User Location in a Wireless Communication Network
Moustafa Youssef and Ashok Agrawala
(Invention of the year award 2003, Office of Technology Commercialization, UMD)
U.S. patent no 7,406,116, issued July 29, 2008.
2. Energy-Aware Network Management
Mohamed Younis , Moustafa Youssef, and Khaled Arisha
US-Patent no. 7,277,414, issued October 2, 2007.
3. The Cyclone Timing Technology
Ashok Agrawala, Moustafa Youssef and Bao Trinh
(Invention of the year award 2000, Office of Technology Commercialization, UMD)
Invention Disclosure IS-2006-096, University of Maryland, College Park, 2006.
4. Enhancements to the Horus WLAN Location Determination System
Moustafa Youssef and Ashok Agrawala
Invention Disclosure IS-2004-092, University of Maryland, College Park, September 2004.
5. Koolspan Technology: Wi-Fi Security at the Edge
Kamel Kevin, Moustafa Youssef, Jaime Lafleur-Vetter, and Ashok Agrawala
Invention Disclosure IS-2004-008, University of Maryland, College Park, February 2004 (US-Patent pending).
6. Nuzzer Technology: Providing Physical Security Using Wi-Fi
Leila Shahamatdar, Moustafa Youssef and Ashok Agrawala
Patent application no. 20050055568, March 10, 2005 (US-Patent pending).

WORK
EXPERIENCE

Nile University, Egypt (Spring 2008- Present)
Assistant Professor

Alexandria University, Egypt (Fall 2007- Present)
Assistant Professor

University of Maryland at College Park (Fall 2000- Present)
Research Assistant and *Research Associate* in the Maryland Information and Network Dynamics lab, Teaching Assistant.

Research

- Design and implementation of the PinPoint location determination system.
- Design and implementation of the Horus WLAN location determination system.
- Design and implementation of the Nuzzer location determination system.
- Design and implementation of the Cyclone timing technology.
- Design and implementation of a wireless monitoring technique for traffic analysis and intrusion detection in 802.11-based networks.
- Design and implementation of the Rover contextaware system.
- Design and implementation of the Instance-Based Networking paradigm to support peer-to-peer applications.
- Design and Implementation of the Autonomous Transport Protocol that support transparent network users mobility.
- Design and implementation of a location-based authentication system.

- Modelling and analysis of the 802.11 protocol using the systems of communicating machines approach.

Systems / Software Tools

- A new device driver for the Wavelan IEEE/Orinoco card under Linux. The new driver is the first driver to return the signal strength measured from all the access points. *Currently part of the Linux kernel for handheld devices.*
- A general API for interfacing with any device driver that supports the wireless extensions under Linux. (The API is the only work cited whose author is an individual under IBM wireless tools page (<http://www-106.ibm.com/developerworks/views/wireless/downloads.jsp>) [Last Accessed 03/09/05])
- A device driver for the *Schlumberger Smart Card Readers - Reflex 20* under FreeBSD.
- A modified FreeBSD kernel to better support polling based interrupt handling.
- A shared library for training and solving Hidden Markov Models. The library is written in C++ with an interface with Matlab math libraries. The shared library has been tested as an extension to Linux GNumeric.
- A bottom-up parser using LISP.
- A multithreaded HTTP server supporting servlets using Java.
- A distributed chat room using Javas RMI.
- Enhancements to the OpenGL graphic pipeline (including View Frustum Culling, Quantized Back Face Culling, and converting a model represented by a triangle mesh to an equivalent one represented by triangle fans.)
- A distributed directory namespace. The project included designing a new searching algorithm for the nodes in the namespace.

Alexandria University, Egypt

(Fall 1997-Spring 2000)

Researcher, Lecturer, and Engineer
Research

- Design and implementation a Banyan-network based ATM switch.

Systems/ Software Tools

- Installation of Alexandria University Intranet.
- Requirement analysis and implementation of the database system for performing the control operations and preparation of final results of the preparatory year students of the Faculty of Engineering.
- Requirement analysis and implementation of the database system for the distribution of the preparatory year students of the Faculty of Engineering among departments.
- Modification the Kernel of a Multiprogramming Operating System (KMOS) to allow multiple priorities and to provide accounting functions to the users.
- Design and implementation of an Arabic Web Browser under Windows 95 operating system.
- Design and Implementation of a front-end compiler to convert from Pascal Language to C Language.
- Design and implementation of an Automatic Control Programs Package including: signal flow graph analyzer, root locus plotter, and analyzer, stability analyzer, and Bode plot and frequency domain analyzer.

