Tarun Mangla

Contact Information

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Research Interests

Network Measurements, Broadband Equity, Video Streaming

Current Position

Postdoctoral Scholar, Department of Computer Science/ Data Science Institute, UChicago
Mentor: Nick Feamster — September 1, 2020 - *Present*

Education

College of Computing, Georgia Institute of Technology, USA,
MS and Ph.D., School of Computer Science — August, 2014 - July, 2020

- *Advisors*: Mostafa Ammar and Ellen W. Zegura
- *Thesis*: Video QoE Estimation using Network Measurement Data

Indian Institute of Technology, Delhi, India
B.Tech. in Computer Science and Engineering — July, 2010 - May, 2014

Current Research Projects

Mapping and Mitigating Broadband Access in the US

- Understanding the accuracy of existing Broadband access datasets
- Developing methods to measure broadband infrastructure, availability, and performance
- Feasibility study of using 60GHz wireless for broadband access

QoE measurement and enhancement in video streaming and conferencing

- Developing techniques to infer video QoE using passive network measurements
- Systems development for large-scale network monitoring and QoE inference

Conference Publications (*in chronological order*)

Benchmarks or Equity? A New Approach to Measuring Internet Performance
Ranya Sharma, Tarun Mangla, James Saxon, Marc Richardson, Nick Feamster, Nicole P Marwell. TPRC, September 2022

Best Practices for Collecting Speed Test Data
Kyle MacMillan, Tarun Mangla, Marc Richardson, Nick Feamster TPRC, September 2022

Internet Inequity in Chicago: Adoption, Affordability, and Availability
Tarun Mangla, Udit Paul, Arpit Gupta, Nicole P Marwell, Nick Feamster. TPRC, September 2022

A Tale of Three Datasets: Characterizing Mobile Broadband Access in the US
Tarun Mangla, Esther Showalter, Vivek Adarsh, Kipp Jones, Morgan Vigil-Hayes, Elizabeth Belding, Ellen Zegura. Communications of the ACM, March 2022

Measuring the performance and network utilization of popular video conferencing applications
Kyle MacMillan, Tarun Mangla, James Saxon, Nick Feamster. ACM IMC, 2021

Coverage is Not Binary: Quantifying Mobile Broadband Quality in Urban, Rural, and Tribal Contexts
Vivek Adarsh, Michael Nekrasov, Udit Paul, Tarun Mangla, Arpit Gupta, Morgan Vigil-Hayes, Ellen Zegura, Elizabeth Belding. IEEE ICCCN, 2021

Drop The Packets: Using Coarse-grained Data to detect Video Performance Issues
Tarun Mangla, Emir Halepovic, Ellen Zegura, Mostafa Ammar. ACM CoNEXT, 2020

eMIMIC: Estimating HTTP-based Video QoE Metrics from Encrypted Network Traffic
Tarun Mangla, Emir Halepovic, Ellen Zegura, Mostafa Ammar. IFIP Traffic Measurement and Analysis (TMA), 2018 ***(Best paper)***

VideoNOC: Assessing Video QoE for Network Operators using Passive Measurements
Tarun Mangla, Emir Halepovic, Rittwik Jana, Kyung-Wook Hwang, Marco Platania, Ellen Zegura, Mostafa Ammar. ACM Multimedia Systems (MMSys), 2018

TANGO: Toward a More Reliable Mobile Streaming through Cooperation between Cellular Network and Mobile Devices
Nawanol Theera-Ampornpunt, Tarun Mangla, Saurabh Bagchi, Rajesh Panta, Kaustubh Joshi, Mostafa Ammar, Ellen Zegura. IEEE Symposium on Reliable Distributed Systems (SRDS), 2016

Optimal radius for connectivity in duty-cycled wireless sensor networks Amitabha Bagchi, Cristina M. Pinotti, Sainyam Galhotra, Tarun Mangla. ACM Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWIM) 2013.

