

Arani Bhattacharya

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June 2, 2017

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Research Interests

I am interested in designing algorithms, protocols and systems to improve the performance of wireless networks, mobile applications and the Internet of Things (IoT).

Education

- **Stony Brook University** Incheon, Korea & Stony Brook, NY, USA
Ph.D. Computer Science 2013 - 2016 (SUNY Korea) & 2016 onwards (Main Campus)
 - Research Topic: Quality of Experience in Mobile Systems
 - Advisors: Samir R. Das & Pradipta De
 - Awarded research fellowship by Republic of Korea for three years
 - Awarded teaching assistantship in main campus for one year
- **Indian Statistical Institute** Kolkata, India
M. Tech Computer Science 2011 - 2013
 - Thesis: Power-Aware Decoding of H.264 Videos on Multicore Systems
 - Advisors: Ansuman Banerjee, Susmita Sur-Kolay
 - Graduated with First Class with Distinction
- **West Bengal University of Technology** Kolkata, India
B. Tech Computer Science 2007 - 2011

Professional Experience

- **WINGS Lab, Stony Brook University** New York, USA
Doctoral Advisor: Samir R. Das 2016 onwards
 - **Detection of Spectrum Violations:** With spectrum becoming a scarce commodity, it has become important to ensure that it is not used without a proper license. Thus, regulatory authorities need to protect the licensed spectrum from potential violations. One way of detecting such violation is crowdsourcing the task of sensing across heterogeneous sensors available with users. I am designing techniques to draw conclusions about the presence and location of spectrum violators by adding up the data coming from multiple heterogeneous sensors.
 - **Measurement of Fairness in Cloud Gaming:** Cloud gaming has become popular recently due to their convenience and scalability. However, one key aspect that affects their user experience is the network latency. I am working on characterizing how higher latency in cloud games can increase the difficulty of a player to win a game.
 - **End-user Measurement of Video Quality:** Media sticks are becoming increasingly popular to view videos on televisions. However, there is no known way of measuring the quality of experience provided by different media sticks. I worked on understanding the differences in adaptation techniques and response to different network conditions by different media sticks.
- **Mobile Systems Lab, SUNY Korea** Incheon, Korea
Doctoral Advisor: Pradipta De 2013-2016
Computation offloading is a way of utilizing cloud resources to execute parts of mobile applications. I worked on improving adaptation of offloading to different aspects of the environment:
 - **Offloading in Lossy Networks:** In lossy networks, the performance of offloading can vary widely. I designed an algorithm that provides theoretical guarantees on offloading performance in the presence of channel loss.

- **Offloading of Large Applications:** The algorithm that partitions an application between the mobile device and the cloud server needs to be scalable, while minimizing execution time and energy. I proposed and evaluated a polynomial-time dynamic programming based algorithm that could also provide the lowest possible execution time.

- **Department of Computer Science, Stony Brook University** New York, USA
Teaching Assistant 2016-2017
Worked as Teaching Assistant for the courses Graduate Operating Systems and Scripting Languages. The work involved grading answer scripts, and provide remedial lessons to students.
- **Formal Verification Lab, Indian Statistical Institute** Kolkata, India
Masters Advisor: Ansuman Banerjee & Susmita Sur-Kolay 2011-2013
Video decoding forms an important workload of mobile devices, which have limited capacity of battery. I looked at improving the energy efficiency of video decoder while limiting the degradation in its quality.
- **Texas Instruments** Bangalore, India
Collaborators: Bhaskar J. Karmakar, Prasenjit Basu Summer 2012
Although multi-core processors are widely available, few video decoders actually utilize more than a single core to decode video. We proposed an algorithm that improves scalability and leads to much faster decoding of videos.

Publications (available at www.cs.stonybrook.edu/~arbhattachar/publications.html)

1. **Arani Bhattacharya**, Ansuman Banerjee, Pradipta De, *Scheduling with Task Duplication for Application Offloading*, IEEE Consumer Communications & Networking Conference (CCNC) 2017, Las Vegas, USA
2. **Arani Bhattacharya**, Ansuman Banerjee, Pradipta De, *Service Level Guarantee for Mobile Application Offloading in Presence of Wireless Channel Errors*, IEEE Global Telecommunications Conference (Globecom) 2016, Washington DC, USA
3. **Arani Bhattacharya**, Pradipta De, *A Survey of Adaptive Techniques in Computation Offloading*, Elsevier Journal of Network and Computer Applications, Volume 78, 15 January 2017, Pages 97-115
4. **Arani Bhattacharya**, Pradipta De, *Computation Offloading from Mobile Devices: Can Edge Devices Perform Better Than the Cloud?*, ARMS-CC, Held in Conjunction with PODC 2016, Chicago, USA
5. **Arani Bhattacharya**, Ansuman Banerjee, Pradipta De, *Parametric Analysis of Mobile Cloud Computing Frameworks using Simulation Modeling*, ARMS-CC, Held in Conjunction with PODC 2015, Donostia-San Sebastian, Spain

Skills

- **Programming Languages:** C (Kernel/systems), C++, Java/Android, Python, Bash shell
- **Libraries/Software Packages:** Matlab, fftw, numpy, scipy, JavaFX, openMP
- **Software Tools:** PhantomNet, SAT Solver (miniSAT, picoSAT, zchaff), CPLEX, graphviz, git

Awards

- Research Fellowship, Government of Republic of Korea (2013-2016)
- Full scholarship, Indian Statistical Institute (2011-2013)
- Conference travel grant for IEEE/ACM ISCA 2016, ACM CoNEXT 2016
- University travel grant for IEEE AINA 2015, ACM Sensys 2015, IEEE Globecom 2016, IEEE CCNC 2017