Mostafa Uddin

Objective

Applying for the Research Ability Examination waiver.

Biography

I am a third year PhD student in the computer science department at Old Dominion University. I passed my breadth exam in November 2012. Currently I am a graduate research assistant in the SwimSys Lab under Dr. Tamer Nadeem. I also have worked as Research Associate Intern in HP Lab, Palo Alto CA for summer 2013. I did my BSc from CSE department of Bangladesh University of Engineeing & Technology (BUET). I also worked as a Software Engineer for 4 years at KAZ Software and SDSL in Bangladesh.

Research Achievements

I have already published my work in several well known international conferences and workshops, such as in MCS 2014, SECON 2014, BHI 2014, BIBM 2013, PerCom 2013, HotMobile 2013, HomeSys 2012, IWCMC 2012. Besides, I have presented my work in the demo/poster session of several conferences like MobiCom 2013, INFOCOM 2012, HotMobile 2012. My recent work, "A2PSM: Audio Assisted Wi-Fi Power Saving Mechanism for Smart Devices" at HotMobile'13 has received media attention from an UK based computer topic magazine. In my graduate studies, I have been awarded the Outstanding Research Assistant (Fall 2012) in Computer Science Department, Old Dominion University. I have received NSF student travel grant award to present my work in MobiCom'2013 and PerCom 2013 conference. In addition, I was selected for the final round of Student Research Competition(SRC) Presentation at MobiCom 2013. Also I have filled a patent titled "Wireless Software Defined Network".

Research Experience

My research focus is in Mobile Computing and Wireless Network. Following are the list of my research projects.

Audio-WiFi: In this project we integrate the mic/speaker of the smart phones as a parallel communication channel with the Wi-Fi. Our idea is to design and develop a novel framework of communication using mic/speaker in order to improve the efficiency of the Wi-Fi network communication for smart devices.

Mobile Extension of SDN(meSDN): Now-a-days large number of mobile devices use numerous apps that access internet through wireless. With such significant amount of traffic growth and variability, it is now necessary to have greater visibility and control over the traffic generated from the client devices, such that we can ensure performance guarantees to multiple types of users on a shared network infrastructure. Therefore, in this project we extend the SDN framework to the client devices to realize services such as WLAN virtualization with end-to-end QoS, and we propose a framework called meSDN. **This is a collaboration project with HP Labs, Palo Alto, CA.**

AppVision: The need for application-aware networking ever increases with the trend of mobile app explosion, cloud-based hosting and software-defined enterprise IT. Machine Learning (ML)-based traffic classification has been widely studied but its real world adoption has been limited to mostly as an auxiliary solution to Deep-Packet Inspection (DPI), mainly due to the lack of scalable and fine-grained ground truth data needed for ML training. This project is an effort to give another light to ML as a viable solution by 1) proposing device-crowd-sourcing for ground truth collection, 2) addressing the limitation of supervised ML techniques false classification of a flow from a new/unseen application into one of known classes and 3) significantly improving flowtype classification accuracy via a rich feature set that jointly captures time-frequency information. **This is a collaboration project with HP Labs, Palo Alto, CA.**

EnergySniffer: In this project, we develop and evaluate the feasibility of using smart phones in monitoring the energy consumption of the home appliances and machines. We call our system EnergySniffer in which it exploits various sensors, such as magnetic sensor, light, microphone, temperature, camera, WiFi, in smart phones to build a multi sensing framework. This framework is used to build a unique fingerprint profile for each individual machine and home appliance.

SpyLoc: In this project, we design, implement and evaluate the SpyLoc localization system. The design goal of SpyLoc is to develop a light weight and high accuracy localization system for off-the-shelf smartphones. SpyLoc leverages both the acoustic interface (microphone/speaker) and the Wi-Fi interface at the kernel-level of smartphones as well as the inertial sensors in smartphones to achieve high localization accuracy. We implement and evaluated the complete SpyLoc using commercial off-the-shelf smartphones.

SmartSpaghetti: An important tool of the Lean management is the "Spaghetti Diagram", which helps to establish the optimum layout for an emergency department or ward at hospital based on observations of the distances traveled by patients, staff and/or products (e.g., x-ray machines). In this project we use accelerometer, gyroscope, and compass sensors to develop an automated tool to create spaghetti diagrams of movements of personnel in a non-intrusive way. **This is a collaboration project with CHKD Hospital, Norfolk, VA.**

Papers:

