Mostafa Uddin

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Objective Pursue a successful research career in different areas of Network System.

Research Interest My research interest spans in various areas of **Mobile Computing**, **Wireless Network**, **Data Center Network**, **Software Defined Network**, and **Network Security**. I am specially interested in developing algorithms and building real-world systems that involves with Smart devices, Wireless communication, Sensing technology, Signal processing, Software Defined Networking and Applied Machine learning techniques. In developing such systems and applications, I address research challenges in the direction of energy efficiency, bandwidth improvement, ensuring E2E QoS, user's mobility, network security etc.

Education

Old Dominion University, Norfolk, VA, USA
PhD in Computer Science (2011 - 2016)
Advisor: Dr. Tamer Nadeem (nadeem@cs.odu.edu)
Dissertation Topic: Toward Open and Programmable Wireless Network Edge [Defended on May 10]
Dissertation Committee: Dr. Kurt Maly (CS, ODU), Dr. Michele Weigle (CS, ODU), Dr. ChunSheng Xinand (ECE, ODU), Prof. Mahadev Satyanarayanan (CMU)
CGPA 3.98/4.0

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
B.S. in Computer Science and Engineering, 2006
CGPA 3.72/4.0

Industrial Experiences

Network System Researcher, Bell Labs, Holmdel, NJ **June, 2016 - Present**

Bell Lab Researcher - intern, Bell Labs, Murray Hill, NJ **June, 2015 - August, 2015**
Advisor: **Randeem Bhatia**

- Evaluating different techniques of network flow sampling in Open vSwitch(e.g. sFlow, NetFlow, mirroring) based on CPU utilization and bandwidth reductions.
- Developing adaptive and efficient flow sampling actions in the OVS Datapath.
- Developing algorithm for detecting any network anomalies or attacks using the sampled network flow statistics.

Research Associate Intern, HP Labs, Palo Alto, CA **July,2014 - August,2014**
Mentor: **Kyu-Han KIM**, Senior Researcher and Research Manager

- Leveraging both the cellular (i.e. LTE) and the WiFi interface of the smartphone for improving the performance of the peer-to-peer real-time interactive applications such as Skype video chat, Google Hangout, Viber voice call etc.
- Hack the network stack of the Nexus 7 tablet (LTE) to implement the Multi-Path UDP(MPUDP) in the transportation layer of the android kernel.
- Experimental evaluation of our system using 2 Nexus 7 tablet (android device) using AT&T vendors

Research Associate Intern, HP Labs, Palo Alto, CA **May,2013 - August,2013**
Mentor: **Jeongkeun Lee**, Senior Research Scientist

- Extending the SDN framework to the wireless end devices.
- WLAN virtualization with performance guarantee.
- Implementing customized Qdisc for Linux Network stack.
- Implementing required interaction between WiFi driver and Linux Qdisc.
- Deploying open vSwitch in Android platform using cross-platform compiling.

Software Engineer, KAZ (www.kaz.com.bd), Dhaka, Bangladesh **Feb '08-Dec '09**

- Research and Development in ITE Enterprise project, an international tax management tool.
- Developing an installer and auto updating mechanism using InstallShield 2008 for the ITE Enterprise product.
- Programming in C#, WCF and WPF.

Software Engineer, SDSL(www.sdslbd.com), Dhaka, Bangladesh **Nov '06-Feb '08**

- GPS based Real-Time Navigation system for Mobile devices using Symbian C++/S60.
- Instant Mobile Messenger Application for Mobile devices in Symbian OS.
- Developing Mobile Map(http://maps.afrigis.co.za/mobi/splash.html), a J2ME mobile application.
- Developing GRID(http://www.thegrid.co.za/about), a J2ME mobile application.

Software Engineer Intern Vertex Limited, Dhaka, Bangladesh **Dec '05 - May '06**

- Developing software for the RTA-600 Time attendance device. (Java)

Academic Experiences

Research Assistant, Computer Science, ODU, Norfolk, VA **Fall 2011-present**
Advisor: **Dr. Tamer Nadeem**, Assistant Professor