Abu-Kir Fertilizers Company, Egypt

(Fall 1999)

Engineer

- Installation of the company's ATM network.

NCR, Egypt

(Fall 1999)

Lecturer

- Giving a course in TCP/IP concepts.

Fine Foods Group, Egypt

(Fall 1997)

Software Engineer

- Design and implementation of the Payroll system of the Group.

PROFESSIONAL
EXPERIENCE

- Co-Guest Editor, The IEEE Journal on Selected Areas in Communications, Special Issue on Mission-Critical Networking.
- Program Co-Chair, The Second IEEE International Workshop on Intelligent Pervasive Devices (PerDev09), co-located with Percom 2009.
- Technical Program Committee member, the 30th IEEE International Conference on Computer Communications INFOCOM 2010 (INFOCOM'10).
- Technical Program Committee member, the 29th IEEE International Conference on Computer Communications INFOCOM 2009 (INFOCOM'09).
- Technical Program Committee member, ACM SIGSPATIAL GIS 2009.
- Technical Program Committee member, IEEE Globecom 2010 - Ad Hoc and Sensor Networks Symposium (Globecom'10-ASNS).
- Technical Program Committee member, IEEE Globecom 2009 - Ad Hoc Sensor and Mesh Networking Symposium (Globecom'09-AHSN).
- Technical Program Committee member, IEEE ICC 2009 - Ad-Hoc and Sensor Networking Symposium (ICC'09-AHSNET).
- Technical Program Committee member, IEEE ICC 2009 - Wireless Networking Symposium (ICC'09-WN).
- Technical Program Committee member, The 5th IEEE/IFIP International Conference on Embedded and Ubiquitous Computing (EUC'09) - Context-aware Mobile Computing Track.
- Technical Program Committee member, Second International Conference on MOBILE Wireless MiddleWARE, Operating Systems, and Applications (MobilWare 09).
- Technical Program Committee member, The IEEE Local Computer Networks Conference (LCN 2009).
- Technical Program Committee member, the 17th International Conference on Telecommunications - Ad-hoc and Sensor Communications Track.
- Technical Program Committee member, The 5th IEEE LCN Workshop on Security in Communication Networks (SICK) in conjunction with the IEEE Local Computer Networks Conference (LCN 2009).
- Technical Program Committee member, The First International Conference on Emerging Network Intelligence (EMERGING 2009).
- Program Co-Chair, The IEEE International Workshop on Mission Critical Networks (MCN 2008), co-located with Infocom 2008.
- Program Co-Chair, The First IEEE International Workshop on Power-Aware Pervasive Devices (PerDev2008), co-located with Percom 2008.
- Technical Program Committee member, the 28th IEEE International Conference on Computer Communications INFOCOM 2008 (INFOCOM'08).
- Technical Program Committee member, IEEE ICC 2008 - Wireless Networking Symposium (ICC'08-WN).

- Technical Program Committee member, IEEE Globecom 2008 - Ad Hoc Sensor and Mesh Networking Symposium (Globecom'08-AHSN).
- Technical Program Committee member, IFIP/TC6 Networking 2008 Conference.
- Technical Program Committee member, The IEEE Local Computer Networks Conference (LCN 2008).
- Technical Program Committee member, The 17th IEEE International Conference on Computer Communications and Networks (IC3N08).
- Technical Program Committee member, The 1st IEEE International Workshop on Sensor Networks (SN 2008), In Conjunction with IC3N.
- Technical Program Committee member, The 6th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA-08 Networking and Multimedia Track).
- Technical Program Committee member, The 1st ACS/IEEE International Workshop on Wireless Internet Services (WISE 2008).
- Technical Program Committee member, The Third International Conference on Digital Telecommunications (ICDT 2008).
- Technical Program Committee member, First International Conference on MOBILE Wireless MiddleWARE, Operating Systems, and Applications (MobilWare 08).
- Session Chair, Infocom 2008.
- Student demo judge, The Thirteenth Annual International Conference on *Mobile Computing and Networking* (MobiCom 07).
- Technical Program Committee member, MM-CSC 2008 (Mosharaka Multi-Conference on Communications, Signals and Coding).
- Program Co-Chair, The IEEE First International Workshop on Research Challenges in Next Generation Networks for First Responders and Critical Infrastructures (NetCri 2007).
- Technical Program Committee member, IEEE Globecom 2007 - Ad Hoc and Sensor Networks Symposium (Globecom'07-ASNS).
- Technical Program Committee member, IEEE ICC 2007 - Wireless Adhoc and Sensor Networks Symposium (ICC'07-WAS).
- Technical Program Committee member, The IEEE Local Computer Networks conference (LCN 2007).
- Technical Program Committee member, The Seventh IEEE International Workshop on Wireless Local Networks (WLN 2007).
- Technical Program Committee member, the Second IEEE Workshop on Practical Issues in Building Sensor Network Applications (SenseApp 2007).
- Technical Program Committee member, The 2007 IEEE International Conference on Information Reuse and Integration (IEEE-IRI'07).
- Technical Program Committee member, The 3rd International Conference on Embedded Software and Systems (ICCESS 2007).
- Technical Program Committee member, The 16th IEEE International Conference on Computer Communications and Networks (IC3N07).
- Technical Program Committee member, IFIP/TC6 Networking 2007 Conference.
- Technical Program Committee member, IEEE IPCCC 2007.
- Technical Program Committee member, IEEE ICDCS 2007 - Network Protocols Track.
- Technical Program Committee member, IEEE Globecom 2006 - Wireless Ad Hoc and Sensor Networks - towards Anytime Anywhere Internetworking (Globecom'06-WASNet).