- Harmony: Content Resolution using Acoustic Channel(In preparation for INFOCOM 2015)
  Mostafa Uddin, Ahmed Salem, and Tamer Nadeem
- AppVision: Fine-grained, real-time classification of mobile applications and media flows(In review)
  Mostafa Uddin, Gowtham Bellala, Jeongkeun Lee, and Tamer Nadeem
  ACM IMC 2014
- meSDN: mobile extension of SDN [To appear]
  Jeongkeun Lee, Mostafa Uddin, JeanTourrilhes, Souvik Sen, Sujata Banerjee, Manfred Arndt, Kyu-Han Kim, Tamer Nadeem
  ACM MCS 2014.
- SpyLoc: A Light Weight Localization System for Smartphones.(acceptance rate 19.8% = 68/342)[To appear]
  Mostafa Uddin and Tamer Nadeem
  IEEE SECON 2014.
- SmartSpaghetti: Accurate and Robust Tracking of Human's Location [To appear]
  Mostafa Uddin, Ajay Gupta, Kurt Maly, Tamer Nadeem, Sandip Godambe, Arno Zaritsky
  IEEE-EMBS International Conferences on Biomedical and Health Informatics, 2014
- SmartSpaghetti: Use of Smart Devices to Solve Health Care Problems (Full Paper acceptance rate=18%)
  Mostafa Uddin, Ajay Gupta, Kurt Maly, Tamer Nadeem, Sandip Godambe, and Arno Zaritsky
  International Workshop on Biomedical and Health Informatics, BIBM 2013
- RF-Beep: A light ranging scheme for smart devices (acceptance rate 11.2% = 19/170(full paper))
  Mostafa Uddin and Tamer Nadeem
  IEEE PerCom 2013.

- A2PSM: Audio Assisted Wi-Fi Power Saving Mechanism for Smart Devices(acceptance rate 31.5%)
  Mostafa Uddin and Tamer Nadeem
  ACM HotMobile 2013.
- MagnoTricorder: What You Need To Do Before Leaving Home
  Mostafa Uddin and Tamer Nadeem
  ACM HomeSys, UbiComp 2012
- EnergySniffer: Home Energy Monitoring System using Smart Phones [Slide]
  Mostafa Uddin and Tamer Nadeem
  IEEE IWCMC, 2012.

Articles:

- Report of HotMobile 2012
  Igor Pernek, Mostafa Uddin and Jack Fernando Bravo Torres
  IEEE Pervasive Computing.
- HotMobile 2012 Poster: MachineSense: Detecting and Monitoring Active Machines using Smart Phone
  Mostafa Uddin and Tamer Nadeem
  ACM SIGMOBILE MC2R.
- HotMobile 2012 Poster: Audio-WiFi: Audio Channel Assisted WiFi Network for Smart Phones
  Mostafa Uddin and Tamer Nadeem
  ACM SIGMOBILE MC2R.

Demos/Posters:

- Poster: Extending SDN for mobile device
  Jeongkeun Lee, Mostafa Uddin, Jean Tourrilhes, Souvik Sen, Sujata Banerjee, Manfred Arndt and Tamer Nadeem
  ACM HotMobile 2014
- SpyLoc: a Light Weight Localization System for Smartphones [Poster][SRC Presentation]
  Mostafa Uddin and Tamer Nadeem
  In Proceedings of MobiCom'13
- Audio-WiFi: Audio Channel Assisted WiFi Network for Smart Phones[Demo]
  Mostafa Uddin and Tamer Nadeem
  IEEE INFOCOM, 2012 .
- EnergySniffer: Home Energy Monitoring System using Smart Phones[Poster]
  Mostafa Uddin and Tamer Nadeem
  IEEE INFOCOM, 2012 .
- MachineSense: Detecting and Monitoring Active Machines using Smart Phones[Poster]
  Mostafa Uddin and Tamer Nadeem
  ACM HotMobile, 2012 .

Patents and Invention Disclosures

Jung Gun Lee, Mostafa Abdulla Zahid Uddin, Jean Tourrilhes, Souvik Sen, Manfred R Arndt. "Wireless Software-Defined Networking", Patent Application Filed on Oct 2013.

News/Media

Researchers develop sound way to improve smartphone battery life(V3 online Magazine)

Awards	ACM SIGMOBILE Travel grant for attending HotMobile 2014. Microsoft Research "ACM SRC" Grant Recipient for MobiCom 2013, Miami, FL. NSF Student Travel Grant Recipient for MobiCom 2013, Miami, FL. NSF Travel grant for attending IEEE PerCom 2013. ACM SIGMOBILE Travel grant for attending HotMobile 2013. Outstanding RA (fall 2012) - Computer Science Department. Travel grant for attending HoMobile 2012, INFOCOM 2012, and Ubicomp2012(from CS Department of ODU). Dominion Graduate Scholar offered by College of Sciences ODU. Dean's List Scholarship during undergraduate studies at BUET. Placed in top 1% in Higher Secondary Exam (A-level) in Bangladesh. Placed in top 1% in Secondary School Exam (O-level) in Bangladesh.
Professional Services	Student Volunteer in MobiCom'2013, HotMobile'2013, HotMobile'2014 Reviewer through Advisor: IEEE ICC 2014, IEEE PerCom'2014, IEEE Globecom' 2013, IEEE IWCMC'2013.
Membership & Activities	ACM SIGMOBILE Student Member ACM Student Member Member of Software Design Group (http://sdgbuet.tripod.com), Bangladesh University of Engineering & Technology(Feb 2003- Nov 2006).