- **TrafficVision:** In this project, we design and develop modules that extend the SDN's layer architecture to have fine-grained and real-time traffic-awareness at the network edge. We extend the SDN's data layer and Southbound-API to extract new traffic flow feature, that allow us to develop tool (e.g. *TrafficVision*) in the control layer to have scalable,economic and flexible solutions of classifying the network traffic flows based on novel Machine-Learning (ML) technique. This is a collaboration research project with HP Labs, Palo Alto, CA.
- **CHKD**: In this project, we use accelerometer, gyroscope, and compass sensors of the smartphone to build an automatic tool to create spaghetti diagrams of movements of personnel in a non-intrusive way.
- **meSDN**: In this project, we extend the SDN framework to the client devices to provide services such as WLAN virtualization with end-to-end QoS. This is a collaboration research project with HP Labs, Palo Alto, CA.
- **Audio-WiFi**: In this project, we build a novel framework that integrate the Audio interface (mic,speaker, and sound driver) with the Wi-Fi Interface to develop a more efficient Wi-Fi network communication for smart devices.
- **MagnoTricorder**: In this project, we leverage the effect of Electro Magnetic Interference (EMI) generated by the AC current in the main power-line at home to identifying and detecting the running devices. In this project we use magnetic field sensor of the smartphone, signal processing, and machine learning technique to build the system.
- **EnergySniffer**: In this project we use the acoustic sensors of the smartphone to identify the running machines at home. We use signal processing and machine learning technique to build such system.
- **ParkZoom**: This is an infrastructure aided smartphone sensing based parking localization system. This is a collaboration project with Siemens Corporate Research to develop smart parking system.

Teaching Assistant, Computer Science, ODU, Norfolk, VA **Fall 2011-present**

- CS300 - Computer in Society, Fall 2011.
- CS250 - Programming and Problem Solving II, Spring 2012.
- CS495/595 - App Development for Smart Devices, Fall 2012.
- CS495/595 - App Development for Smart Devices, Fall 2013.

Computer Skills

Programming Skill:	C/C++, Java, Python, C#, SQL, JavaScript/CSS/D3, nesC
Technical Skill	Android Programming, Linux Kernel Programming, Open vSwitch (user-space and kernel space) Linux Network Stack (IP, Qdisc, Bridge, Core, mac80211 etc.) hacking, Wireless Driver Hacking(Qualcomm, Broadcom, TI etc.) Audio Driver Hacking (ALSA), Signal Processing, Machine learning, Smartphone Power Monitoring(Monsoon), USRP and GNU Radio, MATLAB, Octave, Weka-Data mining tool, TinyOS- TelosB Sensor.

Papers:

- SafeEnd: An Application-Aware Programmable Network Security Solution for Mobile Devices (In preparation)
  Mostafa Uddin, and Tamer Nadeem
- SmartEdge: Toward Making Wireless Network Edges Traffic-Aware (in preparation)
  Mostafa Uddin, Ibrahim Ben Mustafa, and Tamer Nadeem
- TrafficVision: A Case Scenario of Pushing SDN to Wireless Edges (in review)
  Mostafa Uddin, Gowtham Bellala, Jeongkeun Lee, and Tamer Nadeem
- Understanding the Intermittent Traffic Pattern of HTTP Video Streaming over Wireless Networks
  Ibrahim Ben Mustafa, Mostafa Uddin, and Tamer Nadeem
  WINMEE 2016
- Wearable Sensing Framework for Human Activity Monitoring
  Mostafa Uddin, Ahmed Salem, Ilho Nam, and Tamer Nadeem
  ACM WearSys'15
- Harmony: Content Resolution using Acoustic Channel (acceptance rate 19% = 316/1640) [To appear]
  Mostafa Uddin, and Tamer Nadeem
  IEEE INFOCOM 2015
- meSDN: mobile extension of SDN
  Jeongkeun Lee, Mostafa Uddin, JeanTourrilhes, Souvik Sen, Sujata Banerjee, Manfred Arndt, Kyu-Han Kim, Tamer Nadeem
  ACM MCS 2014 (with MobiSys 2014).
- SpyLoc: A Light Weight Localization System for Smartphones.(acceptance rate 19.8% = 68/342)
  Mostafa Uddin and Tamer Nadeem
  IEEE SECON 2014.
- SmartSpaghetti: Accurate and Robust Tracking of Human's Location
  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", Publication number WO2015065422 A1, Publication date May 7, 2015.

Mostafa Uddin, Tamer Nadeem. "SMILE – Towards Smarter Network Edges for Next

Generation Networks", Filling Date Oct, 2015.

DBLP & Google Scholar	DBLP Profile Google Scholar Profile
News/Media	Researchers develop sound way to improve smartphone battery life(V3 online Magazine)
Awards	ACM SIGMOBILE Travel grant for attending HotMobile 2015. 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, DriveSense'2014 Invited Reviewer IEEE Internet of Things Journal (IoT), ACM/IEEE Transactions on Networking (ToN) Reviewer through Advisor: IEEE INFOCOM 2016, IEEE LCN 2015, ACM HotMobile 2015, IEEE SECON 2015, IEEE ICC 2014, IEEE PerCom'2014, IEEE Globecom' 2013, IEEE IWCMC'2013.
Membership & Activities	ACM SIGMOBILE Student Member ACM Student Member ODU Bangladeshi Student Association, President