Journal Publications

Using Session Modeling to Estimate HTTP-Based Video QoE Metrics From Encrypted Network Traffic
Tarun Mangla, Emir Halepovic, Ellen Zegura, Mostafa Ammar. IEEE Transactions on Network Service and Management, (TNSM) June 2019 ***(Invited paper)***

Optimal radius for connectivity in duty-cycled wireless sensor networks
Amitabha Bagchi, Cristina M. Pinotti, Sainyam Galhotra, Tarun Mangla. ACM Transactions on Sensor Networks (ToSN) 2015.

Workshop Publications

MIMIC: Using passive network measurements to estimate HTTP-based adaptive video QoE metrics
Tarun Mangla, Emir Halepovic, Mostafa Ammar, Ellen Zegura. IEEE/IFIP Workshop on Mobile Network Measurement (MNM) 2017

Video Through a Crystal Ball: Effect of Bandwidth Prediction Quality on Adaptive Streaming in Mobile Environments
Tarun Mangla, Nawanol Theera-Ampornpunt, Mostafa Ammar, Ellen Zegura, Saurabh Bagchi. ACM Workshop on Mobile Video Delivery (MoVid) 2016.

Patents

Method and apparatus for estimating quality of experience from network data Inventors
Inventors: Emir Halepovic, Tarun Mangla, Mostafa H Ammar, Ellen Witte Zegura. US17079907

Estimating video quality of experience metrics from encrypted network traffic Inventors
Inventors: Emir Halepovic, Tarun Mangla, Mostafa H Ammar, Ellen Witte Zegura. US10757220

Professional Experience

AT&T Research Labs, NJ, USA Sep 2016 - Dec 2016, May 2018 - Aug 2018
Research Intern hosted by *Emir Halepovic*
Video QoE inference in cellular networks using passive network measurements.

Microsoft Research India, Bangalore, India
Research Intern hosted by *Venkat Padmanabhan* May 2016 - August 2016
Using Multipath for improving the QoE in VoIP applications.

Yahoo Inc., Sunnyvale, CA, USA May 2015 - August 2015
Software Engineering Intern hosted by *Ahmed Mansy & Partha Kanuparthy*
Worked on a performance-based traffic engineering system for video workloads.

Microsoft India (R&D) Private Limited, Hyderabad, India May 2013 - July 2013
Software Engineering Intern
Developed a prototype to infer social reference in a search query utilizing user's social graph.

Cavium Networks, Hyderabad, India May 2012 - July 2012
Software Engineering Intern
Worked on removing bottlenecks and reducing runtime of compiler for Neuron Search Processor launched in Oct 2012.

Professional Service and Teaching Experience

Reviewer: MMSys 2022 (Datasets and Software Track), CoNEXT 2021, MMSys 2021 (Datasets and Software Track), ACM S3 2019 (Mobicom workshop), ACM IMC 2018 (Shadow PC), IFIP TMA 2018 (Shadow PC)

Teaching Assistant
Advanced Computer Networks, CS6250 OMSCS, Georgia Tech Summer 2019
- Part of the course content designing team for a revised version of the course
- Designed and scripted lecture modules on transport and application-layer

Guest Lecture on Inter-domain routing for undergraduate Computer Networking Spring 2019

Teaching Assistant
Advanced Computer Networks, CS6250, Georgia Tech Spring 2016, Fall 2017, Fall 2018
- Guest Lecture on Bitrate Adaptation Algorithms in Video Streaming (Fall 2017)

Teaching Assistant
Introduction to Probability and Stochastic Processes, MAL250, IIT Delhi Spring 2014
- Prepared and conducted tutorial to discuss course concepts and homework
- Graded exams and quizzes

Technical Skills

C++, Python, Java, Matlab, JavaScript, Hadoop, Hive, SQL

Scholastic Achievements

- Best paper award, IFIP TMA 2018
- Recipient of Student Travel Grant for IFIP TMA PhD School in 2018
- Recipient of Student Travel Grant for IEEE ICNP in 2015
- All India Rank 79 in IIT-JEE 2010 among over 500,000 students
- All India Rank 16 in AIEEE 2010 among over 1,000,000 students
- Merit certificate in 3/5 subjects for being among the top 0.1% nationwide (by CBSE in 2010)
- Recipient of the prestigious National Talent Search Examination(NTSE)-2008 scholarship