- Technical Program Committee member, The 15th IEEE International Conference on Computer Communications and Networks (IC3N06).
- Technical Program Committee member, IEEE International Conference on Wireless Networks, Communications, and Mobile Computing (WirelessCom 2006), Symposium on Mobile Computing 2006.
- Technical Program Committee member, the First IEEE Workshop on Practical Issues in Building Sensor Network Applications (SenseApp 2006).
- Technical Program Committee member, International Conference on Digital Telecommunications (ICDT'06), August 30-31, 2006, Côte d'Azur, France.
- Technical Program Committee member, IEEE Advanced Information Networking and Applications (AINA2006), Mobile Networks and Applications track.
- Publicity Co-Chair, Second IEEE Workshop on Dependability and Security in Sensor Networks and Systems (DSSNS'2006).
- Technical Program Committee member for Networks and Communication Systems (NCS 2006).
- Session Chair, The Second Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (MobiQuitous 2005) July 17-21, 2005, San Diego, California.
- Technical Program Committee member, IEEE International Conference on Computer Communications and Networks (IC3N) 2005.
- Technical Program Committee member, IEEE International Conference on Wireless Networks, Communications, and Mobile Computing (WirelessCom 2005), Symposium on Mobile Computing 2005.
- Technical Program Committee member, IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC) 2005.
- Technical Program Committee member, The Ninth IASTED International Conference on Internet, Multimedia Systems and Applications (IMSA 2005).
- Publicity Chair, Wireless Networks, Communications and Mobile Computing Conference, Symposium on Mobile Computing (WirelessCom) 2005.
- Technical Program Committee member, Workshop on Internet Compatible QoS in Ad hoc Wireless Networks (IC-QAWN) 2005.
- Reviewer, IEEE Transactions on Mobile Computing, IEEE Transactions on Wireless Communications, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Vehicular Technology, ACM Transactions on Embedded Computing Systems, Journal on Selected Areas of Communication, ACM Mobile Computing and Communications Review, Elsevier Journal of Computer Networks, IEEE Pervasive Computing, Elsevier Journal of Ad Hoc Networks, IEEE Wireless Communications Magazine, IEEE Communications Letters, Elsevier Computer Communications, Mobile Networks and Applications journal, EURASIP Journal on Wireless Communications and Networking, Journal of Computing, International Journal of Security and Networks, Journal of Computer and System Sciences, IEEE ICNP, ACM/Usenix MobiSys, IEEE PerCom, IEEE Globecom, IEEE VTC, ACM WiSe, IEEE ICC, IEEE WCNC, IEEE RIDE, ACM/IEEE MSWiM 2005, SensorFusion Workshop, IEEE PIMRC, IEEE IWCMC, IEEE IPSN, IASTED International Conference on Communication Systems.
- Member: IEEE, IEEE Computer Society, IEEE Communication Society, ACM SigMobile, International Society on Modelling and Simulation, The International Association of Science and Technology for Development (IASTED) Technical Committee, and Egyptians Syndicate Professional Engineers society.
- Elected member, Phi Kappa Phi.

- Life member: General Egyptian Society For Talented.

CITIZENSHIP

Egyptian.